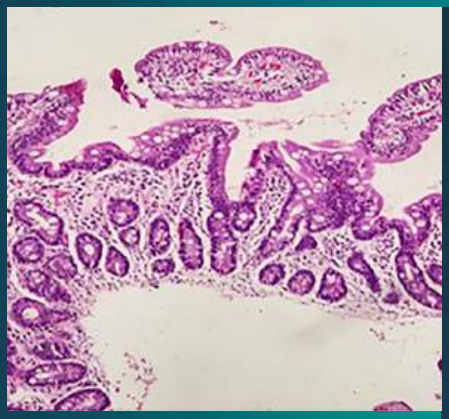
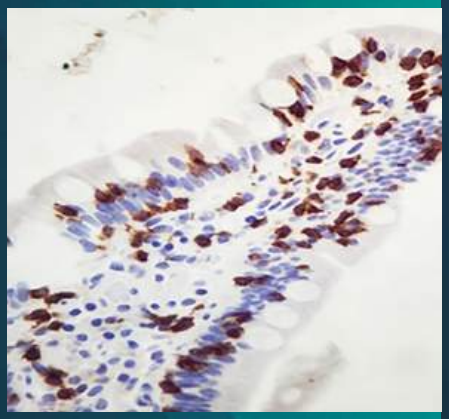
ISSN 0120-9957
ISSN 2500-7440 (Online)
DOI: https://doi.org/10.22516/issn.2500-7440

RCG Revista Colombiana de Gastroenterología

Volume 40 - Number 3
July - September 2025

www.revistagastrocol.com
www.gastrocol.com · www.scielo.org.co





Editorial

Real-Time Artificial Intelligence for Colorectal Polyp Detection: Challenges and Perspectives

Original articles

Real-Time Use of Artificial Intelligence During Colonoscopy for Detection and Characterization of Colorectal Polyps

Comparative Evaluation of the Glasgow-Blatchford, Pre-Endoscopic Rockall, and CANUKA Scores in Predicting Morbidity in Patients with Upper Gastrointestinal Bleeding

Differences in Gastroenterology Procedure Rates in Colombia According to Geographic Location and Health Insurance Regimen

Relationship Between Quality of Life and an Educational Strategy Based on the Information Needs of Patients With Liver Cirrhosis

Detection of FODMAP Intolerances and Symptom Improvement Following Dietary Intervention in Patients from Northwestern Mexico

Review articles

Colonic Endoscopic Tattooing and Its Impact on Colorectal Surgery: More Than Just a Mark

Research and Publication. Part 7. How to Organize and Present Bibliography

Case reports

Intestinal Obstruction Due to Colorectal Cancer in a Pregnant Patient: A Case Report

Collagenous Gastritis: An Unusual Cause of Anemia in Young Patients

Type 1 Refractory Celiac Disease: Report of Two Cases with Different Therapeutic Approaches

Duodenal Adenocarcinoma: A Rare Finding. A Case Report

Incarcerated Littre's Hernia: A Case Report

Diagnosis of Dubin–Johnson Syndrome in an Adult Patient: A Case Report

Modified Endoluminal Vacuum Therapy for the Treatment of Colorectal Fistula: Experience from a Gastroenterology Unit in a High-Complexity Institution

Esophageal Leukoplakia and Its Clinical Significance: Does It Imply Risk?

Anorectal Abscess Due to Foreign Body Ingestion: A Case Report

Cholestatic Acute Hepatitis as an Unusual Manifestation of Syphilis in an Immunocompetent Patient: A Case Report

Distal Esophageal Fibrovascular Polyp: A Case Presentation

ASOCIACION COLOMBIANA DE GASTROENTEROLOGIA
1947

Volume 40 No. 3 | July - September 2025

Contents

RCG Revista Colombiana de Gastroenterología

Editorial

Real-Time Artificial Intelligence for Colorectal Polyp Detection: Challenges and Perspectives 277
David B. Páramo-Hernández.

Original articles

Real-Time Use of Artificial Intelligence During Colonoscopy for Detection and Characterization of Colorectal Polyps 279
Diego Mauricio Aponte-Martín, Juan Sebastián Salas-Robayo, Laura Gaitán, Sandra Judith Huertas-Pacheco, Andrea Carolina Córdoba, Hernán Vergara, María Valentina Aponte-Aparicio, Luis Carlos Sabbagh.

Comparative Evaluation of the Glasgow-Blatchford, Pre-Endoscopic Rockall, and CANUKA Scores in Predicting Morbidity in Patients with Upper Gastrointestinal Bleeding 284
Iván Enrique González-Mendoza, Alberto Rodríguez-Varón, Óscar Muñoz, Heberth Camilo Gómez-Perea.

Differences in Gastroenterology Procedure Rates in Colombia According to Geographic Location and Health Insurance Regimen 292
Juan Pablo García-Marmolejo, Juan Samuel Hernández, Carlos Lombo-Moreno, Nancy Herrera-Leaño, Julián Barahona-Correa, Óscar Muñoz-Velandia, Alberto Rodriguez-Varón.

Relationship Between Quality of Life and an Educational Strategy Based on the Information Needs of Patients With Liver Cirrhosis 300
Ismael Yepes-Barreto, Guillermo Donado-Gamez, Sindy Yohana Poveda-Salinas.

Detection of FODMAP Intolerances and Symptom Improvement Following Dietary Intervention in Patients from Northwestern Mexico 307
Adriana Verónica Bolaños-Villar, Alejandra Chávez-Ríos, Ana María Calderón de la Barca.

Review articles

Colonic Endoscopic Tattooing and Its Impact on Colorectal Surgery: More Than Just a Mark 315
Ronel Eduardo Barbosa-Calderón, Diego Efraín Valbuena-Velásquez, Sergio Camilo Ayala-Pérez.

Research and Publication. Part 7. How to Organize and Present Bibliography 323
Ricardo Cepeda-Vásquez.

Case reports

Intestinal Obstruction Due to Colorectal Cancer in a Pregnant Patient: A Case Report **327**

Lía Jazmín Jiménez-Ramírez, Ricardo Mendoza, Lina M. García, Blanca V. Fajardo.

Collagenous Gastritis: An Unusual Cause of Anemia in Young Patients **333**

Clara Eugenia Plata-García, Maria Alexandra Torres-Guerra, Sandra Judith Huertas-Pacheco.

Type 1 Refractory Celiac Disease: Report of Two Cases with Different Therapeutic Approaches **339**

Lorete María da Silva-Kotze, Luis Roberto Kotze, César Lazzarotto, Luana Fanho-Souto, Emanueli Taine-Schadek, Renato Nisihara.

Duodenal Adenocarcinoma: A Rare Finding. A Case Report **346**

Cristian Tarazona-León, Mauricio Vanegas-Ballesteros, Fabio Alejandro Vergara-Suárez, Gianmarco Camelo-Pardo, Luis Felipe Murcia, Niyireth Alicia Trillos-Padilla.

Incarcerated Littre's Hernia: A Case Report **352**

Álvaro Flechas, Carlos Moya-Ortiz, Paulo Cabrera-Rivera, Alejandro González, Natalia Quintana-Montejo.

Diagnosis of Dubin–Johnson Syndrome in an Adult Patient: A Case Report **357**

Angie Daniela Torres-Gil, Jamir Muñoz-Torres.

Modified Endoluminal Vacuum Therapy for the Treatment of Colorectal Fistula: Experience from a Gastroenterology Unit in a High-Complexity Institution **362**

Stefano Valsangiacomo-Avendaño, Diego Augusto Moreno-Díaz, Juan Diego Cantillo-Quintero, Luis Felipe Murcia-Cárdenas, Rómulo Arturo Bonilla-Garnica, Gonzalo Rojas-Hernández.

Esophageal Leukoplakia and Its Clinical Significance: Does It Imply Risk? **367**

Aldair José Chaar-Hernández, Hernando José Vergara-Segrera, Jesús Antonio Rodríguez-Fajardo.

Anorectal Abscess Due to Foreign Body Ingestion: A Case Report **372**

Carlos Mauricio Martínez-Montalvo, Juan Pablo Pérez-Daza, Johana Andrea Sisa-Rodríguez, Wilmer Orlando Aponte-Barrios, Édgar Germán Junca.

Cholestatic Acute Hepatitis as an Unusual Manifestation of Syphilis in an Immunocompetent Patient: A Case Report **377**

Carlos Andrés Marín-Hoyos, Karen Juliana Moreno, Jhonattan Fabian Morales-Giraldo, Raúl Vallejo-Serna, Diego Mauricio Gómez-Ramírez.

Distal Esophageal Fibrovascular Polyp: A Case Presentation **380**

Mariana Varela-Alzate, Luisa Fernanda Serna-Vanegas, Laura María Velásquez-Castro, Juan Camilo Rivas-Domínguez, Manuela Ramírez-Hurtado, Robin Germán Prieto-Ortiz.

Cover: *Histopathology of the duodenal mucosa.*
A. Duodenal biopsy before treatment; hematoxylin-eosin showing Marsh 3-A (100X).
B. Immunohistochemistry before treatment showing a high number of IELs: CD8 >50% of IELs, compatible with type 1 RCD (400X).
Article: Type 1 Refractory Celiac Disease: Report of Two Cases with Different Therapeutic Approaches.
Courtesy of the authors: Lorete María da Silva-Kotze, Luis Roberto Kotze, César Lazzarotto, Luana Fanho-Souto, Emanueli Taine-Schadek, Renato Nisihara.

https://doi.org/10.22516/25007440.1444

Editorial

Real-Time Artificial Intelligence for Colorectal Polyp Detection: Challenges and Perspectives

David B. Páramo-Hernández.[1]

OPEN ACCESS

Citation:
Páramo-Hernández D.
Real-Time Artificial Intelligence for Colorectal Polyp Detection: Challenges and Perspectives.
Revista. colomb. Gastroenterol. 2025;40(3):277-278.
https://doi.org/10.22516/25007440.1144

[1] Gastroenterologist and Clinical Epidemiologist. GutMédica, Instituto de salud digestiva. Editor, Colombian Journal of Gastroenterology. Bogotá, Colombia.

***Correspondence:** David B. Páramo Hernández.
paramo.david@gmail.com

Received: 25/08/2025
Accepted: 26/08/2025

In mid-2024, our journal published the first experience in Colombia on the use of artificial intelligence (AI) with a computational method in colonoscopy for polyp detection[1,2]. Its results were compared with the markings of different colonoscopy experts, achieving an accuracy of 0.77, a sensitivity of 0.89, a specificity of 0.71, and an area under the curve (AUC; *receiver operating characteristics)* of 0.87[1].

Now, in real time, Dr. Aponte and his group present a licensed, automatic polyp detection module, which demonstrated a sensitivity of 78.8% and a specificity of 83.1%, with an AUC of 0.73 (95% confidence interval [CI]: 0.686-0.882). Compared to the adenoma detection rate (ADR) of two of the authors, the use of AI improved the adenoma detection rate by more than 10%[3].

Although colonoscopy is the cornerstone of colorectal cancer (CRC) screening, its performance is operator-dependent, and notable variations persist in ADR and the rate of missed lesions. Consequently, computer-aided detection systems based on "deep learning" (AI) are already being used in clinical practice with the goal of alerting in real time to findings that might otherwise go unnoticed[4].

A review of the evidence from clinical experience and meta-analyses of randomized controlled trials (RCTs) concludes that computer-aided detection systems improve ADR and reduce the rate of missed adenomas, particularly for diminutive and sessile serrated lesions. A meta-analysis involving patients with inflammatory bowel disease, which included only prospective RCTs, estimated a relative increase in ADR of nearly 20% and a significant reduction in missed lesions. These benefits are achieved without clinically relevant increases in withdrawal time[5,6].

The European Society of Gastrointestinal Endoscopy (SEED) recently presented an expert consensus that accepts and recommends the use of AI-assisted computer technology for screening and surveillance colonoscopy, due to consistent increases in the detection of adenomas and other small lesions[7]. However, like any new technology, it presents some challenges that must be considered. First, a risk of "deskilling" in lesion detection is suggested: endoscopists accustomed to AI show reduced performance when the assistance is withdrawn, necessitating the design of strategies for its supervised use[8]. Another aspect to resolve relates to false positives, as system adjustments regarding alert sensitivity are required, including reducing fatigue from excessive alarms and, if necessary, generating management protocols for false positives[9].

It is also worth considering that these types of programs can overemphasize the detection of diminutive non-neoplastic polyps, leading to an increase in unneces-

© 2025 Asociación Colombiana de Gastroenterología

sary polypectomies, which has implications for costs and patient safety[9]. Furthermore, although it is suggested to be a cost-effective technology, whether the increase in ADR translates into a reduction in interval colorectal carcinomas remains to be established[10].

Currently, AI has progressed from a dream come true to a tool with a positive impact on ADR. Its routine implementation will depend not only on the acquisition of programs with high computational technical standards but also on professional training programs that emphasize that AI does not replace endoscopic technique and quality (insufflation, cleansing, retroflexion, withdrawal times). Finally, it is essential to insist on clinical responsibility, as the final decision always remains a human one[11].

REFERENCES

1. Gómez Zuleta MA, Cano Rosales DF, Bravo Higuera DF, Ruano Balseca JA, Romero Castro E. Detección automática de pólipos colorrectales con técnicas de inteligencia artificial. Rev Colomb Gastroenterol. 2021:36(1):7-17. https://doi.org/10.22516/25007440.471
2. Páramo Hernández DB, Cepeda Vásquez RA. Inteligencia artificial: el futuro hecho realidad. Rev Colomb Gastroenterol. 2024:39(2):131-2. https://doi.org/10.22516/25007440.1236
3. Aponte-Martín DM, Salas-Robayo JS, Gaitán L, Huertas-Pacheco SJ, Córdoba AC, Vergara H, et al. Uso de inteligencia artificial en tiempo real durante la colonoscopia para la detección y caracterización de pólipos colorrectales. Revista. colomb. Gastroenterol. 2025;40(3):279-283. https://doi.org/10.22516/25007440.1425
4. Wang P, Berzin TM, Glissen Brown JR, Bharadwaj S, Becq A, Xiao X, et al. Real-time automatic detection system increases colonoscopic polyp and adenoma detection rates: a prospective randomised controlled study. Gut. 2019;68(10):1813-1819. https://doi.org/10.1136/gutjnl-2018-317500
5. Repici A, Badalamenti M, Maselli R, Correale L, Radaelli F, Rondonotti E, et al. Efficacy of Real-Time Computer-Aided Detection of Colorectal Neoplasia in a Randomized Trial. Gastroenterology. 2020;159(2):512-520.e7. https://doi.org/10.1053/j.gastro.2020.04.062
6. Hassan C, Spadaccini M, Mori Y, Foroutan F, Facciorusso A, Gkolfakis P, et al. Real-Time Computer-Aided Detection of Colorectal Neoplasia During Colonoscopy : A Systematic Review and Meta-analysis. Ann Intern Med. 2023;176(9):1209-1220. https://doi.org/10.7326/M22-3678
7. Bretthauer M, Ahmed J, Antonelli G, Beaumont H, Beg S, Benson A, et al. Use of computer-assisted detection (CADe) colonoscopy in colorectal cancer screening and surveillance: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement. Endoscopy. 2025;57(6):667-673. https://doi.org/10.1055/a-2543-0370
8. Budzyń K, Romańczyk M, Kitala D, Kołodziej P, Bugajski M, Adami HO, et al. Endoscopist deskilling risk after exposure to artificial intelligence in colonoscopy: a multicentre, observational study. Lancet Gastroenterol Hepatol. 2025 Oct;10(10):896-903. https://doi.org/10.1016/S2468-1253(25)00133-5. Epub 2025 Aug 12. Erratum in: Lancet Gastroenterol Hepatol. 2025:S2468-1253(25)00294-8. https://doi.org/10.1016/S2468-1253(25)00294-8
9. Misawa M, Kudo SE, Mori Y. Computer-aided detection in real-world colonoscopy: enhancing detection or offering false hope? Lancet Gastroenterol Hepatol. 2023;8(8):687-688. https://doi.org/10.1016/S2468-1253(23)00166-8
10. Hassan C, Povero M, Pradelli L, Spadaccini M, Repici A. Cost-utility analysis of real-time artificial intelligence-assisted colonoscopy in Italy. Endosc Int Open. 2023;11(11):E1046-E1055. https://doi.org/10.1055/a-2136-3428
11. Lai WY, Lin KW, Ling LP, Li JW, Lau LHS, Chiu PWY. Artificial Intelligence in Colonoscopy: Where Are We Now in 2024? Digestion. 2025:1-14. https://doi.org/10.1159/000544030

https://doi.org/10.22516/25007440.1425

Original article

Real-Time Use of Artificial Intelligence During Colonoscopy for Detection and Characterization of Colorectal Polyps

Diego Mauricio Aponte-Martín,[1*] Juan Sebastián Salas-Robayo,[2] Laura Gaitán,[2] Sandra Judith Huertas-Pacheco,[3] Andrea Carolina Córdoba,[4] Hernán Vergara,[5] María Valentina Aponte-Aparicio,[6] Luis Carlos Sabbagh.[7]

OPEN ACCESS

Citation:
Aponte-Martín DM, Salas-Robayo JS, Gaitán L, Huertas-Pacheco SJ, Córdoba AC, Vergara H, Aponte-Aparicio MV, Sabbagh LC. Real-Time Use of Artificial Intelligence During Colonoscopy for Detection and Characterization of Colorectal Polyps. Revista. colomb. Gastroenterol. 2025;40(3):279-283. https://doi.org/10.22516/25007440.1425

[1] Specialist in Gastroenterology and Digestive Endoscopy, Coordinator of the Gastroenterology Specialization Program, Fundación Universitaria Sanitas, Keralty. Bogotá, Colombia.
[2] Gastroenterology Resident, Fundación Universitaria Sanitas. Bogotá, Colombia.
[3] Specialist in Digestive Pathology, Clinical and Pathology Laboratory, Clínica Reina Sofía. Bogotá, Colombia.
[4] Specialist in Gastroenterology and Digestive Endoscopy. Gastroenterologist, Clínica Universitaria Colombia. Bogotá, Colombia.
[5] Specialist in Epidemiology, Fundación Universitaria Sanitas. Bogotá, Colombia.
[6] General Practitioner, Pontificia Universidad Javeriana. Intern and Research Physician, Funinderma. Bogotá, Colombia.
[7] Specialist in Gastroenterology and Digestive Endoscopy, Head of the Department of Clinical Gastroenterology, Colsanitas, Keralty. Bogotá, Colombia.

***Correspondence:** Diego Mauricio Aponte-Martín.
didimauro673@yahoo.es

Received: 11/07/2025
Accepted: 04/08/2025

Abstract

Introduction: Colorectal cancer represents a significant public health concern in Colombia and worldwide. The detection and resection of adenomatous polyps via colonoscopy have contributed to reducing the incidence and mortality associated with colorectal cancer. Recently, numerous studies have been published regarding the use of artificial intelligence (AI) for detecting adenomatous polyps during colonoscopy; however, data on this topic in South America remain scarce. **Materials and Methods:** We conducted a prospective, descriptive study including patients over 45 years of age who underwent colonoscopy for colorectal cancer screening assisted by a real-time polyp detection system (Computer-Aided Detection, CAD EYE, Fujifilm, Tokyo, Japan) at two tertiary referral centers between May 2023 and June 2024. Demographic and procedural variables were recorded. The diagnostic performance of this tool was assessed through analysis of sensitivity, specificity, likelihood ratios, adenoma detection rate (ADR), polyp detection rate (PDR), and receiver operating characteristic (ROC) curves for lesion characterization (neoplastic and non-neoplastic). **Results:** A total of 86 patients were included in the final analysis. Of these, 80.2% (n = 69) were female, with a mean age of 63 years (± 9.83). The PDR with CAD EYE was 58.1%, whereas the ADR was 38.4% The concordance rate between AI and histopathology for lesions classified as neoplastic or hyperplastic was 73.13%. AI-based categorization of colorectal lesions as neoplastic demonstrated a sensitivity of 78.8% and specificity of 83.1%, with an area under the curve (AUC) of 0.73 (95% confidence interval [CI]: 0.686–0.882). Compared with the ADR previously reported by two of the study authors, the use of AI increased adenoma detection by more than 10%. **Conclusion:** This is the first study in Colombia evaluating the use of real-time AI software during colonoscopy, demonstrating a significant improvement in both ADR and PDR. Current evidence, alongside the findings of this study, indicates a promising discriminative ability for AI-assisted characterization of colonic polyps.

Keywords

Artificial intelligence, colonoscopy, adenoma, Colombia, diagnosis.

INTRODUCTION

Colorectal cancer (CRC) is the third most prevalent type of cancer worldwide and the second leading cause of cancer-related death globally[1]. The combination of molecular events leading to colon adenocarcinoma is heterogeneous and includes genetic and epigenetic abnormalities, among which the classic adenoma-carcinoma sequence is responsible for up to 80% of sporadic colon tumors. The detection and resection of precursor lesions, such as adenomatous

polyps via colonoscopy, have been shown to reduce the prevalence and mortality of CRC, which is why colonoscopy is currently considered the gold standard for screening this disease[2].

The adenoma detection rate (ADR) is one of the most studied quality indicators and the one best correlated with the prevention of CRC and interval cancer, both for screening colonoscopies and for colonoscopies performed for other indications[3]. However, various studies have reported that up to 27% of polyps present at the time of the examination are not detected by this method[4], a high error rate that could be explained by various factors, such as inadequate patient preparation, blind spots during the examination, interobserver variability, and human error, among others[5]. In response to this, quality indicators and strategies to improve intraprocedural quality have been proposed, among which the ADR is the clinically most relevant and best-validated quality indicator[5].

In recent years, thanks to technological advances, interest has grown in the use of artificial intelligence (AI) as a "second observer" to improve the ADR. Currently, real-time computer-aided detection (CADe) systems exist, with performance close to that of expert endoscopists, which, according to available scientific evidence, appear to improve the ADR and the characterization of detected lesions compared to conventional colonoscopy[6,7].

The objective of this study was to prospectively evaluate the performance of a real-time AI-assisted detection system during colonoscopy for the detection and characterization of colorectal polyps, as well as adenomas, in a real-world clinical setting in the Colombian population.

MATERIALS AND METHODS

Study Population

After approval of the study by the Research Ethics Committee (CIR), all patients over 45 years of age who underwent a colonoscopy for CRC screening assisted by a real-time automatic polyp detection system (Computer-aided detection, CAD EYE, Fujifilm, Tokyo, Japan) between May 2023 and June 2024 were included. This prospective study was conducted at two reference centers in Bogotá, Colombia (Clínica Universitaria Colombia and Clínica Reina Sofía). Patients with inadequate preparation, defined as a Boston score less than 6, were excluded. The ethical criteria of the Declaration of Helsinki were met, and the study was conducted with CIR approval.

This is a descriptive, prospective, real-world study. The data collection instrument included demographic characteristic variables such as age and sex, and procedure variables including lesion location in the colon, Boston score, procedure time, CAD EYE characterization of lesions, and the histopathological findings described in the pathology report.

Statistical Analysis

Descriptive statistics were performed for all study parameters. Data were analyzed using the licensed version of Stata 17. Continuous data were summarized according to their nature. Categorical data were summarized by frequency and proportion. The CAD EYE system categorizes detected lesions as "neoplastic" or "hyperplastic"; therefore, for histopathological analysis, detected lesions were grouped into neoplastic and non-neoplastic. A diagnostic test was performed to establish sensitivity, specificity, and likelihood ratio. The correlation between CAD EYE findings and histological evaluation was reported in terms of proportions. An ROC curve was generated between CAD EYE findings and histological findings for neoplastic lesions, and the area under the curve (AUC) was provided.

RESULTS

Out of a total of 86 patients who underwent CAD EYE-assisted colonoscopy, a total of 110 colorectal lesions were detected and resected. Women constituted the majority of the population at 80.2% (n = 69), with a mean age of 63 years (± 9.83). The median Boston score was 9 points, and the withdrawal time was 10.13 minutes (± 3.68).

The ADR was 38.4% and the polyp detection rate (PDR) was 58.1%. Of these lesions, the CAD EYE system characterized 55.41% as hyperplastic lesions and 44.59% as neoplastic lesions. Following histopathological analysis, the most frequently found lesions were tubular adenomas with low-grade dysplasia, at 48.65%, followed by hyperplastic polyps, at 39.19% (**Table 1**).

The CAD EYE system demonstrated a sensitivity of 66.67% and a specificity of 80%. The correlation between CAD EYE and histological findings was 72.97%. An ROC curve was generated with this data (**Figure 1**), which determined an area under the curve (AUC) of 0.73, showing a promising discriminatory capability for the histological characterization of colorectal polyps.

DISCUSSION

The impact of colonoscopy on CRC depends on several factors, including some related to the conditions under which the procedure is performed, the characteristics of the polyps themselves, and operator-dependent variables. In response to this, quality indicators and strategies to improve procedural quality have been proposed, among which the ADR is the clinically most relevant and best-vali-

Table 1. Results of CAD EYE-assisted colonoscopies

Characteristics	Results
Sex, % (n)	
- Women	69 (80.2)
- Men	17 (19.8)
Age, years (SD)	63 (9.83)
Boston Score (IQR)	9 (6;9)
Withdrawal Time, minutes (SD)	10.13 (3.68)
Lesions Categorized by AI (%)	
Hyperplastic	55.41
Neoplastic	44.59
Histopathological Classification (%)	
- Neoplastic	52.70
- Non-neoplastic	47.30
Pathological Findings	
- Neoplastic (%)	
Tubular Adenoma with Low-Grade Dysplasia	48.65
Tubular Adenoma with High-Grade Dysplasia	4.05
- Non-neoplastic (%)	
Normal Mucosa	2.70
Hyperplastic Polyps	39.19
Inflammatory Polyps	5.41
Adenoma Detection Rate (%)	38.4
Polyp Detection Rate (%)	58.1

SD: standard deviation; AI: artificial intelligence; IQR: interquartile range. Table prepared by the authors.

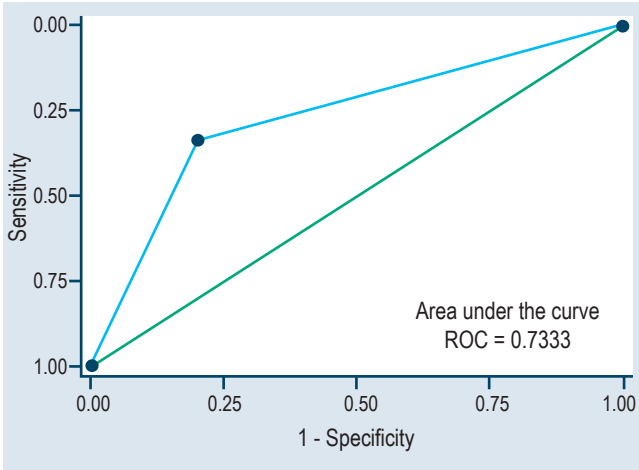


Figure 1. ROC curve and AUC data. Image property of the authors.

dated quality indicator[8]. It has been established that each percentage point increase in the detection rate is associated with a 3% decrease in the CRC rate[9,10].

Numerous studies have been published on the use of AI for the detection of adenomas and polyps during colonoscopy. Repici et al.[11,12] demonstrated in two randomized clinical trials the positive impact of using AI on the adenoma detection rate in both expert and non-expert hands (30% to 46%). Similarly, Xu et al., in another randomized clinical trial, showed how the use of real-time AI during colonoscopy could help detect adenomas that would be missed in conventional colonoscopy[13]. Furthermore, a recent meta-analysis favors the use of AI for adenoma detection with a higher detection rate (relative risk [RR]: 1.43; 95% confidence interval [CI]: 1.33-1.53; p <0.001; inconsistency index [I^2] = 36%), confirmed with a pooled analysis of ADR (35.4% vs. 24.9%), compared to conventional colonoscopy[6].

These findings are consistent with those we observed, documenting how the ADR can significantly improve when the procedure is performed with an AI-assisted system (ADR 38.4%), data comparable to that reported in the previously mentioned meta-analysis[13]. Likewise, the PDR was close to that reported by Schöler et al. (58.1% vs. 61%)[14].

Our study compares the characterization of colorectal polyps detected by CAD EYE with the histopathological findings of the analyzed samples, demonstrating a correlation of 72.97%. The correlation rate was 78.79% for lesions categorized as neoplastic and 68.29% for lesions categorized as non-neoplastic, thus showing a greater discriminatory capacity for neoplastic lesions. As a diagnostic test, CAD EYE has a sensitivity of 66.67% with a specificity of 80% and a likelihood ratio of 3.33 for lesion characterization, with an acceptable AUC value of 0.733. These data highlight the importance of using real-time AI for the detection and characterization of colorectal polyps in our population, results that align with the evidence available to date[2,15].

It is important to emphasize that two of the authors of this work have previously published their ADR of 28% in the same hospital settings and in patients under conditions similar to our current study[16]. The present work demonstrates that with the use of AI, this rate was improved by 10%, a percentage similar to that found in several published articles.

The limitations of our study include the small sample size and the absence of a comparative group with conventional colonoscopy. Meanwhile, our study shows a correlation between CAD EYE and the reference method (histopathological findings), which adds to the available evidence on the use of AI in the detection and characterization of adenomas during colonoscopy.

CONCLUSIONS

This is the first descriptive, prospective study conducted in Colombia reporting the polyp and adenoma detection rates in a group of patients undergoing CRC screening; furthermore, it shows that the use of real-time AI during colonoscopy significantly improves the ADR. Likewise, current evidence and the results of our study demonstrate a promising discriminatory capability for the characterization of colorectal polyps using AI-assisted systems. These data reinforce the current available evidence on the use of these systems for the early detection and prevention of CRC. Further prospective studies with larger samples and comparative groups are needed to confirm our results.

Ethical Approval and Consent to Participate

After approval by our Institutional Review Board and the ethics committee, all procedures performed in studies involving human participants were conducted in accordance with the ethical standards of the institutional or national research committee and with the 1964 Helsinki Declaration.

Data and Materials Availability

The datasets used or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest

None of the authors declare any conflicts of interest.

Sources of Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

1. Xi Y, Xu P. Global colorectal cancer burden in 2020 and projections to 2040. Transl Oncol. 2021;14(10):101174. https://doi.org/10.1016/j.tranon.2021.101174
2. Kamitani Y, Nonaka K, Isomoto H. Current Status and Future Perspectives of Artificial Intelligence in Colonoscopy. J Clin Med. 2022;11(10):2923. https://doi.org/10.3390/jcm11102923
3. Keswani RN, Crockett SD, Calderwood AH. AGA Clinical Practice Update on Strategies to Improve Quality of Screening and Surveillance Colonoscopy: Expert Review. Gastroenterology. 2021;161(2):701-711. https://doi.org/10.1053/j.gastro.2021.05.041
4. Ahn SB, Han DS, Bae JH, Byun TJ, Kim JP, Eun CS. The Miss Rate for Colorectal Adenoma Determined by Quality-Adjusted, Back-to-Back Colonoscopies. Gut Liver. 2012;6(1):64-70. https://doi.org/10.5009/gnl.2012.6.1.64
5. Gómez-Zuleta MA, Cano-Rosales DF, Bravo Higuera DF, Ruano-Balseca JA, Romero-Castro E. Detección automática de pólipos colorrectales con técnicas de inteligencia artificial. Rev Colomb Gastroenterol. 2021;36(1):7-17. https://doi.org/10.22516/25007440.471
6. Xu L, He X, Zhou J, Zhang J, Mao X, Ye G, et al. Artificial intelligence-assisted colonoscopy: A prospective, multicenter, randomized controlled trial of polyp detection. Cancer Med. 2021;10(20):7184-7193. https://doi.org/10.1002/cam4.4261
7. Hassan C, Spadaccini M, Iannone A, Maselli R, Jovani M, Chandrasekar VT, et al. Performance of artificial intelligence in colonoscopy for adenoma and polyp detection: a systematic review and meta-analysis. Gastrointest Endosc. 2021;93(1):77-85.e6. https://doi.org/10.1016/j.gie.2020.06.059
8. Rex DK, Anderson JC, Butterly LF, Day LW, Dominitz JA, Kaltenbach T, et al. Quality indicators for colonoscopy. Gastrointest Endosc. 2024;100(3):352-381. https://doi.org/10.1016/j.gie.2024.04.2905
9. Corley DA, Jensen CD, Marks AR, Zhao WK, Lee JK, Doubeni CA, et al. Adenoma detection rate and risk of colorectal cancer and death. N Engl J Med. 2014;370(14):1298-306. https://doi.org/10.1056/NEJMoa1309086
10. Rex DK, Schoenfeld PS, Cohen J, Pike IM, Adler DG, Fennerty MB, et al. Quality indicators for colonoscopy. Gastrointest Endosc. 2015:81(1):31-53. https://doi.org/10.1016/j.gie.2014.07.058
11. Repici A, Spadaccini M, Antonelli G, Correale L, Maselli R, Galtieri PA, et al. Artificial intelligence and colonoscopy experience: lessons from two randomised trials. Gut. 2022;71(4):757-765. https://doi.org/10.1136/gutjnl-2021-324471
12. Repici A, Badalamenti M, Maselli R, Correale L, Radaelli F, Rondonotti E, et al. Efficacy of Real-Time Computer-Aided Detection of Colorectal Neoplasia in a Randomized Trial.

Gastroenterology. 2020;159(2):512-520.e7. https://doi.org/10.1053/j.gastro.2020.04.062
13. Huang D, Shen J, Hong J, Zhang Y, Dai S, Du N, et al. Effect of artificial intelligence-aided colonoscopy for adenoma and polyp detection: a meta-analysis of randomized clinical trials. Int J Colorectal Dis. 2022;37(3):495-506. https://doi.org/10.1007/s00384-021-04062-x
14. Schöler J, Alavanja M, de Lange T, Yamamoto S, Hedenström P, Varkey J. Impact of AI-aided colonoscopy in clinical practice: a prospective randomised controlled trial. BMJ Open Gastroenterol. 2024;11(1):e001247. https://doi.org/10.1136/bmjgast-2023-001247
15. Mohan BP, Facciorusso A, Khan SR, Chandan S, Kassab LL, Gkolfakis P, et al. Real-time computer aided colonoscopy versus standard colonoscopy for improving adenoma detection rate: A meta-analysis of randomized-controlled trials. EClinicalMedicine. 2020;29-30:100622. https://doi.org/10.1016/j.eclinm.2020.100622
16. Aponte Martín DM, Corso Bernal CL, Aponte Aparicio MV, Sabbagh Sanvicente LC. Mejoría de la preparación de colonoscopia usando tecnologías de la información y comunicación (TIC), ensayo clínico aleatorizado. Rev Colomb Gastroenterol. 2024:39(1);51-8. https://doi.org/10.22516/25007440.1092

https://doi.org/10.22516/25007440.1360

Original article

Comparative Evaluation of the Glasgow-Blatchford, Pre-Endoscopic Rockall, and CANUKA Scores in Predicting Morbidity in Patients with Upper Gastrointestinal Bleeding

Iván Enrique González-Mendoza,[1*] Alberto Rodríguez-Varón,[2] Óscar Muñoz,[3] Heberth Camilo Gómez-Perea.[4]

OPEN ACCESS

Citation:
González-Mendoza IE, Rodríguez-Varón A, Muñoz O, Gómez-Perea HC. Comparative Evaluation of the Glasgow-Blatchford, Pre-Endoscopic Rockall, and CANUKA Scores in Predicting Morbidity in Patients with Upper Gastrointestinal Bleeding. Revista. colomb. Gastroenterol. 2025;40(3):284-291. https://doi.org/10.22516/25007440.1360

[1] Internal Medicine Physician, Specialist in Gastroenterology. Clinical Adjunct Professor, Department of Internal Medicine, Pontificia Universidad Javeriana. Bogotá, Colombia.
[2] Internal Medicine Physician and Gastroenterologist. Full Professor, Pontificia Universidad Javeriana. Bogotá, Colombia.
[3] Internal Medicine Physician, Associate Professor, Internal Medicine, Pontificia Universidad Javeriana. Bogotá, Colombia.
[4] Internal Medicine Physician, Pontificia Universidad Javeriana. Bogotá, Colombia.

***Correspondence:** Iván Enrique González-Mendoza.
ivangonzalezgastro@gmail.com

Received: 07/04/2025
Accepted: 09/07/2025

Abstract

Introduction and Objective: Upper gastrointestinal bleeding (UGIB) is a common reason for presentation in emergency departments. Various scoring systems have been developed to determine the need for endoscopic intervention and to predict the risk of adverse outcomes. The aim of this study was to evaluate the Glasgow-Blatchford score (GBS), CANUKA score, and pre-endoscopic Rockall score as predictors of a composite morbidity outcome in patients with non-variceal UGIB. **Materials and Methods:** This retrospective study included patients with non-variceal UGIB and compared the discriminative ability of three scoring systems to predict a composite morbidity outcome, defined as a hospital stay exceeding 72 hours, intensive care unit (ICU) admission, need for endoscopic hemostatic therapy, blood product transfusion, embolization, repeat endoscopic intervention, or surgical management. Areas under the curve (AUC) were compared using DeLong's method. **Results:** A total of 496 patients were included (median age: 60 years; 62.3% male; 20.6% with cancer). The composite morbidity outcome occurred in 49.4% of patients, and 3.23% died. The CANUKA (AUC: 0.8101) and GBS (AUC: 0.8070) scores demonstrated superior discriminative ability ($p = 0.0124$). Individually, the GBS showed the best capacity to discriminate patients requiring ICU care (AUC: 0.8011; $p = 0.0004$) and blood product transfusion (AUC: 0.9123; $p < 0.0001$). Both CANUKA and GBS scores were superior in predicting the need for repeat endoscopic intervention, with AUROC values of 0.6601 and 0.6555, respectively. **Conclusion:** These findings suggest that the CANUKA and GBS scores are superior predictors of morbidity and should be preferred when making decisions regarding early intervention and close monitoring.

Keywords

Gastrointestinal hemorrhage, morbidity, comparative.

INTRODUCTION

Upper gastrointestinal bleeding (UGIB) is one of the most frequent reasons for consultation in emergency departments, with an incidence of 47 cases per 100,000 inhabitants and a mortality rate of 2%, primarily secondary to peptic ulcer[1]. In the United States, there are up to 300,000 annual hospitalizations, with an approximate cost exceeding one billion dollars[2]. International consensus guidelines have suggested the early use of certain scores to rapidly identify very low-risk patients who can be managed on an outpatient basis[3,4]. Among these, the Glasgow-Blatchford Score (GBS), pre-endoscopic Rockall score, and CANUKA score are notable.

Although these scores are used to define the need for endoscopic management, they can also predict the risk of adverse outcomes. The pre-endoscopic Rockall score was initially created to assess mortality and rebleeding risk[5]; the GBS was designed to determine which patients require blood product transfusion, rebleeding, and death[6]; and

© 2025 Asociación Colombiana de Gastroenterología

the CANUKA score, in addition to the aforementioned outcomes, assesses 30-day mortality and rebleeding risk[7]. Some previous studies have compared multiple risk scores and have documented that the GBS performs well in predicting hospitalization and the need for blood product transfusion[8], and is better for these outcomes than other scores[9], while the pre-endoscopic Rockall and CANUKA scores might better discriminate the likelihood of rebleeding and mortality[10].

Currently, there are no studies conducted in Ibero-America that establish whether there are differences in the ability of these scores to discriminate the same composite outcome, including different types of morbidity, in patients with non-variceal upper gastrointestinal bleeding.

Typically, these scores are used to identify low-risk patients who can be managed as outpatients. The objective of the present study is to evaluate, in patients admitted to the emergency department for non-variceal UGIB, whether any of the following scores (GBS, CANUKA, and pre-endoscopic Rockall) better discriminates patients who will develop morbidity, based on a cohort of patients who presented to a referral hospital in Colombia.

MATERIALS AND METHODS

This is a retrospective diagnostic test study aimed at evaluating the discriminatory capacity of three scores for predicting morbidity, based on a cohort of patients with upper gastrointestinal bleeding who presented to Hospital Universitario San Ignacio in Bogotá, Colombia, between June 2020 and July 2022. Patients over 18 years of age who presented with non-variceal UGIB were included. Those with a history of cirrhosis and pregnancy, those hospitalized for other reasons who developed UGIB during their hospital stay, and those referred to another institution were excluded.

Patients were identified from the handover lists of the internal medicine, emergency medicine, and resuscitation room services. Additionally, the list where all upper gastrointestinal endoscopic procedures performed at the institution are systematically recorded was reviewed. Once patients were selected, electronic medical records were reviewed, and information regarding demographic data (age and sex), clinical presentation, mental status, comorbidities (diabetes, hypertension, cardiac diseases, liver disease, renal disease, or malignancy), clinical characteristics at admission, and the data necessary to calculate the GBS, pre-endoscopic Rockall score, and CANUKA score was recorded in a standardized manner.

Likewise, information regarding each morbidity outcome of interest was collected. Morbidity is defined as the presence of at least one of the following: hospital stay longer than 72 hours, intensive care unit (ICU) stay related to UGIB or exacerbated comorbidities, need for endoscopic hemostatic therapies (use of hemoclips, bands, or injectable therapy with epinephrine), transfusion of blood products, embolization, need for repeat endoscopic intervention, or need for surgical management to control bleeding during the hospital stay. Additionally, mortality events associated with UGIB complications were identified.

Statistical Analysis

Variable analysis was performed using the Stata 16 statistical program[11]. Absolute and relative frequency measures were reported for categorical variables. For continuous variables with normal distribution, the mean and standard deviation were reported, while for variables with non-normal distribution, medians and interquartile ranges were reported. The Shapiro-Wilk test was applied to assess the assumption of normality for continuous variables. Discriminatory capacity was evaluated using the areas under the curve, and the comparison between the areas was performed using De Long's non-parametric method[12].

Ethical Considerations

This research work was primarily guided by the International Ethical Guidelines for Biomedical Research Involving Human Subjects published by the Council for International Organizations of Medical Sciences (CIOMS) and the World Health Organization (WHO) in 1993; in which Guideline No. 9 establishes that data collected from routine clinical care may be stored and used for research unless the person explicitly states their objection, therefore explicit authorization from the included patients was not considered necessary. Additionally, Resolution 8430 of 1993 from the Ministry of Health was used as a guide, which establishes that the present study is "risk-free research". The study obtained approval from the institutional ethics committee (minutes 5 of 2023).

RESULTS

A total of 496 patients were included in the analysis. The median age was 60 years, and 62.3% were male. The main symptom at admission was melena (65.32%). One hundred ninety patients (38.31%) presented with tachycardia (heart rate >100 beats per minute [bpm]) at admission, while only 78 (15.73%) had a systolic blood pressure <100 mm Hg. The most frequent associated comorbidity was hypertension (32.53%), and 102 patients (20.6%) had some oncological pathology (**Table 1**).

Table 1. Demographic Characteristics

Demographic Characteristics	
Variable	**n: 496**
- Age in years, median (IQR)	60 (43-70)
- Female sex, n (%)	187 (37.70)
- HTN, n (%)	161 (32.53)
- Malignancy, n (%)	102 (20.61)
- Diabetes mellitus, n (%)	64 (12.93)
- CKD, n (%)	37 (7.46)
- Coronary artery disease, n (%)	32 (6.45)
- Heart failure, n (%)	25 (5.05)
- Non-cirrhotic liver disease, n (%)	15 (3.04)
Admission Symptoms, n (%)	
- Melena	324 (65.32)
- Hematemesis	212 (42.83)
Clinical Status at Admission, n (%)	
- Heart rate >100 bpm	190 (38.31)
- Systolic blood pressure at admission <100 mm Hg	78 (15.73)
- Syncope	38 (7.69)
- Altered consciousness at admission	16 (3.20)
Laboratory Values at Admission, n (%)	
- Blood Urea Nitrogen >20 mg/dL, n (%)*	287 (58.93)
- Low Hemoglobin, n (%)**	235 (47.38)

*Blood urea nitrogen was measured in 487 of the total sample. **Low hemoglobin, defined as <13 g/dL for men and <12 g/dL for women. CKD: chronic kidney disease; HTN: hypertension; bpm: beats per minute; IQR: interquartile range. Table prepared by the authors.

Table 2. Endoscopic Findings and Outcomes

Outcomes	n (%)
Hospital stay >72 hours	198 (39.92)
Requirement for transfusion	105 (21.21)
Requirement for hemostatic therapy	74 (14.92)
Endoscopic reintervention	42 (8.48)
ICU stay	36 (7.27)
Requirement for embolization	12 (2.42)
Requirement for surgical management	4 (0.81)
Morbidity*	245 (49.39)
Mortality	16 (3.23)
Endoscopic Findings	
- Peptic Ulcer Forrest I Forrest II Forrest III	183 (36.90) 30 (6.06) 39 (7.88) 114 (23.03)
- Erosive Gastritis	70 (14.11)
- Neoplasia**	51 (10.28)
- Esophageal Lesions	37 (7.46)
- Vascular Lesions	20 (4.03)
- Mallory-Weiss	12 (2.41)
- No cause identified	30 (6.04)

*Morbidity: defined as the presence of at least one of the following outcomes: hospital stay >72 hours, ICU stay, requirement for endoscopic hemostatic therapies, transfusion of blood products, embolization, endoscopic reintervention, or need for surgical management. **Neoplasia as the cause of bleeding. ICU: intensive care unit. Table prepared by the authors.

The most frequent endoscopic findings were peptic ulcer in 183 patients (36.90%), erosive gastritis in 70 patients (14.11%), and neoplastic lesions in 51 patients (10.28%) (**Table 2**).

The composite morbidity outcome occurred in 245 patients (49.40%). Individually, the most common outcomes were hospital stay >72 hours (39.52%), requirement for transfusion support (21.17%), and requirement for ICU stay (7.27%).

Table 3 presents the morbidity events for each score according to the points obtained. It shows that 86.67% of patients with a pre-endoscopic Rockall score of 5 presented at least one morbidity outcome, 75.0% of patients with a GBS of 8 or 9, and 79.5% of patients with a CANUKA score of 8 or 9 (**Table 3**).

The discriminatory capacity for the composite morbidity outcome for the three scores is presented in **Figure 1A**. It was found that the CANUKA score (AUROC: 0.8101) and GBS (AUROC: 0.8070) had better discriminatory capacity compared to the pre-endoscopic Rockall score (AUROC: 0.7480) ($p = 0.0124$).

When evaluating the discriminatory capacity for predicting other outcomes, the three scores were similar for discriminating the need for hospital management for more than 72 hours (**Figure 1B**). The GBS had a better discri-

Table 3. Percentage of Composite Morbidity Outcome* Presentation, According to Score

Pre-endoscopic Rockall Score			Glasgow-Blatchford Score			CANUKA Score		
Points Obtained	Total Patients n: 495	Outcome Presentation n: 244	Points Obtained	Total Patients n: 488	Outcome Presentation n: 242	Points Obtained	Total Patients n: 488	Outcome Presentation n: 242
0	82	11 (13.41%)	0-1	97	16 (16.49%)	0-1	30	5 (16.67%)
1	79	30 (37.97%)	2-3	71	20 (28.17%)	2-3	96	10 (10.42%)
2	76	28 (36.84)	4-5	66	24 (36.36%)	4-5	110	48 (43.64%%)
3	107	64 (59.81%)	6-7	78	37 (47.44%)	6-7	114	65 (57.02%)
4	98	64 (65.31%)	8-9	64	48 (75.0%)	8-9	78	62 (79.49%)
5	30	26 (86.67%)	10-11	44	34 (77.27%)	10-11	40	34 (85%)
6	19	17 (89.47%)	12-13	40	37 (92.50%)	12-13	12	12 (100%)
7-8	4	4 (100%)	≥14	28	26 (92.86%)	≥14	7	6 (85.71%)

*Morbidity: defined as the presence of at least one of the outcomes. CANUKA: The Canada-United Kingdom-Adelaide. Table prepared by the authors.

minatory capacity for the requirement of ICU management with an area under the curve of 0.8011 ($p = 0.0004$) and for the requirement of blood products (**Figure 1C**) with an area under the curve of 0.9123 ($p < 0.0001$). The CANUKA and GBS scores were better at discriminating the requirement for endoscopic reintervention (**Figure 1D**) (AUROC: 0.6601 and 0.6555, respectively), and were superior to the pre-endoscopic Rockall score (AUROC: 0.5468; $p = 0.0196$).

Sixteen mortality events (3.23%) were documented, which are presented in **Table 4** for each score according to the points. The prediction of mortality was best for the GBS with an AUROC of 0.8648 ($p = 0.0062$), as observed in **Figure 2**.

Table 4. Mortality Percentage According to Score

Pre-endoscopic Rockall Score			Glasgow-Blatchford Score			CANUKA Score		
Points Obtained	Total Patients n: 495	Mortality Presentation n: 15	Points Obtained	Total Patients n: 488	Mortality Presentation n: 15	Points Obtained	Total Patients n: 488	Mortality Presentation n: 15
0	82	0 (0%)	0-1	97	0 (0%)	0-1	30	0 (0%)
1	79	2 (2.53%)	2-3	71	1 (1.41%)	2-3	96	0 (0%)
2	76	1 (1.32%)	4-5	66	0 (0%)	4-5	110	3 (2.73%)
3	107	2 (1.87%)	6-7	78	1 (1.28%)	6-7	114	0 (0%)
4	98	6 (6.12%)	8-9	64	0 (0%)	8-9	78	3 (3.85%)
5	30	1 (3.33%)	10-11	44	2 (4.55%)	10-11	40	5 (12.5%)
6	19	3 (15.79%)	12-13	40	6 (15%)	12-13	12	0 (0%)
7-8	4	0 (0%)	≥14	28	5 (17.86%)	≥14	7	4 (57.14%)

CANUKA: The Canada-United Kingdom-Adelaide. Table prepared by the authors.

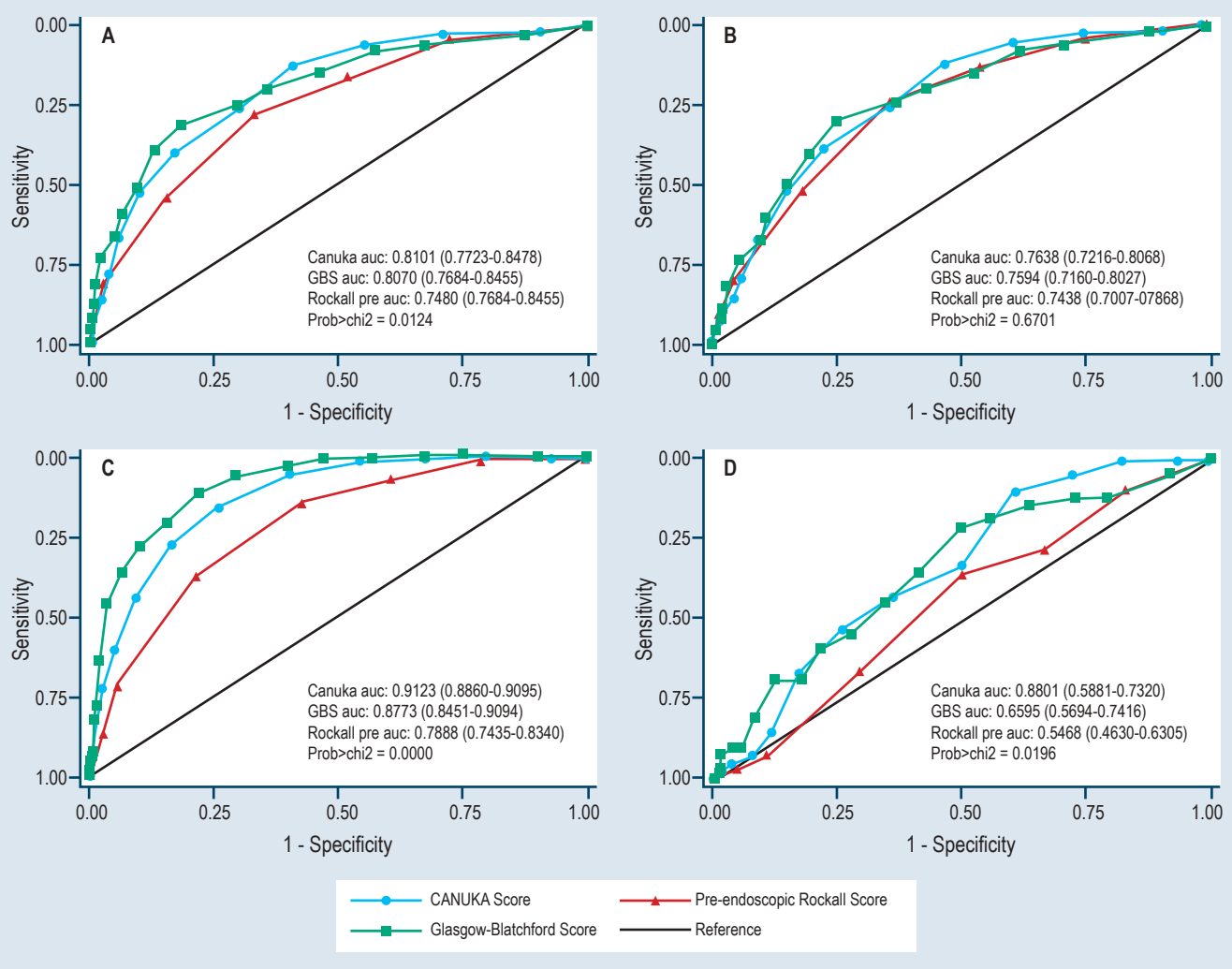


Figure 1. Discrimination of the Three Scores. Different correlations between the findings and what was predicted by each score regarding morbidity, hospitalization >72 hours, transfusion, and endoscopic reintervention. In red, the pre-endoscopic Rockall score; in green, the Glasgow-Blatchford score; and in dark blue with a circle, the CANUKA score. **A.** Morbidity. **B.** Hospitalization >72 hours. **C.** Transfusion. **D.** Endoscopic Reintervention. AUROC: area under the receiver operating characteristic curve; CANUKA: The Canada-United Kingdom-Adelaide; GBS: Glasgow-Blatchford Score. Images property of the authors.

DISCUSSION

Considering that the primary utility of these scores lies in identifying low-risk patients who can be managed on an outpatient basis, and that morbidity is not part of the objective for which they were developed, this study evaluated patients admitted to the emergency department with non-variceal UGIB and found that nearly half experienced morbidity events and up to 3% experienced mortality. Our data suggest that the CANUKA and GBS scores are better at predicting which patients will develop morbidity compared to the pre-endoscopic Rockall score, so either of these scores could be used for this purpose. The differences between CANUKA and GBS were not statistically significant, so using the GBS, which is better known and more widely used in Colombia, is a reasonable option.

Our findings are similar to those reported by Stanley et al.[13], who prospectively evaluated the predictive capacity for a composite outcome (requirement for transfusion, embolization, rebleeding, 30-day mortality, and hospital stay), comparing different scores, including GBS and pre-endoscopic Rockall, and demonstrated that GBS (AUROC: 0.86) was better at predicting this composite outcome compared to pre-endoscopic Rockall (AUROC: 0.71).

Regarding specific outcomes, we found that for predicting transfusion of blood products, the GBS performed

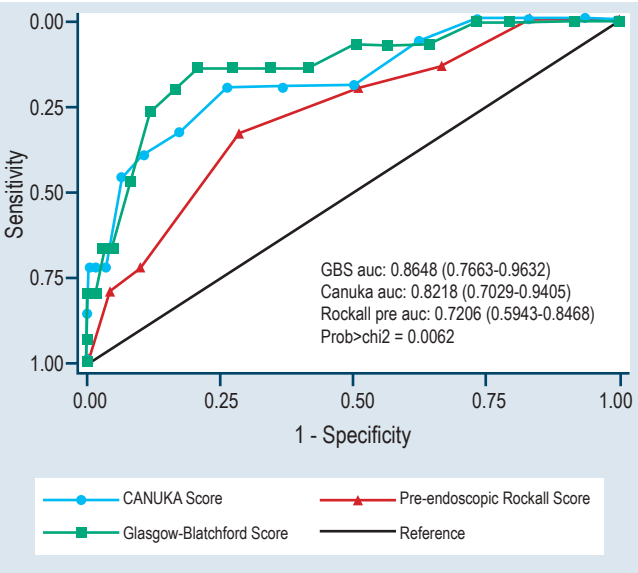


Figure 2. Discrimination of Mortality Prediction According to the Three Studied Scores. In red, the pre-endoscopic Rockall score; in green, the Glasgow-Blatchford score; and in dark blue with a circle, the CANUKA score. AUROC: area under the receiver operating characteristic curve; CANUKA: The Canada-United Kingdom-Adelaide; GBS: Glasgow-Blatchford Score. Image property of the authors.

best, followed by the CANUKA score, and thirdly the pre-endoscopic Rockall score (AUROC: 0.9123, 0.7888, and 0.8773, respectively; p <0.0001). These results are similar to those of Oakland et al., who demonstrated better discrimination for the GBS score compared to the pre-endoscopic Rockall and CANUKA scores[7].

Regarding the requirement for ICU, we evidenced a significantly better performance for the GBS, whereas studies such as that by M. Lincoln et al. find that most evaluated scores have poor discrimination for assessing ICU length of stay[14]. Finally, for discriminating hospital stay >72 hours, there was no difference between the scores, and there was a lower discriminatory capacity for other outcomes.

Although our study was not designed to evaluate mortality, given the low frequency of events, we found that GBS and CANUKA are better at predicting this outcome. These results are similar to those found by Li et al.[10], where GBS had the best discriminatory capacity (AUROC: 0.787 in older adults and 0.737 in the rest of the population in that study). Other studies, such as that by Oakland et al.[7], found that the CANUKA score was superior to GBS (AUROC: 0.77 vs. 0.74, respectively; p = 0.047); likewise, Cassana et al., in a study conducted in a Latin American population, described an AUROC of 0.66 for the CANUKA score for mortality in non-variceal upper gastrointestinal bleeding[15].

It is important to highlight that our study showed a similar performance of the three scores for predicting the requirement for endoscopic reintervention, with no statistically significant differences in discriminatory capacity.

Our study does not propose a specific cutoff score, as sometimes it is preferable to set a cutoff with high sensitivity, and other times to select a point where sensitivity and specificity are simultaneously as high as possible. However, our data suggest that scores ≥4 for CANUKA and GBS predict the occurrence of at least one adverse outcome in 43.64% and 36.36% of cases, respectively, and that higher scores such as 8 to 9 predict the presentation of adverse outcomes in up to 75% of cases. Compared with other studies, comparisons between GBS and pre-endoscopic Rockall in predicting some outcomes are found, and scores greater than or equal to 10 and 6, respectively, are described as being able to predict mortality and even rebleeding[16]. Future studies should evaluate whether diagnostic-therapeutic strategies based on different cutoff points can generate better long-term clinical outcomes.

Additional studies with larger sample sizes are required to confirm our findings regarding these outcomes.

CONCLUSIONS

Our results suggest that CANUKA and GBS are better for predicting morbidity. These findings suggest that these scores should be preferred and implemented in our setting to define which patients will require early interventions and stricter follow-up, without being able to recommend the use of one of these two scores over the other.

Funding Source

This study did not receive funding.

Conflicts of Interest

The authors declare no conflict of interest.

REFERENCES

1. Oakland K. Changing epidemiology and etiology of upper and lower gastrointestinal bleeding. Best Pract Res Clin Gastroenterol. 2019;42-43:101610. https://doi.org/10.1016/j.bpg.2019.04.003
2. Tielleman T, Bujanda D, Cryer B. Epidemiology and Risk Factors for Upper Gastrointestinal Bleeding. Gastrointest Endosc Clin N Am. 2015;25(3):415-28. https://doi.org/10.1016/j.giec.2015.02.010

3. Laine L, Barkun AN, Saltzman JR, Martel M, Leontiadis GI. ACG Clinical Guideline: Upper Gastrointestinal and Ulcer Bleeding. American Journal of Gastroenterology. 2021;116(5):899-917. https://doi.org/10.14309/ajg.0000000000001245
4. Gralnek IM, Stanley AJ, Morris AJ, Camus M, Lau J, Lanas A, et al. Endoscopic diagnosis and management of nonvariceal upper gastrointestinal hemorrhage (NVUGIH): European Society of Gastrointestinal Endoscopy (ESGE) Guideline – Update 2021. Endoscopy. 2021;53(3):300-32. https://doi.org/10.1055/a-1369-5274
5. Rockall TA, Logan RF, Devlin HB, Northfield TC. Risk assessment after acute upper gastrointestinal haemorrhage. Gut. 1996;38(3):316-21. https://doi.org/10.1136/gut.38.3.316
6. Blatchford O, Murray WR, Blatchford M. A risk score to predict need for treatment for upper gastrointestinal haemorrhage. The Lancet. 2000;356(9238):1318-21. https://doi.org/10.1016/S0140-6736(00)02816-6
7. Oakland K, Kahan BC, Guizzetti L, Martel M, Bryant RV, Brahmania M, et al. Development, Validation, and Comparative Assessment of an International Scoring System to Determine Risk of Upper Gastrointestinal Bleeding. Clinical Gastroenterology and Hepatology. 2019;17(6):1121-1129.e2. https://doi.org/10.1016/j.cgh.2018.09.039
8. Bryant RV, Kuo P, Williamson K, Yam C, Schoeman MN, Holloway RH, et al. Performance of the Glasgow-Blatchford score in predicting clinical outcomes and intervention in hospitalized patients with upper GI bleeding. Gastrointest Endosc. 2013;78(4):576-83. https://doi.org/10.1016/j.gie.2013.05.003
9. Taha AS, McCloskey C, Craigen T, Angerson WJ. Antithrombotic drugs and non-variceal bleeding outcomes and risk scoring systems: comparison of Glasgow Blatchford, Rockall and Charlson scores. Frontline Gastroenterol. 2016;7(4):257-63. https://doi.org/10.1136/flgastro-2015-100671
10. Li Y, Lu Q, Song M, Wu K, Ou X. Comparisons of six endoscopy independent scoring systems for the prediction of clinical outcomes for elderly and younger patients with upper gastrointestinal bleeding. BMC Gastroenterol. el 2022;22(1):187. https://doi.org/10.1186/s12876-022-02266-1
11. Stata Corp. Stata 16 [Software]. Stata; 2019 [consultado el diciembre 30 del 2019]. Disponible en: https://www.stata.com/stata16/
12. DeLong ER, DeLong DM, Clarke-Pearson DL. Comparing the Areas under Two or More Correlated Receiver Operating Characteristic Curves: A Nonparametric Approach. Biometrics. 1988;44(3):837. https://doi.org/10.2307/2531595
13. Stanley AJ, Laine L, Dalton HR, Ngu JH, Schultz M, Abazi R, et al. Comparison of risk scoring systems for patients presenting with upper gastrointestinal bleeding: international multicentre prospective study. BMJ. 2017:356:i6432. https://doi.org/10.1136/bmj.i6432
14. Lincoln M, Keating N, O'Loughlin C, Tam A, O'Kane M, MacCarthy F, et al. Comparison of risk scoring systems for critical care patients with upper gastrointestinal bleeding: predicting mortality and length of stay. Anaesthesiol Intensive Ther. 2022;54(4):310-4. https://doi.org/10.5114/ait.2022.120741
15. Cassana A, Scialom S, Segura E, Chacaltana A. Estudio de validación diagnóstica de la escala de Glasgow-Blatchfordpara la predicción de mortalidad en pacientes con hemorragia digestiva alta en un hospital de Lima, Perú (junio 2012-diciembre 2013). Rev Esp Enferm Dig. 2015;107(8):476-82. https://doi.org/10.17235/reed.2015.3745/2015
16. Aktas G, Ustaoglu M, Bakir T, Aslan R, Goren F, Bektas A. Analysis of the patients with nonvariceal upper gastrointestinal bleeding and comparison of Rockall and Glasgow-Blatchford scores. Indian Journal of Gastroenterology. 2022;41(6):576–82. https://doi.org/10.1007/s12664-022-01290-z

https://doi.org/10.22516/25007440.1407

Original article

Differences in Gastroenterology Procedure Rates in Colombia According to Geographic Location and Health Insurance Regimen

Juan Pablo García-Marmolejo,[1*] Juan Samuel Hernández,[1] Carlos Lombo-Moreno,[2] Nancy Herrera-Leaño,[2] Julián Barahona-Correa,[2] Óscar Muñoz-Velandia,[2,3] Alberto Rodriguez-Varón.[2,4]

OPEN ACCESS

Citation:
García-Marmolejo JP, Hernández JS, Lombo-Moreno C, Herrera-Leaño N, Barahona-Correa J, Muñoz-Velandia O, Rodriguez-Varón A. Differences in Gastroenterology Procedure Rates in Colombia According to Geographic Location and Health Insurance Regimen. Revista. colomb. Gastroenterol. 2025;40(3):292-299.
https://doi.org/10.22516/25007440.1407

[1] Physician, Internal Medicine Resident, Pontificia Universidad Javeriana. Bogotá, Colombia.
[2] Internal Medicine Physician, Hospital Universitario San Ignacio. Bogotá, Colombia.
[3] Internal Medicine Physician, Epidemiologist, Associate Professor of Internal Medicine, School of Medicine, Pontificia Universidad Javeriana. Bogotá, Colombia.
[4] Internal Medicine Physician, Gastroenterologist, Associate Professor of Gastroenterology, School of Medicine, Pontificia Universidad Javeriana. Bogotá, Colombia.

***Correspondence:** Juan Pablo García-Marmolejo.
jp-garciam@javeriana.edu.co

Received: 25/06/2025
Accepted: 11/08/2025

Abstract

Introduction: Previous evidence suggests the existence of barriers that may result in differential access to healthcare in Colombia; however, the impact on diagnostic gastroenterology procedures has not been evaluated. **Objectives:** To assess procedure rates (PR) in gastroenterology and describe differences according to geographic location, insurance regimen, age, and sex. **Methods:** Secondary analysis of a population-based database containing data reported to the Integrated Social Protection Information System (SISPRO) in Colombia between 2017 and 2023. PRs were calculated for esophagogastroduodenoscopy (EGD), colonoscopy, endoscopic ultrasound (EUS), and endoscopic retrograde cholangiopancreatography (ERCP). Procedure rate ratios (PRRs) were computed according to geographic region, sex, and insurance regimen. **Results:** National PRs ranged from 66 per 100,000 inhabitants for EUS to 4,144 per 100,000 for EGD, with significantly lower rates in the Caribbean coast, southern, and eastern regions of Colombia. PRs were higher in women (PRR EGD: 1.66; confidence interval [CI]: 1.65–1.66; $p < 0.001$; PRR ERCP: 1.52; CI: 1.45–1.59; $p < 0.001$) and lower in patients under the subsidized insurance regimen (PRR ERCP: 0.85; CI: 0.82–0.89; $p < 0.0001$; PRR EUS: 0.50; CI: 0.49–0.51; $p < 0.0001$). A progressive increase in procedure rates with age was observed. **Conclusions:** Our findings indicate that procedure rates increase with age and are higher in women. Furthermore, patients residing in certain geographic areas of Colombia and those enrolled in the subsidized insurance regimen face barriers to accessing gastroenterology procedures. These results underscore the need to implement public health policies aimed at reducing these disparities.

Keywords

Diagnostic techniques and procedures, surgical procedures of the digestive system, gastroenterology, barriers to healthcare Access.

INTRODUCTION

Gastrointestinal diseases account for up to 10% of consultations for patients presenting to emergency departments in Colombia[1]. Some of the most prevalent include *Helicobacter pylori* infection (present in up to 38.5% of the population), irritable bowel syndrome (20%), and gastroesophageal reflux (11.9%)[2-4]. Others are less prevalent but have a high impact on mortality, such as gastric cancer, with an age-standardized mortality rate (ASMR) of 9.9 per 100,000 inhabitants, and colorectal cancer, with an ASMR of 8.0 per 100,000 inhabitants[5]. Upper gastrointestinal bleeding (UGIB) has a mortality rate close to 10%[6], and acute cholangitis, up to 65%[7]. The management of these diseases typically requires performing multiple procedures, among which upper gastrointestinal endoscopy (UGIE),

© 2025 Asociación Colombiana de Gastroenterología

colonoscopy, endoscopic retrograde cholangiopancreatography (ERCP), and endoscopic ultrasound (EUS) are prominent.

The availability and potential barriers to access for diagnostic or therapeutic procedures for various gastrointestinal diseases in Colombia have not been studied until now. However, for different diseases, significant differences have been found in access to diagnostic interventions or specific treatments based on geographic regions or health insurance regimens. For example, Mora-Moreo et al.[8] demonstrated that the use of health services differed by regimen, finding lower demand, access, and provision of health services in the population enrolled in the subsidized regime. Parra-Lara et al.[9] analyzed the five-year overall survival of patients with gastric cancer and found lower survival among those belonging to the subsidized regime and those residing in rural areas. Gaitán et al.[10] found significant inequality in events reported to the Public Health Surveillance System (SIVIGILA) in Colombia, which disadvantages the population enrolled in the subsidized regime in almost all departments, and is more notable in areas such as Cauca, Huila, Córdoba, Santander, and Casanare. Likewise, approximately 6.5% of rural households had difficulties receiving or acquiring health services.

Based on the above, it is suspected that barriers to healthcare may generate differential access to diagnostic or therapeutic procedures in gastroenterology in Colombia; however, this gap has not been quantified, nor have the potential specific associated factors.

The objective of this study is to evaluate the rates of performance of diagnostic or therapeutic procedures in gastroenterology and to describe whether there are differences in the performance rate according to geographic location, insurance regimen, age, and sex, based on information reported between 2017 and 2023 to the SISPRO information system (Integrated Social Protection Information System) in Colombia.

MATERIALS AND METHODS

This is a secondary analysis of a population-based database to evaluate the frequency of performance of diagnostic or therapeutic procedures that were recorded in the SISPRO system. Procedures were identified using the CUPS code (Unique Health Procedure Classification). These codes describe in a detailed and validated manner the procedures performed based on the billing and payment of procedures to different healthcare providers in Colombia[11]. The SISPRO system is a tool developed by the Ministry of Health of Colombia where the basic information required for the direction, regulation, and control of the processes of the general social security health system is stored and processed. Its reliability has been previously demonstrated as it includes data verification and encompasses information from over 98% of the Colombian population[12]. The study was approved by the ethics committee of Pontificia Universidad Javeriana and Hospital Universitario San Ignacio under record number FM-CIE-0013-24.

Data extraction was performed using online pivot tables. To identify the procedures performed, CUPS codes 441301, 441302, 441303, 452301, 452303, 452305, 511000, and 881317 were used, corresponding to UGIE, colonoscopy, ERCP, and EUS. Information was extracted in aggregate at the national level and subsequently divided by department, sex, five-year age group, and health system membership regimen (subsidized or contributory). All information recorded between 2017 and 2023 was considered.

Procedure performance rates were adjusted according to geographic location, membership regimen, age, and sex. Performance rates were calculated by dividing the number of procedures by the number of people within a specific category. Data from the national census conducted in 2018 were used for the denominators.

The procedure rate ratio was calculated by dividing the procedure performance rate in each category by the rate in the reference category ("men" for sex, "Bogotá" for geographic regions, and "contributory" for the health system membership regimen). Statistical analysis was performed using the Stata 16 statistical program (Statacorp, College Station, TX, USA). Datawrapper software was used for graphical analysis according to the country's departments.

RESULTS

Between 2017 and 2023, a total of 3,397,816 gastroenterology procedures (UGIE, colonoscopy, ERCP, or EUS) were performed in Colombia, for a performance rate of 7041 procedures per 100,000 inhabitants. Of these, 1,999,841 were UGIE, 1,357,963 were colonoscopy, 31,853 were EUS, and 8,159 were ERCP, with procedure performance rates of 4144 (UGIE), 2814 (colonoscopy), 66 (EUS), and 17 (ERCP) per 100,000 inhabitants.

Figure 1 shows the performance rates of different procedures according to geographic location within the country. UGIE was performed most frequently in the Coffee Axis region (Risaralda, Caldas, Quindío), Caquetá, and Bogotá, with notably low procedure performance rates in areas such as Amazonas, Guainía, and the Caribbean Coast. For colonoscopy, it was noteworthy that Chocó had the highest performance rate (12,263 procedures per 100,000 inhabitants), followed by Quindío, Bogotá, and Risaralda, values significantly higher than those found for areas such as Vichada, Guainía, and Vaupés, which had the lowest rates. Regarding EUS, a significantly higher procedure per-

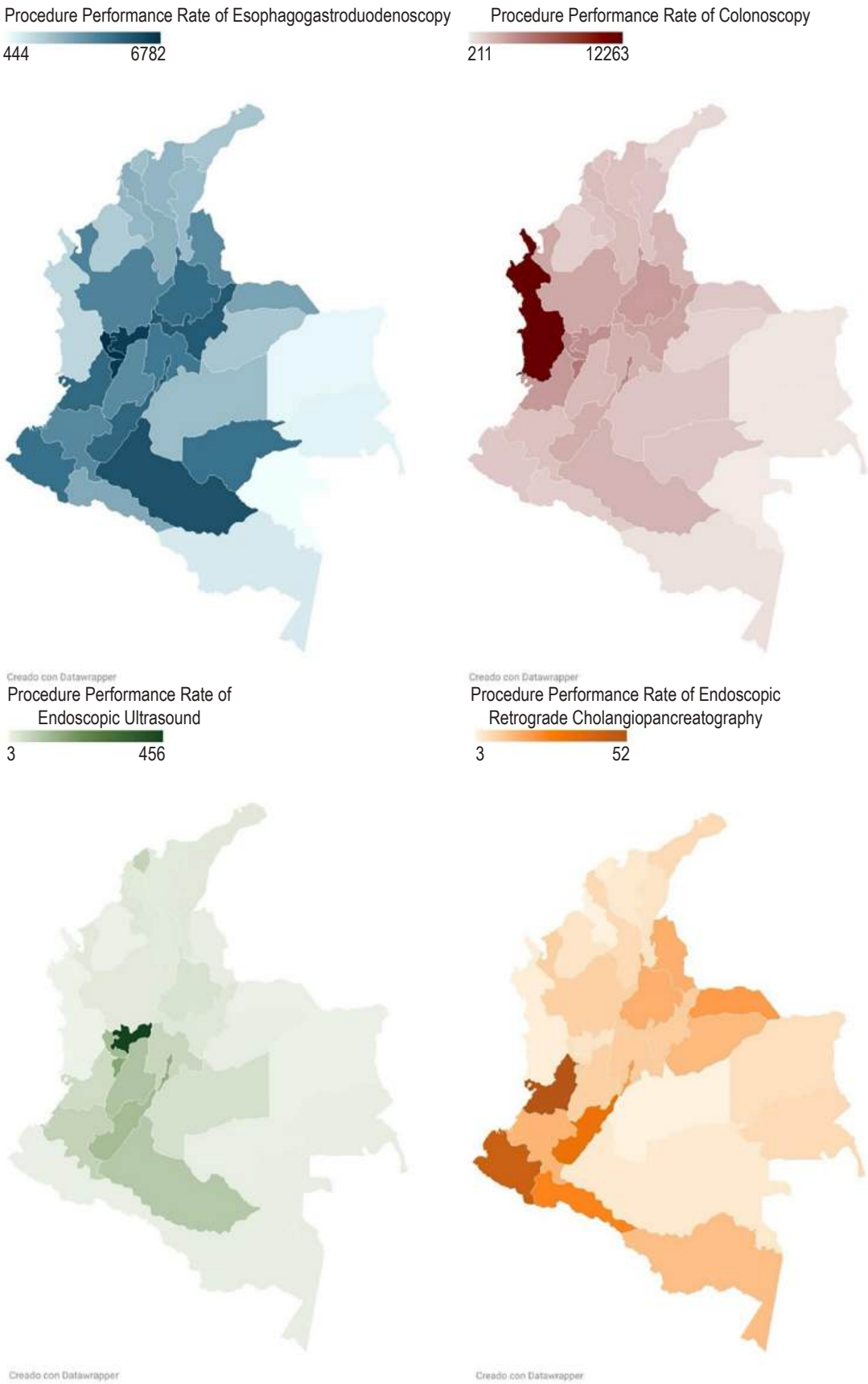


Figure 1. Procedure performance rate according to geographic distribution*. *Rates adjusted by department per 100,000 inhabitants. Images property of the authors.

formance rate was evidenced in the Coffee Axis, and especially in Caldas (456 procedures per 100,000 inhabitants), followed by Quindío (164 procedures), which is higher than that found in areas like Bogotá, Valle del Cauca, and Antioquia. Finally, for ERCP, the highest rate was in Valle del Cauca, Nariño, and Huila, with rates exceeding 30 procedures per 100,000 inhabitants.

Table 1 shows the procedure rate ratio of Colombian departments compared to the city of Bogotá. For UGIE, a higher rate ratio was noted in the Coffee Axis (Risaralda, Quindío, and Caldas), Boyacá, and Caquetá. For colonoscopy, the rate was especially higher in Chocó (2.91; confidence interval [CI]: 2.88-2.93). For EUS, the performance rate ratio was higher in Caldas (3.07; CI: 2.96-3.18). Finally, the departments of Valle del Cauca (2.53; CI: 2.37-2.7) and Nariño (2.17; CI: 1.99-2.37) had the highest ERCP performance rate ratio, all with a statistically significant difference compared to Bogotá (p <0.0001).

Figure 2 presents the procedure performance rate by five-year age groups and sex. It is generally evident that the performance rate for all procedures increases with age and is highest in patients over 60 years old. Additionally, it was found that the performance rate in women was higher, with a procedure rate ratio for UGIE of 1.66 (CI: 1.65-1.66), for colonoscopy of 1.61 (CI: 1.61-1.62), for EUS of 1.65 (CI: 1.61-1.69), and for ERCP of 1.52 (CI: 1.45-1.59). All differences were statistically significant (p <0.0001).

When comparing the procedure rate ratio according to the type of health system membership, it was found that fewer procedures are performed in patients belonging to the subsidized regime compared to the contributory regime. For UGIE, the rate ratio was 0.81 (CI: 0.80-0.81), for colonoscopy 0.68 (CI: 0.67-0.68), for EUS 0.50 (CI: 0.49-0.51), and for ERCP 0.85 (CI: 0.82-0.89), all with a statistically significant difference (p <0.0001).

DISCUSSION

This study evaluates the performance rates of gastroenterology procedures and the differences according to geographic location, insurance regimen, age, and sex. Our results show that there are regional differences in procedure performance rates, which are higher in the Coffee Axis, southwestern Colombia, and Bogotá, and lower in the Caribbean

Table 1. Procedure Rate Ratio by Department, Compared to Bogotá*

Department	UGIE	Colonoscopy	EUS	ERCP
Bogotá	1	1	1	1
Antioquia	0.78 (0.77-0.78)	0.66 (0.65-0.67)	0.12 (0.11-0.13)	0.48 (0.44-0.53)
Valle	0.94 (0.93-0.94)	0.81 (0.81-0.82)	0.33 (0.31-0.34)	**2.53 (2.37-2.70)**
Caldas	**1.20 (1.19-1.21)**	0.90 (0.89-0.91)	**3.07 (2.96-3.18)**	0.26 (0.20-0.35)
Nariño	0.89 (0.88-0.90)	0.37 (0.36-0.37)	0.06 (0.05-0.07)	**2.17 (1.99-2.37)**
Chocó	0.30 (0.29-0.30)	**2.91 (2.88-2.93)**	0.02 (0.01-0.03)	0.19 (0.11-0.29)
Putumayo	0.56 (0.55-0.57)	0.32 (0.31-0.33)	0.06 (0.04-0.09)	**1.27 (1.01-1.57)**
Caquetá	**1.07 (1.06-1.09)**	0.55 (0.54-0.56)	0.62 (0.55-0.68)	0.26 (0.16-0.40)
Quindío	**1.23 (1.22-1.24)**	**1.17 (1.15-1.18)**	**1.10 (1.03-1.18)**	0.48 (0.36-0.63)
Huila	0.95 (0.94-0.96)	0.61 (0.60-0.62)	0.78 (0.74-0.83)	**1.63 (1.44-1.82)**
Risaralda	**1.27 (1.26-1.29)**	0.98 (0.97-0.99)	0.79 (0.74-0.84)	0.32 (0.24-0.41)
Boyacá	**1.02 (1.01-1.03)**	0.69 (0.69-0.70)	0.17 (0.15-0.19)	0.55 (0.46-0.65)
Santander	0.92 (0.91-0.92)	0.78 (0.78-0.79)	0.84 (0.74-0.94)	0.24 (0.22-0.26)
Atlántico	0.41 (0.42-0.43)	0.39 (0.38-0.39)	0.17 (0.13-0.21)	0.44 (0.41-0.46)

*All results are statistically significant (p <0.0001). UGIE: upper gastrointestinal endoscopy, ERCP: endoscopic retrograde cholangiopancreatography. EUS: endoscopic ultrasound. Table prepared by the authors.

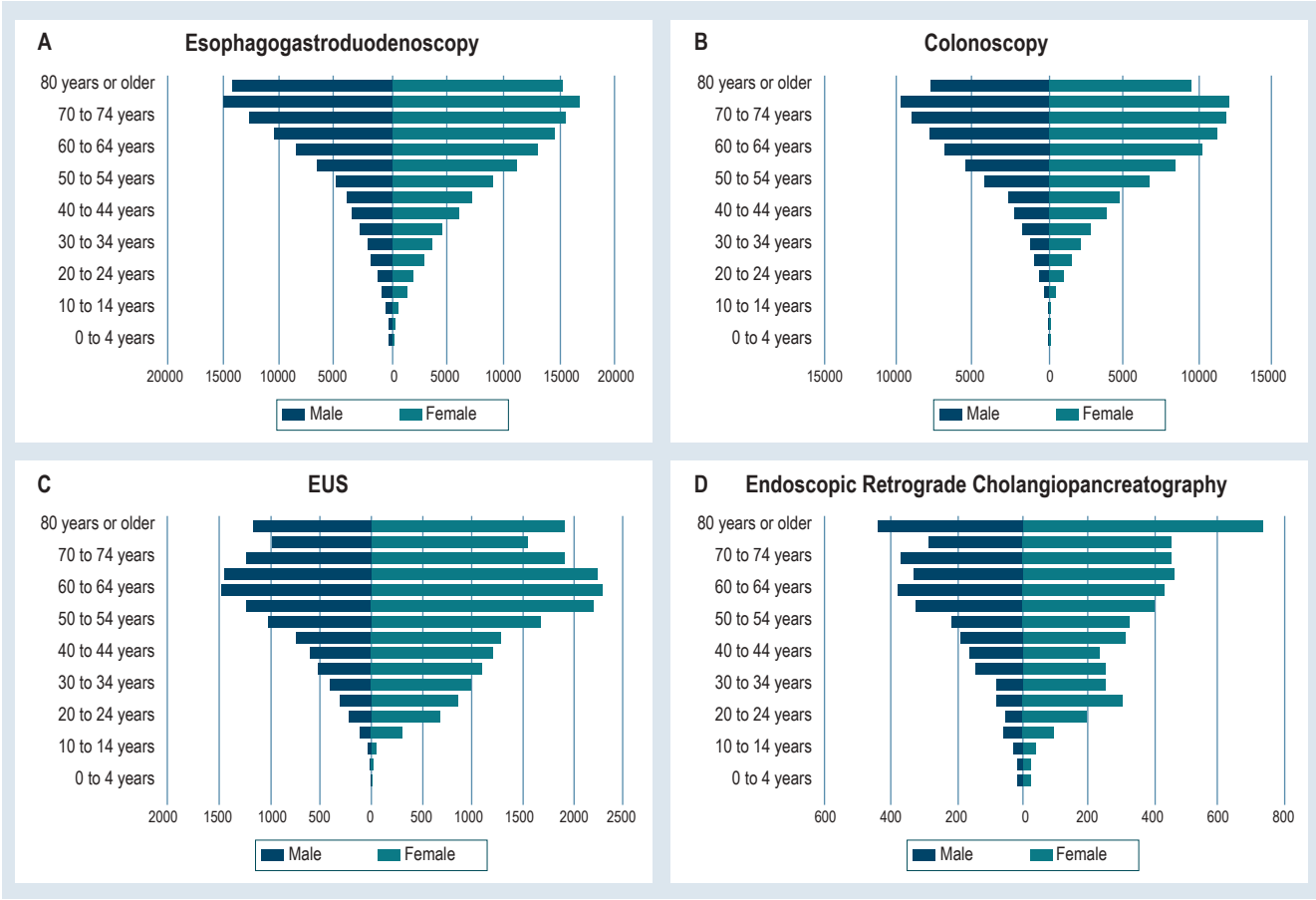


Figure 2. Procedure performance rates by age and sex, adjusted by department per 100,000 inhabitants. Images property of the authors.

coast, the south, and eastern Colombia, with specific differences for each type of procedure. It was also demonstrated that the procedure performance rate increases with age, is higher in women than in men, and that patients belonging to the contributory regime undergo more procedures than those belonging to the subsidized regime.

In our study, we found that a total of 3,397,816 diagnostic or therapeutic procedures were performed in Colombia over 7 years, with an annual average of 250,000 UGIE, 200,000 colonoscopies, 4,500 EUS, and 1,200 ERCP. The procedure with the highest annual performance rate was UGIE (518 per 100,000 inhabitants), a value much lower than that reported in the United States (5882 per 100,000 inhabitants)[13], but higher than that reported in Spain for 2014 (61.6 per 100,000 inhabitants)[14]. However, it is difficult to compare these results given the different methodologies used in each study. Similarly, it is difficult to compare rates with other Latin American countries due to the absence of data in the literature.

Regarding geographic distribution, we found a higher procedure performance rate in the Coffee Axis, southwestern Colombia, and Bogotá, an expected finding given the greater number of healthcare provider institutions capable of performing these procedures in these regions of the country. For colonoscopy, it was found that Chocó had a considerably higher performance rate compared to the rest of the country, 2.91 times higher than that reported in Bogotá. Analyzing the trend in the number of procedures performed per year, an increase is evident from 609 in 2021, to 12,770 in 2022, and up to 49,268 colonoscopies in 2023. Similar findings (but to a lesser extent) were found for UGIE and EUS in Guaviare and for ERCP in Putumayo. These results can be explained by potential voluntary or involuntary errors in the billing of the procedure or reporting to the health system, either due to reports of procedures not performed in that area or procedures that were referred and performed in other regions; considering that the mentioned departments have lower socioeconomic development and lack the installed

capacity and sufficient resources to perform such a volume of procedures. These findings should trigger audit and control mechanisms in the system to determine the causes and generate corrective measures if voluntary errors in billing the system are documented.

Regarding sex, it was found that, on average, 60% more procedures are performed in women, a finding that contrasts with reports by the Pan American Health Organization (PAHO), with data suggesting that women have clear barriers to accessing health services, which could decrease the procedure performance rate[15]. This finding can be explained by a higher frequency of functional gastrointestinal pathology[16], which becomes the indication for performing procedures. Additionally, it suggests that women have greater adherence to clinical and procedural follow-ups.

The higher performance rate of ERCP and EUS in those over 80 years of age is noteworthy, which may be due to a higher prevalence of neoplastic pathology involving the biliary tract in this age group and a higher frequency of comorbidities that may contraindicate surgical management of these pathologies[17]. In fact, Rodríguez et al. have reported that ERCP is a safe technique, with a low percentage of complications and effective in patients over 90 years old[18]. Additionally, an increase in the ERCP performance rate is evident in women between 25 and 29 years old, a finding consistent with the peak prevalence age for cholelithiasis and choledocholithiasis[19], conditions that increase the need to perform ERCP.

A lower procedure performance rate was also found in the subsidized regime, and the gap is greater for high-cost procedures like EUS (50% less compared to the contributory regime), a finding possibly associated with the fact that health institutions providing care to patients in this regime do not have the availability of such procedures, or due to barriers to healthcare access in that regime. These findings are similar to those found by Mora-Moreo et al.[8] in their systematic literature review, which demonstrated that the use of health services differed by regime, and found lower demand, access, and provision of health services in the subsidized regime.

Among the limitations of this study is, first, the potential bias associated with recording errors in the SISPRO platform, which, being for public use, can lead to errors in data entry resulting in underreporting. However, this bias is mitigated by the verification mechanisms implemented for the system. Audit and control mechanisms should be strengthened to limit the number of voluntary or involuntary errors in the system. A second limitation is the lack of detail in the data, which, for example, makes it difficult to identify in which region a procedure was billed and in which region it was ultimately performed. Third, our study shows the procedure performance rate and allows for generating hypotheses about potential barriers to system access, but it does not allow for specifically characterizing the reasons or the importance of each of them. Complementary studies should delve deeper into these findings to generate specific actions that mitigate the described differences in access to procedures.

Fourth, our study did not include procedures performed privately and, therefore, not reported to the SISPRO system. However, we believe the impact of this potential bias is low, as demonstrated in previous studies estimating that out-of-pocket health expenditure of the Colombian population is less than 10%[20] and, therefore, high-cost procedures are not typically performed privately. Fifth, it must be considered that the COVID-19 pandemic may have caused a transient reduction in the frequency of procedure performance during 2020 and 2021 due to health restrictions and the suspension of elective procedures in many regions of the country. This phenomenon could explain part of the observed interannual variability and must be considered when interpreting the results. Finally, this is an exploratory study based on administrative records and, as such, does not allow for the direct identification of the specific causes of access barriers. However, the patterns found allow for generating hypotheses about potential structural inequalities that should be investigated through qualitative or longitudinal studies.

CONCLUSIONS

Our study is the first to describe, at a national level, the performance rate of gastroenterology procedures and shows significant regional differences. Additionally, it demonstrated that the procedure performance rate increases with age, is higher in women, and in patients belonging to the contributory regime, findings consistent with previous studies showing barriers to healthcare access in certain areas of Colombia and differential access according to the type of membership. This is a call to action to establish public health policies that minimize these gaps. More studies are needed to identify the barriers to access and the impact of each of them.

REFERENCES

1. Bejarano M, Gallego CX, **Gómez JR.** Frecuencia de abdomen agudo quirúrgico en pacientes que consultan al servicio de urgencias. Rev Colomb Cir. 2011;26:33-41.
2. Páramo Hernández DB, Albis R, Galiano MT, Mendoza de Molano B, Rincón R, Pineda Ovalle LF, et al. Prevalencia de síntomas del reflujo gastroesofágico y factores asociados: una encuesta poblacional en las principales ciudades de Colombia. Rev. colomb. Gastroenterol. 2017;31(4):337-46. https://doi.org/10.22516/25007440.108
3. Pontet Y, Olano C. Prevalencia de síndrome de intestino irritable en América Latina. Rev Gastroenterol Perú. 2021;41(3):144-149. https://doi.org/10.47892/rgp.2021.413.1154
4. Sepúlveda Copete M, Maldonado Gutiérrez C, Bravo Ocaña JC, Satizabal N, Gempeler Rojas A, Castro Llanos AM, et al. Prevalencia de Helicobacter pylori en pacientes llevados a endoscopia de vías digestivas altas en un hospital de referencia en Cali, Colombia, en 2020. Rev Colomb Gastroenterol. 2022;37(4):355-61. https://doi.org/10.22516/25007440.868
5. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021;71(3):209-249. https://doi.org/10.3322/caac.21660
6. Vreeburg EM, Terwee CB, Snel P, Rauws EA, Bartelsman JF, Meulen JH, et al. Validation of the Rockall risk scoring system in upper gastrointestinal bleeding. Gut. 1999;44(3):331-5. https://doi.org/10.1136/gut.44.3.331
7. An Z, Braseth AL, Sahar N. Acute Cholangitis: Causes, Diagnosis, and Management. Gastroenterol Clin North Am. 2021;50(2):403-414. https://doi.org/10.1016/j.gtc.2021.02.005
8. Mora-Moreo L, Estrada-Orozco K, Espinosa O, Melgarejo LM. Characterization of the population affiliated to the subsidized health insurance scheme in Colombia: a systematic review and meta-analysis. Int J Equity Health. 2023;22(1):28. https://doi.org/10.1186/s12939-022-01818-x
9. Parra-Lara L, Falla-Martinez J, Bravo J, Bravo L, Zambrano A. Health disparities and gastric cancer survival in Cali, Colombia: a hospital-based study. Annals Of Oncology. 2019;30:iv94. https://doi.org/10.1093/annonc/mdz155.340
10. Hilarión-Gaitán L, Díaz-Jiménez D, Cotes-Cantillo K, Castañeda-Orjuela C. Desigualdades en salud según régimen de afiliación y eventos notificados al Sistema de Vigilancia (Sivigila) en Colombia, 2015. Biomédica. 2019;39(4):737-747. https://doi.org/10.7705/biomedica.4453
11. Ministerio de Salud y Protección Social. Contenido tabla de referencia CUPS [Internet]. SISPRO [consultado el 4 de febrero de de 2025]. Disponible en: https://web.sispro.gov.co/WebPublico/Consultas/ConsultarDetalleReferenciaBasica.aspx?Code=CUPS
12. Ministerio De Salud y Protección Social. Resolución número 2077 de 2021, por la cual se establece la Clasificación Única de Procedimientos en Salud – CUPS [Internet]. Ministerio De Salud y Protección Social; 2021 [consultado el 4 de febrero de de 2025]. Disponible en: https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/DIJ/resolucion-2077-de-2021.pdf
13. Ruhl CE, Everhart JE. Indications and outcomes of Gastrointestinal Endoscopy. En: Everhart JE (editor). The Burden of Digestive Diseases in the United States. Washington, DC: US Government Printing Office; 2008. p. 123-36.
14. García-Rodríguez A, Fernández-Esparrach G, Sendino O, Ginès A; en representación del Grupo de Ecoendoscopia de la SEED. State of endoscopic ultrasonography in Spain in 2017. Gastroenterol Hepatol. 2018;41(10):672-678. https://doi.org/10.1016/j.gastrohep.2018.06.009
15. Houghton N, Báscolo E, Jara L, Cuellar C, Coitiño A, Del Riego A, et al. Barreras de acceso a los servicios de salud para mujeres, niños y niñas en América Latina. Rev Panam Salud Publica. 2022;46:e94. https://doi.org/10.26633/RPSP.2022.94
16. Mayer EA, Naliboff B, Lee O, Munakata J, Chang L. Review article: gender-related differences in functional gastrointestinal disorders. Aliment Pharmacol Ther. 1999;13 Suppl 2:65-9. https://doi.org/10.1046/j.1365-2036.1999.00008.x
17. Zhu H, Ji K, Wu W, Zhao S, Zhou J, Zhang C, et al. Describing Treatment Patterns for Elderly Patients with Intrahepatic Cholangiocarcinoma and Predicting Prognosis by a Validated Model: A Population-Based Study. J Cancer. 2021;12(11):3114-3125. https://doi.org/10.7150/jca.53978
18. Rodríguez-González FJ, Naranjo-Rodríguez A, Mata-Tapia I, Chicano-Gallardo M, Puente-Gutiérrez JJ, López-Vallejos P, et al. ERCP in patients 90 years of age and older. Gastrointest Endosc. 2003;58(2):220-5. https://doi.org/10.1067/mge.2003.363
19. Gaitán JA, Martínez VM. Enfermedad litiásica biliar, experiencia en una clínica de cuarto nivel, 2005-2011. Rev Colomb Cir. 2014;29(3):188-96. https://doi.org/10.30944/20117582.397
20. Alvis-Zakzuk J, Marrugo-Arnedo C, Alvis-Zakzuk NJ, De la Rosa FG, Florez-Tanus Á, Moreno-Ruiz D, et al. Gasto de bolsillo y gasto catastrófico en salud en los hogares de Cartagena, Colombia. Rev Salud Pública. 2018;20(5):591-8. https://doi.org/10.15446/rsap.v20n5.61403

https://doi.org/10.22516/25007440.1368

Original article

Relationship Between Quality of Life and an Educational Strategy Based on the Information Needs of Patients With Liver Cirrhosis

Ismael Yepes-Barreto,[1*] Guillermo Donado-Gamez,[2] Sindy Yohana Poveda-Salinas.[3]

OPEN ACCESS

Citation:
Yepes-Barreto I, Donado-Gamez G, Poveda-Salinas SY. Relationship Between Quality of Life and an Educational Strategy Based on the Information Needs of Patients With Liver Cirrhosis. Revista. colomb. Gastroenterol. 2025;40(3):300-306.
https://doi.org/10.22516/25007440.1368

[1] Doctorate, PhD. Assistant Professor. Universidad de Cartagena. Cartagena, Colombia.
[2] Internal Medicine Physician. Gastropack S.A.S. Cartagena, Colombia.
[3] Physician, Specialist in Internal Medicine and Hepatology. Hepatologist. Clínica Imbanaco. Cartagena, Colombia.

***Correspondence:** Ismael Yepes-Barreto.
ismayep@yahoo.com

Received: 26/04/2025
Accepted: 15/07/2025

Abstract

Introduction: Implementation of educational strategies in patients with liver cirrhosis has been shown to improve quality of life. However, these results may not be generalizable to all populations, as information needs vary according to sociodemographic characteristics, cultural factors, and specific determinants of health-related quality of life (HRQoL). The aim of this study was to evaluate the relationship between an educational strategy—designed based on previously identified local needs—and quality of life in a population of patients with cirrhosis. **Methods:** A prospective, longitudinal, analytical study was conducted at a second-level outpatient center specializing in chronic liver diseases in Cartagena (Gastropack S. A. S.). All adult patients diagnosed with liver cirrhosis who attended in May 2024 were included. The intervention consisted of providing written informational materials about cirrhosis and its complications, supplemented by synchronous virtual sessions conducted by a hepatology specialist, followed by a final Q&A session. After signing informed consent, patients completed the Chronic Liver Disease Questionnaire (CLDQ), and caregivers completed the Zarit Burden Interview before and after the intervention, administered by a trained interviewer. **Results:** Forty patients were included, with one excluded due to death during follow-up. 64% (n = 25) were female. At the conclusion of the intervention, the CLDQ score increased by an average of 29 points (95% CI: 24–34; $p < 0.001$), representing a 21.8% improvement from baseline, and caregiver burden decreased by 46%. **Conclusion:** An educational strategy incorporating written materials and virtual sessions significantly improved patient quality of life and reduced caregiver burden in individuals with chronic liver disease.

Keywords

Quality of life, liver cirrhosis, health education, caregiver burden.

INTRODUCTION

Liver cirrhosis is the consequence of a chronic necroinflammatory response triggered by various etiological agents, and represents one of the main causes of liver-related mortality, with approximately 2 million deaths annually worldwide[1]. *Quality of life* is a broad concept encompassing the positive and negative aspects of a person's life[2,3]. A systematic review of 109 studies identified multiple factors affecting quality of life in patients with cirrhosis, including hepatic encephalopathy, psychiatric comorbidities (anxiety or depression), frailty, falls, malnutrition, physical symptoms (such as muscle cramps or sleep disorders), and anemia[4]. A Colombian study additionally identified that viral etiology, female sex, and low albumin levels were related to worse quality of life in this population[2].

Caregiver burden is defined as the sustained impact of caregiving on the caregiver's emotional, physical, social, and financial health over time[5]. This situation has been linked to symptoms of depression, anxiety, and burnout

© 2025 Asociación Colombiana de Gastroenterología

syndrome, and can even impact the clinical outcomes of the patient under their care, although it is often an overlooked aspect in medical practice.

Information need, in turn, is defined as "the recognition that available knowledge is insufficient to achieve a goal within a specific context or situation, at a given moment"[6]. A 2015 qualitative study, which included 10 cirrhotic patients, showed that the lack of information and emotional support at the time of diagnosis generated greater anxiety about the disease; additionally, family-centered educational interventions and effective communication with the healthcare team were identified as some of the main priorities for patients in their care process[7].

A local study also indicated that the main information needs of cirrhotic patients included knowledge about complications and disease prognosis, pharmacological treatment, cancer risk, liver transplantation, and nutrition[8]. Dissatisfaction with the information received has been associated with a negative perception of the disease and poor understanding of the prognosis and treatment[9].

Finally, an experimental study conducted in 44 cirrhotic patients in Iran, with a control group (n = 23) and an intervention group (n = 21), observed that an educational strategy significantly increased quality of life in the intervention group (from 139 to 171.6; $p = 0.001$) and decreased in the control group (from 137 to 112.2; $p = 0.001$)[10]. However, these results cannot necessarily be extrapolated to other populations, as information needs and determinants of quality of life may vary according to the sociocultural factors of each region.

MATERIALS AND METHODS

A prospective, longitudinal, and analytical study was conducted. All patients and their relatives who attended the hepatology outpatient clinic at the Gastropack medical center in the city of Cartagena during May 2024 were considered eligible to enter the study, after signing the informed consent.

Only patients over 18 years of age with a new or previous diagnosis of liver cirrhosis, established through clinical, imaging, histological, or elastographic criteria, were included. Pregnant patients, those with concomitant chronic pathologies that could significantly affect their quality of life, and individuals with severe cognitive impairment or hepatic encephalopathy were excluded.

Educational Strategy

An educational intervention was designed based on the information needs previously identified in patients with liver cirrhosis, according to a local study, which determined the following topics as priorities: decompensations and complications, progression and prognosis, pharmacological treatment, risk of hepatocellular carcinoma, liver transplantation, and nutrition.

The strategy consists of weekly 30-minute virtual educational sessions over a period of three months with a question-and-answer session at the end, supplemented by the delivery of written material aimed at both the patient and the caregiver. At the beginning of the intervention, an educational kit is delivered, including printed material with information in simple language about the mentioned topics, as well as a practical guide for accessing the virtual sessions and learning about their thematic content.

Data Collection and Follow-up

Clinical and sociodemographic information was extracted from the medical record and the initial interview. Laboratory and other imaging test results were only considered valid if they did not exceed a period of 30 days from their performance until the patient's inclusion in the study.

A trained interviewer assessed the patients' quality of life and the caregiver burden using the Chronic Liver Disease Questionnaire (CLDQ) and the Zarit questionnaire, respectively. All questionnaires were administered before and after completing the educational intervention.

Quality of Life Assessment (Chronic Liver Disease Questionnaire)

The impact of the educational intervention on quality of life is assessed using the CLDQ questionnaire, a validated tool for patients with chronic liver disease. It consists of 29 items distributed across six domains: abdominal symptoms, fatigue, systemic symptoms, activity, emotional function, and worry. Each item is scored using a Likert scale from 1 to 7, where 1 represents the highest frequency of symptoms (all the time) and 7 the lowest (never). It can be self-administered or applied by a trained interviewer, in person or by telephone[11]. The overall score for the questionnaire is obtained by summing the scores for each dimension. The lower the score, the worse the quality of life.

Caregiver Burden Assessment (Zarit)

The Zarit Burden Interview (ZBI) is composed of 22 items exploring areas such as support network, quality of life, self-care capacity, and skills for coping with the patient's behavioral and clinical challenges. It is a validated tool for clinical and research use and can be self-administered or applied by a trained interviewer, in person or by telephone. With a scoring scale from 0 to 4, where 0 is the minimum

frequency (never) and 4 the maximum frequency (almost always), it classifies caregiver burden as no burden with a score less than 46 points, mild burden between 47 and 55 points, and intense burden greater than or equal to 56 points[12].

Statistical Analysis

Numerical and categorical variables were described as means (standard deviation [SD]) and percentages, respectively. To determine the relationship between the educational strategy and quality of life, a comparison of means test for related samples was performed. A *p*-value of 0.05 was considered statistically significant.

RESULTS

A total of 40 patients diagnosed with liver cirrhosis were initially included, one of whom was excluded during follow-up due to death before the start of the educational intervention. Sixty-four percent (n = 25) of the participants were women. The most frequent socioeconomic status was status 2, at 41% (n = 16). Regarding etiology, the most common was metabolic dysfunction-associated steatotic liver disease (MASLD), at 33% (n = 13), followed by autoimmune cirrhosis at 23% (n = 9), and cryptogenic at 15% (n = 6). The majority of patients (86%, n = 34) were in the compensated phase of the disease (Child-Pugh A). The average body mass index (BMI) was 30.4 kg/m^2 (SD: 5.8). The complete baseline characteristics of the sample are presented in **Table 1**.

Thirty-three caregivers were also included, with a mean age of 50.1 years (SD: 13.7); 78.1% (n = 25) were women and 21.8% (n = 7) were men. Regarding educational level, 53.1% (n = 17) were technologists, 34.3% (n = 11) had completed high school, and 12.5% (n = 4) had university education. Adherence to the strategy varied between patients and relatives. The attendance percentage for the virtual sessions was 64% and 72% for patients and family members, respectively.

Relationship Between the Educational Strategy, Quality of Life, and Caregiver Burden

An average increase of 29 points was observed in the CLDQ questionnaire score (95% confidence interval [CI]: 24-34; p <0.001) compared to the initial measurement, representing a 21.8% improvement from the baseline assessment (**Table 2**). This improvement was consistent across all subscales of the questionnaire and reached statistical significance in all CLDQ domains except for abdominal symptoms. The largest increases were observed in the emotio-

Table 1. Sociodemographic and Clinical Characteristics of Cirrhotic Patients Undergoing an Educational Strategy*

Variable	n = 39
Male Sex	35.9 (14)
Age	67.4 (11.8)
Strata	
- 1	17.9 (7)
- 2	41.0 (16)
- 3	35.9 (14)
- 4	2.6 (1)
- 6	2.6 (1)
Etiology	
- Cryptogenic	15.4 (6)
- MASLD	33.3 (13)
- Autoimmune	23.1 (9)
- Alcoholic	10.3 (4)
- Hepatitis B	5.1 (2)
- Hepatitis C	12.8 (5)
Child-Pugh-Turcotte	
- A	87.2 (34)
- B	12.8 (5)
BMI	30.4 (5.8)
Total Bilirubin	0.9 (0.6)
Indirect Bilirubin	0.5 (0.3)
INR	1.1 (0.3)
PT	12.1 (1.8)
PTT	31.1 (1.5)
ALT	31.3 (13.2)
AST	39.9 (18.8)
Platelets	152.5 (92.7)
Creatinine	0.9 (0.3)
BUN	15.0 (6.9)
Albumin	3.8 (0.5)

*Quantitative variables are expressed as mean (standard deviation) and numerical variables as percentages (absolute number). BUN: blood urea nitrogen; AST: aspartate aminotransferase; ALT: alanine aminotransferase; BMI: body mass index; INR: international normalized ratio; PT: prothrombin time; PTT: partial thromboplastin time. Table prepared by the authors.

nal function and worry domains, while the smallest were reported in the abdominal symptoms, fatigue, and systemic symptoms domains (**Table 3**).

Regarding caregiver burden, the average score on the Zarit scale decreased from 21.2 to 11.5 points, with a mean reduction of 9.7 points, equivalent to a 46% percentage improvement. The reduction in burden was more pronounced among caregivers over 50 years old (10.5 points) compared to those under that age (7.8 points), although the difference did not reach statistical significance.

Table 2. Impact of the Educational Strategy on Quality of Life and Caregiver Burden*

Impact of the Educational Strategy	Before	After	95% CI	*p*
Global CLDQ Scale Score	133	162	24-34	<0.001
Global Zarit Scale Score	21.2	11.5	12-7.5	<0.001

*Analysis of means comparison for related samples. CLDQ: Chronic Liver Disease Questionnaire; CI: confidence interval. Table prepared by the authors.

Table 3. Differences in the Various CLDQ Domains Before and After the Educational Strategy

Type of Score	Before	After	95% CI	*p*
Abdominal Domain	4.8	5.3	0.09 a -1.09	0.1
Fatigue Domain	4.1	4.7	-0.26 a -1.08	0.002
Systemic Domain	4.4	5	-0.19 a -1.04	0.005
Activity Domain	4.8	5.5	-0.3 a -1.12	0.001
Emotional Domain	4.5	5.8	-0.9 a -1.6	<0.001
Worry Domain	4.8	6.5	-1.2 a - 2.2	<0.001

CLDQ: Chronic Liver Disease Questionnaire; CI: confidence interval. Table prepared by the authors.

DISCUSSION

An educational strategy based on the specific information needs of patients with liver cirrhosis demonstrated a significant improvement in quality of life and a substantial reduction in caregiver burden.

Our findings are consistent with a study conducted in cirrhotic patients in Iran[10], where an educational intervention based on a questionnaire about information needs (fatigue, pruritus, xerostomia, cramps, flatulence, nutrition, and pharmacological treatment) showed a significant increase in quality of life in the intervention group (increase of 32 points, $p = 0.001$) and a decrease in the control group (reduction of 25 points, $p = 0.001$).

Another study, conducted in 20 patient-caregiver dyads, evaluated the effect of a brief mindfulness program combined with group support therapy over 4 weeks aimed at patients with cirrhosis and mild depression (Beck Depression Inventory [BDI] >14) using the Beck Depression Inventory to assess depression severity with 21 items and a Likert scale from 0 to 3; the scores for each item are summed to classify depression severity: 0-13: minimal or no depression, 14-19: mild depression, 20-28: moderate depression, 29-63: severe depression, and their caregivers[17]. A significant improvement in health-related quality of life was observed, a reduction in depression in 55% of patients (who went from BDI >14 to BDI <14), and improved sleep. Furthermore, a significant decrease in caregiver burden, measured by the Zarit scale, was evidenced, from 13.0 ± 9.0 to 9.8 ± 6.9 ($p = 0.04$). Although the focus of that intervention differs from ours, both share the goal of reducing anxiety and stress, in our case by decreasing uncertainty about the prognosis through education, and in the case of mindfulness, by regulating the physiological stress response[13].

In Australia, a study conducted in an outpatient center with 116 patients with decompensated cirrhosis implemented an educational intervention focused on treatment adherence, perceptions about the disease, medication, and lifestyle[14]. The intervention group showed significant improvements in illness perception (Brief Illness Perception Questionnaire [B-IPQ]), including greater understanding ($p = 0.004$), perception of symptoms (^{p} = 0.003), and their impact on daily life ($p = 0.005$). The CLDQ score also improved, even in patients ineligible for liver transplantation.

Improvement in disease knowledge does not seem to depend on the intervention format. A study using educational videos showed an increase in global knowledge from 65% to 83% (p <0.001) and was associated with greater adherence to medical check-ups, imaging studies, endoscopies, and treatments[14]. This type of intervention has also been linked to a reduction in hospitalizations and better clinical outcomes[15].

A prospective multicenter study with 402 cirrhotic patients evaluated the predictive value of health-related quality of life on unplanned hospital admissions and mortality[16]. Over 50% of the cohort had low quality of life (CLDQ and EuroQol visual analog scale [EQ-VAS]). Each additional point in CLDQ and each 10 points in EQ-VAS were associated with a 30% and 13% reduction, respectively, in the risk of hospitalization and mortality. Although our study did not evaluate long-term clinical outcomes, it is reasonable to hypothesize that the improvement in quality of life could translate into better clinical progression.

In chronic diseases such as asthma, heart failure, and ischemic heart disease, improving patient knowledge has been shown to be associated with a reduction in hospital readmissions (relative risk [RR] = 0.64; 95% CI: 0.50-0.82), unscheduled appointments (RR = 0.68), emergency room visits (RR = 0.82), and work absenteeism (RR = 0.79)[17-19].

Knowledge questionnaires about cirrhosis, differentiated for compensated and decompensated patients, have recently been designed and validated, addressing topics such as diet, medication, warning signs, screening for liver cancer, and Baveno VII consensus recommendations[20]. These tools can be useful for designing health literacy strategies tailored to the disease stage.

Our results align with this evidence: the educational strategy produced a significant improvement in quality of life, especially in the emotional and worry domains, without requiring high resource consumption. The virtual format allowed for wide coverage at low cost, requiring only access to a computer or a smartphone, technology common even in low socioeconomic contexts. Virtual delivery also helped overcome mobility and logistical barriers, facilitating the participation of patients and caregivers and achieving an attendance rate above 50%, reflecting good acceptance and adherence.

The caregiver plays an essential role in the management of patients with cirrhosis, from compliance with medical indications to the early identification of signs of decompensation[21]. However, caregiver burden and burnout can negatively impact the course of the disease. In pathologies such as dementia and amyotrophic lateral sclerosis, higher mortality has been documented when caregivers experience high levels of stress[22].

In a study including 100 patients with cirrhosis and their caregivers, factors associated with higher caregiver burden were identified as low educational level of the patient or the caregiver themselves, alcoholic etiology, the presence or history of hepatic encephalopathy, repeated hospitalizations, ascites, and low income or socioeconomic status of the patient[23]. Our educational strategy precisely addressed complications associated with these conditions, which likely facilitated a more effective approach to care and reduced the perceived burden on caregivers.

CONCLUSIONS

The education and training of patients and caregivers, focused on improving the understanding of the disease, was associated with a 46% reduction in caregiver burden and a 22% improvement in the quality of life of patients with chronic liver disease. These findings highlight the value of education as an effective non-pharmacological strategy in the comprehensive management of liver cirrhosis.

REFERENCES

1. Riley TR, Smith JP. Preventive care in chronic liver disease. J Gen Intern Med. 1999;14(11):699-704. https://doi.org/10.1046/j.1525-1497.1999.11188.x
2. Yepes Barreto I, Lepesqueur Guillen L. Predictores de calidad de vida en pacientes con enfermedad hepática crónica en Colombia. Rev Colomb Gastroenterol. 2016;30(4):390. https://doi.org/10.22516/25007440.2
3. Labenz C, Toenges G, Schattenberg JM, Nagel M, Huber Y, Marquardt JU, et al. Health-related quality of life in patients with compensated and decompensated liver cirrhosis. Eur J Intern Med. 2019;70:54-9. https://doi.org/10.1016/j.ejim.2019.09.004
4. Rabiee A, Ximenes RO, Nikayin S, Hickner A, Juthani P, Rosen RH, et al. Factors associated with health-related quality of life in patients with cirrhosis: a systematic review. Liver Int. 2021;41(1):6-15. https://doi.org/10.1111/liv.14680
5. Yanny B, Pham NV, Saleh H, Saab S. Approaches to Assessing Burden in Caregivers of Patients with Cirrhosis. J Clin Transl Hepatol. 2020;8(2):127-134. https://doi.org/10.14218/JCTH.2019.00054
6. Hyland ME, Jones RCM, Hanney KE. The Lung Information Needs Questionnaire: Development, preliminary validation and findings. Respir Med. 2006;100(10):1807-16. https://doi.org/10.1016/j.rmed.2006.01.018
7. Abdi F, Daryani NE, Khorvash F, Yousefi Z. Experiences of Individuals With Liver Cirrhosis: A Qualitative Study. Gastroenterology Nursing. 2015;38(4):252. https://doi.org/10.1097/SGA.0000000000000122
8. Yepes-Barreto I, Londoño JP, Mejía P. Necesidades de información de los pacientes con cirrosis hepática y calidad de vida. Rev Colomb Gastroenterol. 2024;39(1):14-28. https://doi.org/10.22516/25007440.1062
9. Burnham B, Wallington S, Jillson IA, Trandafili H, Shetty K, Wang J, et al. Knowledge, Attitudes, and Beliefs of Patients with Chronic Liver Disease. Am J Health Behav. 2014;38(5):737-44. https://doi.org/10.5993/AJHB.38.5.11
10. Zandi M, Adib-Hajbagheri M, Memarian R, Nejhad AK, Alavian SM. Effects of a self-care program on quality of life of cirrhotic patients referring to Tehran Hepatitis Center. Health Qual Life Outcomes. 2005;3:35. https://doi.org/10.1186/1477-7525-3-35
11. Ferrer M, Córdoba J, Garin O, Olivé G, Flavià M, Vargas V, et al. Validity of the Spanish version of the Chronic Liver

Disease Questionnaire (CLDQ) as a standard outcome for quality of life assessment. Liver Transplantation. 2006;12(1):95-104. https://doi.org/10.1002/lt.20551
12. Rodríguez ÁPA, Córdoba AMC, Poches DKP. Escala de sobrecarga del cuidador Zarit: estructura factorial en cuidadores informales de Bucaramanga. Revista de Psicología Universidad de Antioquia. 2016;8(2):87-99. https://doi.org/10.17533/udea.rpsua.v8n2a06
13. Hayward KL, Valery PC, Patel PJ, Horsfall LU, Wright PL, Tallis CJ, et al. Effectiveness of patient-oriented education and medication management intervention in people with decompensated cirrhosis. Intern Med J. 2020;50(9):1142-6. https://doi.org/10.1111/imj.14986
14. Verma M, Chan M, Toroghi S, Gallagher M, Lo K, Navarro V. Multimedia-Based Education Led to Improvement in Disease Knowledge Among Patients with Cirrhosis. Dig Dis Sci. 2024;69(12):4364-72. https://doi.org/10.1007/s10620-024-08704-2
15. Orman ES, Ghabril MS, Desai AP, Nephew L, Patidar KR, Gao S, et al. Patient-Reported Outcome Measures Modestly Enhance Prediction of Readmission in Patients with Cirrhosis. Clin Gastroenterol Hepatol. 2022;20(6):e1426-37. https://doi.org/10.1016/j.cgh.2021.07.032
16. Kok B, Whitlock R, Ferguson T, James Bailey R, Warren Burak K, Kowalczewski J, et al. Health-Related Quality of Life: A Rapid Predictor of Hospitalization in Patients With Cirrhosis. Am J Gastroenterol. 2020;115(4):575-83. https://doi.org/10.14309/ajg.0000000000000545
17. Ramachandran J, Woodman RJ, Muller KR, Wundke R, McCormick R, Kaambwa B, et al. Validation of Knowledge Questionnaire for Patients With Liver Cirrhosis. Clin Gastroenterol Hepatol. 2020;18(8):1867-1873.e1. https://doi.org/10.1016/j.cgh.2019.11.045
18. Kim YJ, Soeken KL. A Meta-Analysis of the Effect of Hospital-Based Case Management on Hospital Length-of-Stay and Readmission. Nursing Research. 2005;54(4):255. https://doi.org/10.1097/00006199-200507000-00007
19. Gibson PG, Powell H, Coughlan J, Wilson AJ, Abramson M, Haywood P, et al. Self-management education and regular practitioner review for adults with asthma. Cochrane Database Syst Rev. 2003;(1):CD001117. https://doi.org/10.1002/14651858.CD001117
20. Bloom PP, Che Z, Hyde A, Johnson E, Miguel-Cruz A, Carbonneau M, et al. Development and Evaluation of a Patient Cirrhosis Knowledge Assessment. Dig Dis Sci. 2024;69(2):399-409. https://doi.org/10.1007/s10620-023-08238-z
21. Nagel M, Weidner V, Schulz S, Marquardt JU, Galle PR, Schattenberg JM, et al. Continued alcohol consumption and hepatic encephalopathy determine quality of life and psychosocial burden of caregivers in patients with liver cirrhosis. Health Qual Life Outcomes. 2022;20(1):23. https://doi.org/10.1186/s12955-022-01923-z
22. Burke T, Hardiman O, Pinto-Grau M, Lonergan K, Heverin M, Tobin K, et al. Longitudinal predictors of caregiver burden in amyotrophic lateral sclerosis: a population-based cohort of patient-caregiver dyads. J Neurol. 2018;265(4):793-808. https://doi.org/10.1007/s00415-018-8770-6
23. Shrestha D, Rathi S, Grover S, Taneja S, Duseja A, Chawla YK, et al. Factors Affecting Psychological Burden on the Informal Caregiver of Patients With Cirrhosis: Looking Beyond the Patient. J Clin Exp Hepatol. 2020;10(1):9-16. https://doi.org/10.1016/j.jceh.2019.06.002

https://doi.org/10.22516/25007440.1293

Original article

Detection of FODMAP Intolerances and Symptom Improvement Following Dietary Intervention in Patients from Northwestern Mexico

Adriana Verónica Bolaños-Villar,[1*] Alejandra Chávez-Ríos,[2] Ana María Calderón de la Barca.[3]

OPEN ACCESS

Citation:
Bolaños-Villar AV, Chávez-Ríos A, Calderón de la Barca AM. Detection of FODMAP Intolerances and Symptom Improvement Following Dietary Intervention in Patients from Northwestern Mexico. Revista. colomb. Gastroenterol. 2025;40(3):307-314.
https://doi.org/10.22516/25007440.1293

[1] Master of Science (Nutrition). Associate Researcher, Centro de Investigación en Alimentación y Desarrollo, A. C. Hermosillo, Sonora, México.
[2] Student, Master of Science. Centro de Investigación en Alimentación y Desarrollo, A. C. Hermosillo, Sonora, Mexico.
[3] Senior Researcher, Nutrition, Centro de Investigación en Alimentación y Desarrollo, A. C. PhD. Hermosillo, Sonora, Mexico.

***Correspondence:** Adriana Verónica Bolaños-Villar.
avb@ciad.mx

Received: 22/10/2024
Accepted: 25/07/2025

Abstract

Introduction: Fermentable oligo-, di-, monosaccharides, and polyols (FODMAP) are associated with gastrointestinal symptoms in patients with gut-brain interaction disorders, negatively impacting quality of life if left untreated. **Objectives:** To identify FODMAP intolerances in patients from Northwestern Mexico referred by gastroenterologists and to design low-FODMAP diets to alleviate their symptoms. **Methods:** A single-group quasi-experimental study was conducted, including breath hydrogen tests to detect small intestinal bacterial overgrowth and intolerances to lactose, fructose, sorbitol, and fructans. Personalized low-FODMAP diets were designed to manage symptoms. Symptoms were assessed at baseline and post-intervention using a 100-mm visual analog scale, and 24-hour dietary recalls were applied. **Results:** Of the 36 patients recruited, 21 (mean age: 35.9 years) completed the study, with 42% diagnosed with irritable bowel syndrome (IBS). At baseline, 92% reported abdominal bloating (mean severity: 6.5 ± 2.4) and flatulence (5.6 ± 2.8). Other reported symptoms included nausea (31%), reflux (28%), anxiety or stress (22%), and insomnia or irritability (17%). Intolerances were observed in 39% for lactose, 33% for fructose, 56% for sorbitol, and 61% for fructans. Following the dietary intervention, severity of abdominal bloating, abdominal pain, borborygmi, diarrhea, constipation, and flatulence decreased significantly ($p \leq 0.05$). Energy and macronutrient intake remained stable throughout the study, whereas FODMAP intake decreased markedly. **Conclusion:** A low-FODMAP dietary intervention tailored to pre-identified specific intolerances effectively reduced patients' gastrointestinal symptoms.

Keywords

Breath test, irritable bowel syndrome, food intolerance, FODMAP diet.

INTRODUCTION

Currently, Mexicans, like many other populations, alongside the stress of modern life, follow poor dietary patterns low in fiber that include ultra-processed foods with various additives[1]. Concurrently, an increase in the prevalence of disorders of gut-brain interaction (DGBI) is observed, which manifest with recurrent and persistent symptoms affecting up to 40% of the world's population[2,3]. Although the pathogenesis of these disorders is not well understood, continuous exposure to ultra-processed, low-fiber foods could promote dysbiosis and disruption of intestinal homeostasis, contributing to the exacerbation of associated symptoms[4,5].

Patients with DGBI often present with intolerance to fermentable oligo-, di-, monosaccharides and polyols (FODMAPs), which are found in various foods, either naturally in fruits and vegetables or as additives in processed products. Consequently, a low-FODMAP diet is recommended to alleviate symptoms such as abdominal bloating, gas, diarrhea, and abdominal pain[6]. A food is considered low in FODMAPs when it contains minimal

amounts of fermentable carbohydrates in a standard serving size. For their classification, specific threshold values have been established for each type of FODMAP, based on clinical evidence regarding the amount that typically triggers digestive symptoms in individuals with irritable bowel syndrome[7].

Some years ago, diagnosing FODMAP intolerance required the use of a very restrictive diet. Each type of food was reintroduced over prolonged periods to identify those causing symptoms through a trial-and-error process[8]. Now, the hydrogen/methane breath test, a reliable and validated technique to measure hydrogen or methane produced after ingesting a carbohydrate, is a useful tool for detecting FODMAP intolerance[9]. This test is neither costly nor invasive and can be accessible to the general population. Once intolerance is identified, a low-FODMAP diet is recommended, excluding foods containing the trigger carbohydrates to alleviate gastrointestinal symptoms[6,8].

The objective of this study was to detect lactose, fructose, sorbitol, and fructan intolerance using hydrogen breath tests, following analysis for small intestinal bacterial overgrowth (SIBO), and to recommend a short-term, personalized treatment with a low-FODMAP diet.

MATERIALS AND METHODS

A prospective quasi-experimental study (before and after in the same group, without including a control group) was conducted in patients with DGBI from Northwestern Mexico. The independent variable was the treatment based on a personalized low-FODMAP diet, according to pre-detected intolerances. The dependent variable was the set of gastrointestinal symptoms. Secondary variables were sex, age, and diet. The study consisted of two periods of one month each. In the first period, hydrogen breath tests were performed, subjecting each patient to a maximum of two tests per week, on different days. In the second period, a nutritionist gave participants dietary recommendations to follow a low-FODMAP diet according to the breath test results.

Participants and Data Recording

A non-probabilistic, purposive sampling method was carried out. Patients referred by gastroenterologists were invited to participate. The study objective and general protocol were explained to them. Those who agreed to participate signed an informed consent form, and their clinical data were recorded. Individuals with celiac disease or small intestinal bacterial overgrowth were excluded, as were patients who had taken antibiotics or undergone a colonoscopy in the last four weeks. Before treatment with the low-FODMAP diet, a 24-hour dietary recall was applied to assess food intake. The severity of gastrointestinal symptoms was also assessed: abdominal pain, abdominal bloating, diarrhea, constipation, gas, borborygmi, and others, using a 100 mm visual analog scale (VAS), with values of 0 (none), 4 (moderate), and 10 (intense)[10].

Hydrogen Breath Tests

Hydrogen breath tests were performed according to the method of Gasbarrini et al.[11]. Patients were instructed the day before the test to avoid consuming alcohol, carbonated beverages, and high-fiber foods. On the day of the examination, they were asked to present after a 12-hour fast and with good oral hygiene. Additionally, they were asked not to engage in sports activity at least one hour before the test because hyperventilation decreases the concentration of exhaled hydrogen, which can compromise diagnostic accuracy. During the test, they were only allowed to drink water.

Initially, SIBO detection was performed with a 65 g dose of glucose (Quintron©, Milwaukee, Wisconsin, USA). Patients with a positive result were referred to a gastroenterologist for treatment and excluded from the study. Patients with a negative result continued with the tests to identify intolerances. For lactose, 25 g (Quintron©) were administered; for fructose, 45 g of agave syrup (Unicornio©, Guadalajara, Mexico), containing 25 g of fructose, were administered. For sorbitol, 10 g (Quintron©) were given, and for fructans, 17.5 g of agave inulin (Unicornio©), containing 8 g of fructans, were given. All doses were dissolved in 250 mL of purified water for administration. Tests were performed with a minimum washout period of three days between them.

In each test, baseline breath samples (in duplicate) were taken before dosing. After administering the corresponding dose (lactose, fructose, sorbitol, or fructans), breath samples (in duplicate) were taken every 20 minutes during the first hour and then every 30 minutes until reaching three hours. During the tests, patients recorded their symptoms using the 100 mm VAS. Upon completion, the hydrogen concentration of the baseline and post-dose samples was measured in a pre-calibrated MicroLyzer mod CM-2 gas chromatograph (Quintron©) using 102 parts per million (ppm) hydrogen (QuinGas, Quintron©). The test was considered positive when an increase of ≥20 ppm of hydrogen compared to the baseline value was obtained.

Breath test interpretation was performed according to Amieva-Balmori et al.[12]. *Malabsorption* was defined as a positive test (H2 ≥20 ppm) without gastrointestinal symptoms, and *intolerance* was defined as a positive test accompanied by symptoms. The test was normal when it was negative (H2 <20 ppm) without symptoms. *Visceral hypersensitivity* was considered when the hydrogen concentra-

tion did not exceed 20 ppm, but during the test, the patient presented new (not habitual) symptoms or experienced ≥2 symptoms with moderate or greater severity (VAS ≥4), suggesting an exaggerated response of the enteric nervous system to the test carbohydrate[13].

Dietary Counseling and Recommendations

Dietary counseling was provided by a nutritionist in weekly 30-50 minute sessions for one month. Patients received individualized diets according to their breath test results. They also received nutritional education based on the Mexican official standard NOM-043-SSA2-2012 "Basic health services, promotion and education for healthy eating"[14] and beverage consumption recommendations[15]. They were trained to measure food portions using the palm of their hand or kitchen utensils. The importance of checking the nutritional labeling of foods and identifying ingredients high in FODMAPs was explained to them using food label samples.

Patients who completed the protocol were advised to avoid high-FODMAP foods for two weeks, then reintroduce them during the following two weeks in small quantities to prevent symptoms and gradually increase the amount based on their tolerance. To help them comply with the dietary recommendations, they were given printed materials, including a list of high and low FODMAP foods, a shopping list, and a seven-day menu with low-FODMAP foods and meals (1320-1504 kcal/day).

Follow-up and Adherence to Dietary Recommendations

Patients were contacted weekly via social media, phone, or in person to resolve doubts and verify their adherence to the treatment. At the end of the month, a 24-hour food recall was applied to indirectly assess adherence to the low-FODMAP diet. The intensity of gastrointestinal symptoms was also assessed using the VAS.

Statistical Analysis

Demographic data, baseline symptoms, and symptoms during the breath tests were analyzed descriptively. The non-parametric Mann-Whitney U test was used to compare symptom severity and differences in FODMAP consumption before and after the dietary recommendations. Statistical significance was set at a p-value ≤0.05. The NCSS package version 2006 (NCSS, LLC. Kaysville, Utah, USA) was used.

Ethical Considerations

All procedures performed in this study followed the principles of the Declaration of Helsinki. The bioethics committee of our institution approved the protocol (CE/011/2018). All participants signed an informed consent form after being informed about the study, and their data were handled with strict confidentiality. Under no circumstances was patient information disclosed that would allow their identification. Their participation in the study was completely voluntary, and they could leave at any time they wished.

RESULTS

Participant Characteristics

Fifty-one subjects were invited to participate in the study, of whom 15 were not eligible (**Figure 1**). Thirty-six participants with negative SIBO tests were recruited. Subsequently, 8 patients dropped out of the study due to the duration of the tests (3 hours), lack of availability to attend appointments, or personal reasons. Of the remaining participants, 28 completed at least two intolerance tests (lactose, fructose, sorbitol, fructans). Afterwards, seven left the study for personal reasons or lack of time. Finally, 21 participants completed the protocol, which included four intolerance tests, counseling, and personalized recommendations for a low-FODMAP diet, and follow-up assessment of gastrointestinal symptoms.

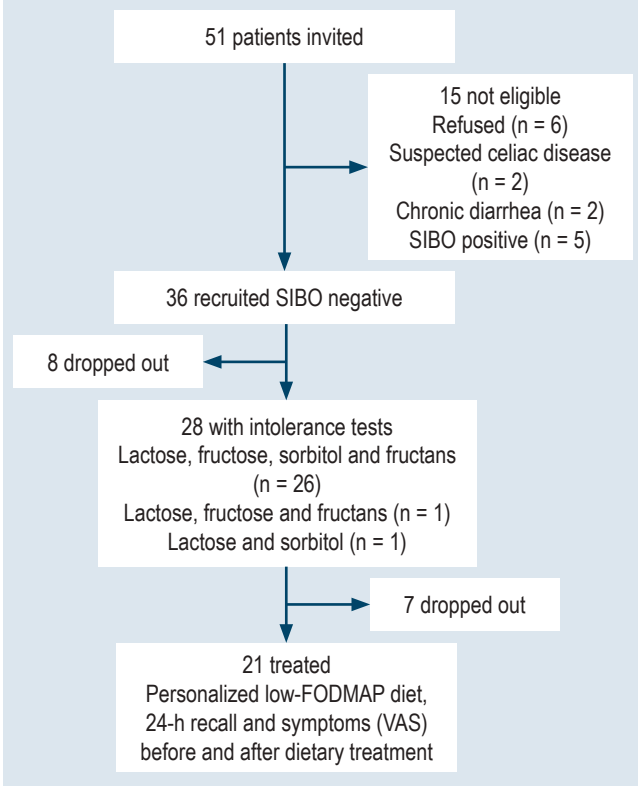


Figure 1. Participant recruitment flow diagram. Image property of the authors.

Participants were predominantly women, with a mean age of 35.9 years (**Table 1**). Forty-two percent had irritable bowel syndrome (IBS) and 8% had had SIBO months before, but symptoms persisted after a negative test. The rest had no defined diagnosis for their condition but experienced persistent gastrointestinal symptoms that worsened after eating.

Table 1. Demographic Characteristics of Participants

Variable	Recruited	Treated
Patients, n (%)	36 (100)	21 (58)
Sex, n (%)		
- Male	8 (22.2)	2 (9.5)
- Female	28 (77.8)	19 (90.5)
Age, mean (SD)	35.9 ± 17.5	36.9 ± 13.4

Data are presented as number (%) of the total group or mean ± standard deviation. SD: standard deviation. Table prepared by the authors.

At the start of the study, 92% of recruited patients presented with abdominal bloating and gas with a severity (VAS: 0-10) of 6.5 ± 2.4 and 5.6 ± 2.8, respectively. Eighty-six percent presented with borborygmi (4.8 ± 2.6), 83% (4.2 ± 2.6) with abdominal pain, 81% (4.3 ± 3.5) with constipation, and 61% (3.4 ± 3.1) with diarrhea. Other symptoms were nausea (31%), reflux (28%), stomach heaviness along with loss of appetite (19%), and belching (11%). Non-gastrointestinal symptoms were anxiety or stress (22%), insomnia or irritability (17%), depression (14%), dizziness (6%), and headache (6%). Most patients (33 of 36) noticed the onset or worsening of symptoms after consuming certain foods, mainly those high in FODMAPs. Other foods related to intestinal discomfort were spicy or fatty foods and irritants, such as coffee.

Hydrogen Breath Tests and Symptoms During Testing

Table 2 presents the prevalence (%) of tests positive for lactose, fructose, sorbitol, and fructans. All patients were positive for one saccharide and more than half (64%) for two or more.

Patients with positive tests showed intolerance to fructans (60.9%), sorbitol (56.5%), lactose (39.1%), and fructose (33.3%). Those with a positive result without symptoms were classified as having malabsorption. Thirteen percent had lactose malabsorption, 13% sorbitol malabsorption, 4.8% fructose malabsorption, and 4.3% fructan malabsorption. Patients with negative tests but who experienced symptoms during the test were classified as having visceral hypersensitivity. Visceral hypersensitivity was present in 21.7% for lactose, 19% for fructose, 17.4% for sorbitol, and 8.7% for fructans.

Table 2. Percentage of Positive Hydrogen Breath Tests*

Saccharide	Recruited (n = 28)	Treated (n = 21)
Lactose	14 (50.0)	12 (57.1)
Fructose	14 (50.0)	8 (38.1)
Sorbitol	19 (67.9)	14 (66.7)
Fructans	18 (64.3)	14 (66.7)

*Data are presented as number (%) of the total group. Table prepared by the authors.

Symptom and Diet Follow-up

All participants who completed the protocol expressed their satisfaction with the symptom relief provided by the low-FODMAP diet (**Figure 2**). Overall, symptom severity decreased significantly ($p \leq 0.05$), primarily abdominal bloating, gas, and borborygmi. Furthermore, they did not present other symptoms such as nausea, reflux, or non-gastrointestinal symptoms.

During follow-up, the nutritionist maintained close contact with the patients to monitor their nutritional needs. The intake of energy, macronutrients, fiber, and calcium did not vary significantly with the low-FODMAP diet (**Table 3**). In contrast, FODMAP intake decreased notably, especially for fructose and fructans ($p \leq 0.05$).

Table 3. Nutrient and FODMAP Content in Participants' Diet Before and After Dietary Recommendations

Variable	Before	After	*p*-value*
Energy, kcal/d	1879.4 ± 1154.4	1914.6 ± 970.2	0.9523
Protein, g/d	75.8 ± 35.2	102.9 ± 78.4	0.6458
Fat, g/d	77.6 ± 59.6	65.7 ± 32.3	0.6458
Carbohydrates, g/d	224.9 ± 118.2	228.9 ± 150.7	0.7342
Fiber, g/d	24.3 ± 15.8	19.6 ± 9.9	0.4116
Calcium, mg/d	778.2 ± 554.6	612.8 ± 306.9	0.4590
Lactose, g/d	3.2 ± 8.7	0.80 ± 2.39	0.0974
Fructose, g/d	12.2 ± 11.7	0.77 ± 1.39	0.0001
Sorbitol, g/d	1.1 ± 2.4	0.23 ± 0.35	0.1347
Fructans, g/d	3.9 ± 7.1	0.20 ± 0.2	0.0007

*Mann-Whitney U test ($p \leq 0.05$). Table prepared by the authors.

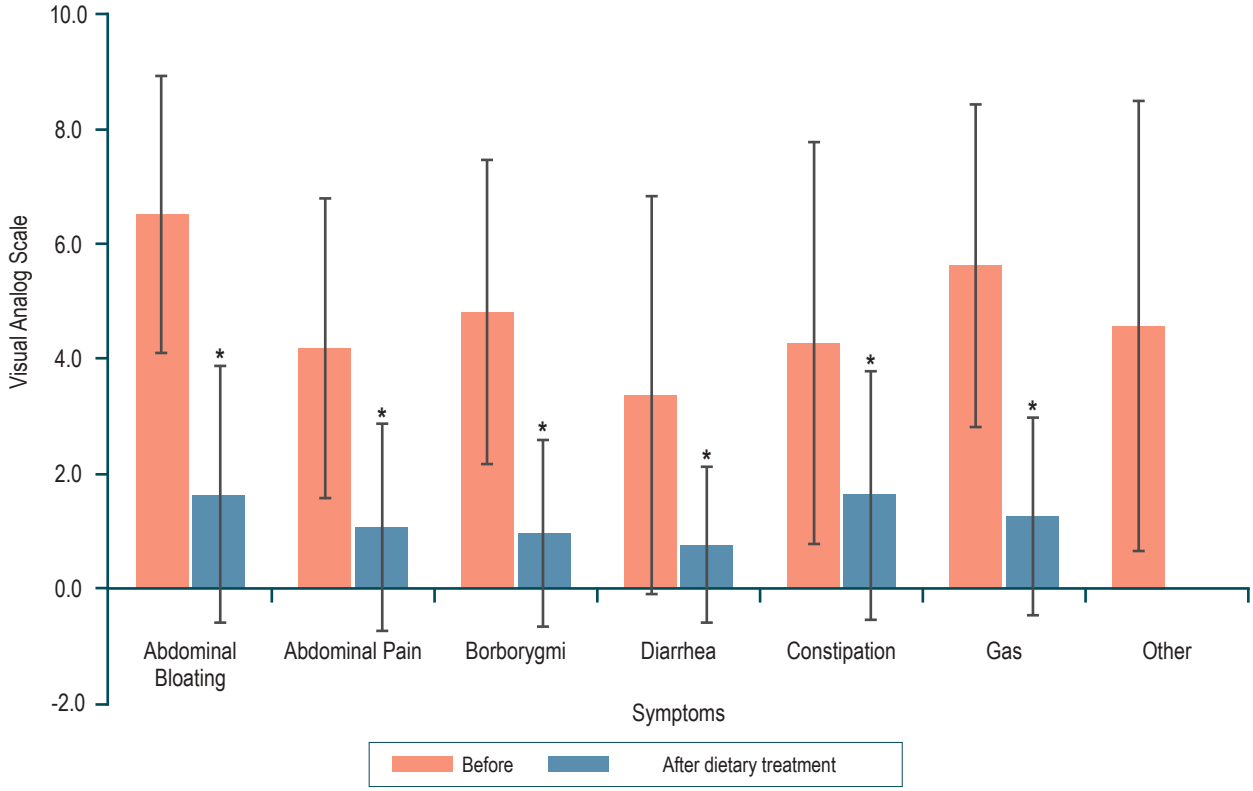


Figure 2. Changes in symptoms after dietary treatment. Values are presented as mean ± standard deviation. *Statistical significance p ≤0.05. Image property of the authors.

DISCUSSION

The initial SIBO test was essential to obtain reliable results in the intolerance tests. Abnormal bacterial growth in the small intestine can induce fermentation and gas production, leading to false positives, so it is necessary to ensure its absence to minimize this risk[16].

At the start of the study, the three most common and severe symptoms reported by our patients were abdominal bloating, gas, and borborygmi, typical in disorders of gut-brain interaction, such as IBS. Gas-related symptoms significantly impact patients' quality of life[17] and, as observed in this study, finding effective solutions to alleviate them is an important achievement[3].

Regarding non-gastrointestinal symptoms, anxiety, stress, insomnia, and irritability were the most frequently mentioned by patients. These symptoms, along with depression, dizziness, and headaches, which were also reported, are associated with disorders of gut-brain interaction, such as IBS[5,18]. Sleep disturbances, for example, could contribute to activating inflammatory cascades, as disruption of circadian rhythms is a form of biological stress[19]. Furthermore, stress affects various functions of the gastrointestinal tract, such as gastric secretion, intestinal motility, and mucosal permeability, which act as cofactors in the development of gastrointestinal symptoms[3]. Therefore, it is necessary to help patients manage stress, as it plays an important role in the pathogenesis of gastrointestinal disorders[20].

Our patients primarily associated their symptoms with high-FODMAP foods, similar to observations in other studies[10,12,17], without knowing they had developed malabsorption or intolerance problems. Identifying the specific symptom triggers allowed for a more refined dietary treatment, which, in turn, indirectly alleviated discomfort in the intestinal mucosa. This specific dietary approach played a crucial role in symptom relief.

This study found a lower prevalence of lactose intolerance (39%) compared to others. Amieva Balmori et al.[12], for example, reported a prevalence of 44% in patients with chronic gastrointestinal symptoms. Wilder-Smith et al.[21] found an even higher prevalence (51%) in patients with functional gastrointestinal disorders (IBS, functional dyspepsia, and functional bloating). Although the prevalence of lactose intolerance in people with gastrointestinal disorders is unknown in Mexico, it is estimated to be approximately 30% in the general population[22]. Currently,

consumption of lactose-free foods is common, which could contribute to many people being unaware of their lactose intolerance condition.

Fructose intolerance in our study (33%) was similar to the 34% observed by Amieva-Balmori et al.[12], but lower than the 52% reported by Reyes-Huerta et al.[23] in Mexicans with IBS, and half the prevalence of 60% observed by Wilder-Smith et al.[21] This variability in prevalence could be attributed to factors such as microbiota composition, dietary habits, and genetics[4,6,24].

Breath tests for sorbitol and fructans are not widely recognized in clinical practice and are primarily used in research studies. However, Sia et al.[25] identified a clinically significant association between fructose and fructan "malabsorption" (determined by a positive hydrogen breath test without symptom assessment) in patients with IBS. They observed that patients with positive tests for either type of malabsorption were 1.95 times more likely to test positive for the other. Consequently, they suggest that fructan malabsorption should be suspected in patients with fructose malabsorption and vice versa.

On the other hand, our study found a high prevalence of sorbitol and fructan intolerance, particularly sorbitol, which is found naturally in fruits and juices but is also added as an artificial sweetener in highly consumed ultra-processed foods in Northwestern Mexico, in addition to being present in various hygiene and health products[4]. It is interesting to note that one of our patients identified a toothpaste containing sorbitol as the cause of their intestinal discomfort.

The categorization of breath tests with negative results but persistent symptoms was particularly useful in our view. This approach allowed for the identification of patients with probable visceral hypersensitivity. In the present study, the prevalence of visceral hypersensitivity to lactose and fructose was 22% and 19%, respectively, which is higher than the 9% found by Amieva-Balmori et al.[12] for lactose, and similar to the 16% for fructose. Considering that approximately 40% to 60% of people with disorders of gut-brain interaction present with visceral hypersensitivity[11], having a tool like this to detect it is especially valuable.

During follow-up, adherence to the nutritional recommendations, indirectly assessed via the 24-hour recall, was maintained in this study and reflected in a significant improvement in symptoms. Patients made some dietary changes, such as reducing consumption of carbonated beverages, drinking only water, cooking at home instead of buying fast food, and eating appropriate portions. When they occasionally deviated from the diet, they were able to return to it because they had already experienced symptom relief. In these cases, the changes in symptoms were small but evident.

The nutritionist's close contact with the patients during follow-up was probably a key factor in maintaining the diet, as other authors have suggested[26]. Knowing that a professional is available to help gives patients the necessary confidence to succeed. Furthermore, short periods (<6 weeks) of low-FODMAP diet intervention have shown greater adherence[27], which aligns with the four-week duration of our study: two weeks on the diet, followed by two weeks of reintroduction. Additionally, the low-FODMAP diet has been recognized to decrease fiber and calcium intake[17]. However, in our study, these reductions were not statistically significant.

The present study had some limitations. The sample size was small (n = 21) compared to other studies, and only 58% of recruited participants completed the protocol, resulting in a high dropout rate. There was no control group, so the results should be evaluated with caution. Nevertheless, the before-and-after single-group design provides some evidence of change. Likewise, although we received positive feedback from participants regarding satisfaction with symptom relief and improvements in their daily lives, we did not conduct a quality of life assessment.

CONCLUSIONS

Following a personalized low-FODMAP diet based on intolerance test results, under the supervision of a trained nutritionist, resulted in a significant reduction of gastrointestinal symptoms. These dietary modifications were essential for the relief of these symptoms, underscoring the importance of personalized nutrition in the treatment of gastrointestinal problems. Long-term studies would be useful to confirm the continuity of symptom control.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Funding Source

None.

REFERENCES

1. Shamah-Levy T, Vielma-Orozco E, Heredia-Hernández O, Romero-Martínez M, Mojica-Cuevas J, Cuevas-Nasu L, et al. Encuesta Nacional de Salud y Nutrición 2018-19: Resultados nacionales. Cuernavaca, México: Instituto Nacional de Salud Pública; 2020.
2. Sperber AD, Bangdiwala SI, Drossman DA, Ghoshal UC, Simren M, Tack J, et al. Worldwide prevalence and burden of functional gastrointestinal disorders, results of Rome foundation global study. Gastroenterology. 2021;160(1):99-114.e3. https://doi.org/10.1053/j.gastro.2020.04.014
3. Black CJ, Drossman DA, Talley NJ, Ruddy J, Ford AC. Functional gastrointestinal disorders: advances in understanding and management. Lancet. 2020;396(10263):1664-74. https://doi.org/10.1016/S0140-6736(20)32115-2
4. Rinninella E, Cintoni M, Raoul P, Gasbarrini A, Mele MC. Food additives, gut microbiota, and irritable bowel syndrome: a hidden track. Int J Environ Res Public Health 2020;17(23):8816. https://doi.org/10.3390/ijerph17238816
5. Smiliotopoulos T, Zampelas A, Houliaras G, Sgouros SN, Michas G, Bamias G, et al. Association of fructose consumption with prevalence of functional gastrointestinal disorders manifestations: results from Hellenic National Nutrition and Health Survey (HNNHS). Br J Nutr. 2023;130(11):1961-72. https://doi.org/10.1017/S0007114523001198
6. Tuck CJ, Biesiekierski JR, Schmid-Grendelmeier P, Pohl D. Food intolerances. Nutrients. 2019;11(7):1684. https://doi.org/10.3390/nu11071684
7. Varney J, Barrett J, Scarlata K, Catsos P, Gibson PR, Muir JG. FODMAPs: food composition, defining cutoff values and international application. J Gastroenterol Hepatol. 2017;32 Suppl 1:53-61. https://doi.org/10.1111/jgh.13698
8. Barrett JS, Gibson PR. Fermentable oligosaccharides, disaccharides, monosaccharides and polyols (FODMAPs) and nonallergic food intolerance: FODMAPs or food chemicals? Therap Adv Gastroenterol. 2012;5(4):261-8. https://doi.org/10.1177/1756283X11436241
9. Usai-Satta P, Oppia F, Lai M, Cabras F. Hydrogen breath tests: are they really useful in the nutritional management of digestive disease? Nutrients. 2021;13(3):974. https://doi.org/10.3390/nu13030974
10. Halmos EP, Power VA, Shepherd SJ, Gibson PR, Muir JG. A diet low in FODMAPs reduces symptoms of irritable bowel syndrome. Gastroenterology. 2014;146(1):67-75.e5. https://doi.org/10.1053/j.gastro.2013.09.046
11. Gasbarrini A, Corazza GR, Gasbarrini G, Montalto M, Di Stefano M, Basilisco G, et al. Methodology and indications of H2-breath testing in gastrointestinal diseases: the Rome Consensus Conference. Aliment Pharmacol Ther. 2009;29 Suppl 1:1-49. https://doi.org/10.1111/j.1365-2036.2009.03951.x
12. Amieva-Balmori M, Coss-Adame E, Rao NS, Dávalos-Pantoja BM, Rao SSC. Diagnostic utility of carbohydrate breath tests for SIBO, fructose, and lactose intolerance. Dig Dis Sci 2020;65(5):1405-13. https://doi.org/10.1007/s10620-019-05889-9
13. Hammer HF, Fox MR, Keller J, Salvatore S, Basilisco G, Hammer J, et al. European guideline on indications, performance, and clinical impact of hydrogen and methane breath tests in adult and pediatric patients: European Association for Gastroenterology, Endoscopy and Nutrition, European Society of Neurogastroenterology and Motility, and European Society for Paediatric Gastroenterology Hepatology and Nutrition consensus. United European Gastroenterol J. 2022;10(1):15-40. https://doi.org/10.1002/ueg2.12133
14. Secretaría de Salud. Norma Oficial Mexicana NOM-043-SSA2-2012, servicios básicos de salud. Promoción y educación para la salud en materia alimentaria. Criterios para brindar orientación [Internet]. Diario Oficial, 22 de enero de 2013 [consultado el 18 de febrero de 2016]. Disponible en: https://www.gob.mx/cms/uploads/attachment/file/138258/NOM-043-servicios-basicos-salud-educacion-alimentaria.pdf
15. Rivera JA, Muñoz-Hernández O, Rosas-Peralta M, Aguilar-Salinas Carlos A, Popkin Barry M, Willett Walter C. Consumo de bebidas para una vida saludable: recomendaciones para la población mexicana. Salud Pública Mex. 2008;50(2):173-95.
16. Perets TT, Hamouda D, Layfer O, Ashorov O, Boltin D, Levy S, et al. Small intestinal bacterial overgrowth may increase the likelihood of lactose and sorbitol but not fructose intolerance false positive diagnosis. Ann Clin Lab Sci. 2017;47(4):447-51.
17. Zingone F, Bertin L, Maniero D, Palo M, Lorenzon G, Barberio B, et al. Myths and facts about food intolerance: a narrative review. Nutrients. 2023;15(23):4969. https://doi.org/10.3390/nu15234969
18. Aziz I, Simrén M. The overlap between irritable bowel syndrome and organic gastrointestinal diseases. Lancet Gastroenterol Hepatol. 2021;6(2):139-148. https://doi.org/10.1016/S2468-1253(20)30212-0
19. Oligschlaeger Y, Yadati T, Houben T, Condello Oliván CM, Shiri-Sverdlov R. Inflammatory bowel disease: A stressed "gut/feeling". Cells. 2019;8(7):659. https://doi.org/10.3390/cells8070659
20. Jafari M, Sabahi P, Jahan F, Sotodeh Asl N. Effectiveness of cognitive-behavioral stress management for depression, anxiety, cognitive emotion regulation, and quality of life in patients with irritable bowel syndrome: a quasi-experimental study. Jundishapur J Chronic Dis Care. 2022;11(2):e122098. https://doi.org/10.5812/jjcdc.122098
21. Wilder-Smith CH, Materna A, Wermelinger C, Schuler J. Fructose and lactose intolerance and malabsorption testing: the relationship with symptoms in functional

gastrointestinal disorders. Aliment Pharmacol Ther. 2013;37(11):1074-83. https://doi.org/10.1111/apt.12306
22. Rosado JL. Intolerancia a la lactosa. Gac Med Mex. 2016;152 Suppl 1:67-73.
23. Reyes-Huerta JU, de la Cruz-Patiño E, Ramírez-Gutiérrez de Velasco A, Zamudio C, Remes-Troche JM. Intolerancia a la fructosa en pacientes con síndrome de intestino irritable; un estudio de casos y controles. Rev Gastroenterol Mex. 2010;75(4):405-11.
24. Raithel M, Weidenhiller M, Hagel AF, Hetterich U, Neurath MF, Konturek PC. The malabsorption of commonly occurring mono and disaccharides: levels of investigation and differential diagnoses. Dtsch Arztebl Int. 2013;110:775-82. https://doi.org/10.3238/arztebl.2013.0775
25. Sia T, Tanaka RO, Mousad A, Narayan AP, Si K, Bacchus L, et al. Fructose malabsorption and fructan malabsorption are associated in patients with irritable bowel syndrome. BMC Gastroenterol. 2024;24(1):143. https:// doi.org/10.1186/s12876-024-03230-x
26. Mehtab W, Agarwal A, Singh N, Malhotra A, Makharia GK. All that a physician should know about FODMAPs. Indian J Gastroenterol. 2019;38(5):378-90. https://doi.org/10.1007/s12664-019-01002-0
27. Alfaro-Cruz L, Heitkemper M, Chumpitazi BP, Shulman RJ. Literature review: Dietary intervention adherence and adherence barriers in functional gastrointestinal disorder studies. J Clin Gastroenterol. 2020;54(3):203-11. https://doi.org/10.1097/MCG.0000000000001280

https://doi.org/10.22516/25007440.1324

Review article

Colonic Endoscopic Tattooing and Its Impact on Colorectal Surgery: More Than Just a Mark

Ronel Eduardo Barbosa-Calderón,[1] Diego Efraín Valbuena-Velásquez,[1] Sergio Camilo Ayala-Pérez.[2*]

OPEN ACCESS

Citation:
Barbosa-Calderón RE, Valbuena-Velásquez DE, Ayala-Pérez SC. Colonic Endoscopic Tattooing and Its Impact on Colorectal Surgery: More Than Just a Mark. Revista. colomb. Gastroenterol. 2025;40(3):315-322. https://doi.org/10.22516/25007440.1324

[1] Specialist Physician in General Surgery, Subspecialist in Coloproctology, Fundación Universitaria Sanitas, Clínica Universitaria Colombia. Bogotá, Colombia.
[2] Specialist Physician in General Surgery, Fellow in Coloproctology, Universidad Militar Nueva Granada, Clínica Universitaria Colombia. Bogotá, Colombia.

***Correspondence:** Sergio Camilo Ayala-Pérez.
camilo.ayala.md@gmail.com

Received: 18/12/2024
Accepted: 04/03/2025

Abstract

Introduction: Endoscopic tattooing of colorectal lesions has evolved from a simple marking technique into an essential tool for preoperative localization in colorectal surgery. Since its introduction in 1958, its utility has been particularly demonstrated in minimally invasive surgeries, where tactile feedback is limited. **Objective:** To review the role of endoscopic tattooing and its surgical implementation, as well as the outcomes achieved, to facilitate lesion identification, ensure adequate oncologic margins, and reduce operative times. **Methods:** A comprehensive literature review was conducted, highlighting current indications, techniques, and recommendations for endoscopic tattooing. Guidelines from the American Society for Gastrointestinal Endoscopy (ASGE) regarding its use in the colorectal context were also analyzed. **Results:** Evidence supports the use of endoscopic tattooing in the transverse, descending, and sigmoid colon, improving intraoperative localization and reducing the risk of incorrect resections. For the right colon, anatomical landmarks are recommended as an alternative. In the rectum, tattooing is debated due to the risk of lymphatic ink absorption and potential overstaging in imaging studies. **Conclusions:** Endoscopic tattooing is a cost-effective and precise method for lesion localization, directly impacting surgical planning, confidence in resection margins, and oncologic outcomes. Implementing standardized guidelines on its use is crucial to maximize its benefits in colorectal surgery.

Keywords

Endoscopy, tattooing, colon, surgery.

INTRODUCTION

The concept of *tattooing colon polyps* was introduced in 1958 by Sauntry and Knudtson[(1)], who used Lausanne Brilliant Blue to mark colonic lesions. Subsequently, Knoernschild[(2)] reported on 190 patients who underwent endoscopic tattooing. In 1975, Ponsky and King highlighted the value of endoscopic tattooing for the intraoperative localization of colonic lesions, promoting its implementation[(3)].

For over three decades, endoscopic tattooing, via the injection of India ink, has been established as an essential tool for the preoperative localization of tumors in colorectal resections. This technique allows for the precise identification of lesions during surgical procedures or follow-up colonoscopies and is particularly valuable in minimally invasive surgery due to the limited tactile feedback, which makes detecting and locating small lesions in the colon difficult.

Although colonoscopy is the gold standard for detecting colorectal cancer, the accuracy in pinpointing the exact tumor location shows significant variation. Endoscopic orientation is hampered by the lack of reliable anatomical landmarks between the anal verge and the ileocecal valve, leading to accuracy rates ranging from 59.7% to 98.3%, dropping to as low as 37.5% for transverse colon tumors[(4,5)].

Complete resectability of colorectal cancer is crucial for achieving an oncological cure, and multiple clinical trials have shown comparable oncological outcomes between laparoscopic and open resections[6]. Inaccurate localization of a lesion during laparoscopy can have critical consequences, including blind resections, removal of incorrect segments, unexpected modifications to the surgical plan, or the need for a permanent stoma[7].

To overcome these barriers, various localization techniques have been described, with colonoscopic tattooing being the predominant one. However, alternatives also exist, such as colonoscopic metal clips, intraoperative ultrasound, and preoperative computed tomography colonography, albeit with varying results regarding accuracy, safety, cost, and availability. Despite the popularity of colonoscopic tattooing, a superior technique has not yet been established in Colombia, nor are there standardized guidelines to consistently guide endoscopists[8].

This article reviews errors in tumor localization in patients with colorectal cancer who were preoperatively evaluated for curative-intent surgery and synthesizes the available evidence on risk factors associated with localization errors and adverse events during the procedure. This review aims to provide a solid scientific basis for developing guidelines to optimize the practice of endoscopic tattooing in the Colombian context, thereby strengthening the accuracy of lesion localization and improving surgical outcomes for patients with colorectal cancer.

IMPORTANCE OF ACCURATE TUMOR LOCALIZATION

Colonoscopy is a fundamental tool for the preoperative localization of colorectal lesions; however, most tumors are described in relation to anatomical reference points, such as the ileocecal valve, the hepatic flexure, and the splenic flexure. Complementing this orientation, endoscopists also use the inserted length of the colonoscope as an indirect measure of tumor position. Nevertheless, these methods have limitations, especially in patients with colonic redundancy, which distorts the anatomy and reduces the accuracy of anatomical measurements. Lack of precision in tumor localization leads to laparoscopic resections of incorrect segments, resulting in conversions to laparotomies, additional resections, and consequently, increased patient morbidity as well as higher costs for the healthcare system (**Figure 1**)[7].

In this context, a reliable method for accurate tumor localization is indispensable to ensure adequate margins during the laparoscopic resection of colorectal tumors, minimizing surgical complications. Historically, other methods have been used, such as barium enemas, clip placement, computed tomography (CT) scans, CT colonography, intraoperative colonoscopy with markers, and proctoscopy with sutures[8]. However, each technique has limitations: barium enemas have reduced effectiveness in visualizing small or flat tumors[9], while intraoperative colonoscopy, despite its high potential for determining location, prolongs operative time, requires advanced skills, and increases postoperative complications due to bowel distension. Endoscopic clips are often ineffective due to their low visibility in the laparoscopic context and the possibility of migration.

The available evidence strongly supports the use of permanent endoscopic tattoos as the most effective method for ensuring accurate intraoperative localization of colorectal lesions[10].

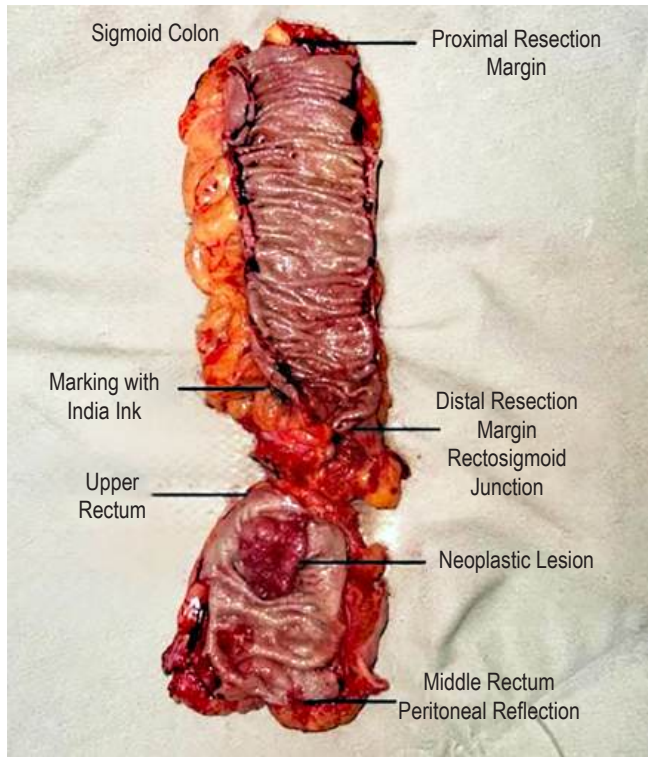


Figure 1. Lack of precision in tumor localization in the colon, leading to a new laparoscopic colon resection. Image property of the authors.

INDICATIONS FOR ENDOSCOPIC TATTOOING

The American Society for Gastrointestinal Endoscopy (ASGE) recommends tattooing during colonoscopy for those lesions that may require localization in future endoscopic or surgical procedures. This includes confirmed or suspected malignant lesions, polypectomy sites, endoscopic mucosal resection or endoscopic submucosal dissection, difficult-to-locate polyps, and dysplastic areas. Lesions located in the cecum, adjacent to the ileocecal valve, or in the lower rectum do not require tattooing due to their easy identification[11]. We propose the following objectives:

- To facilitate surgical localization: Endoscopic tattooing enables the precise identification of lesions during surgical resection, increasing patient safety and reducing surgical time spent locating the lesion (**Figure 2**).
- To enable clinical monitoring: It is used to monitor the patient after a polypectomy, allowing for long-term follow-up of treated areas and early detection of recurrences (**Figure 3**).

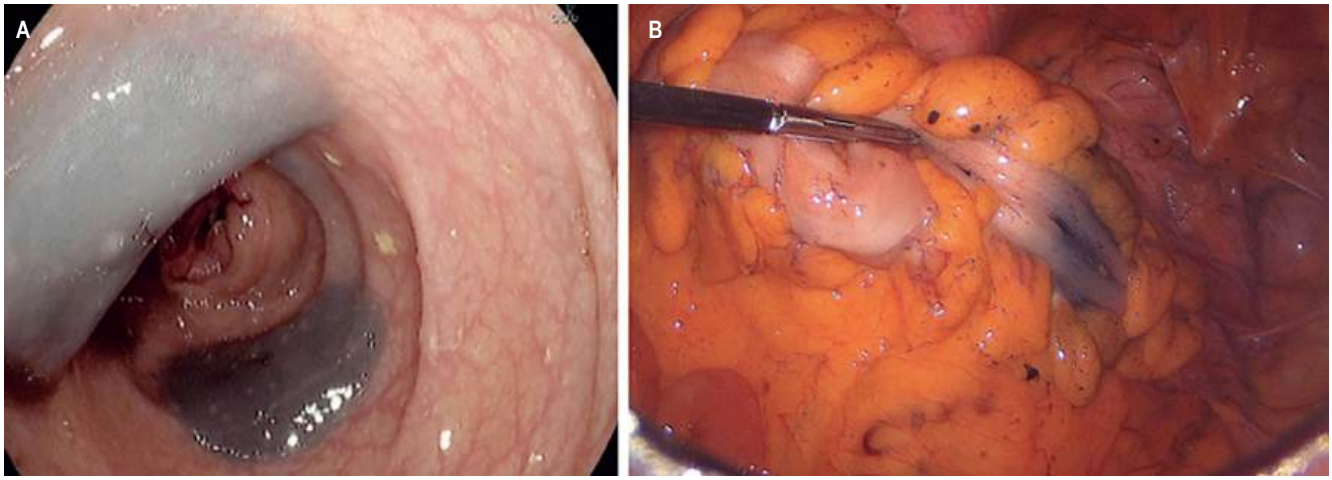


Figure 2. Endoscopic tattooing of the colon. **A.** Endoluminal marking distal to the lesion in two contralateral segments. **B.** Marking with India ink tattoo on the colon, allowing for its laparoscopic identification. Images property of the authors.

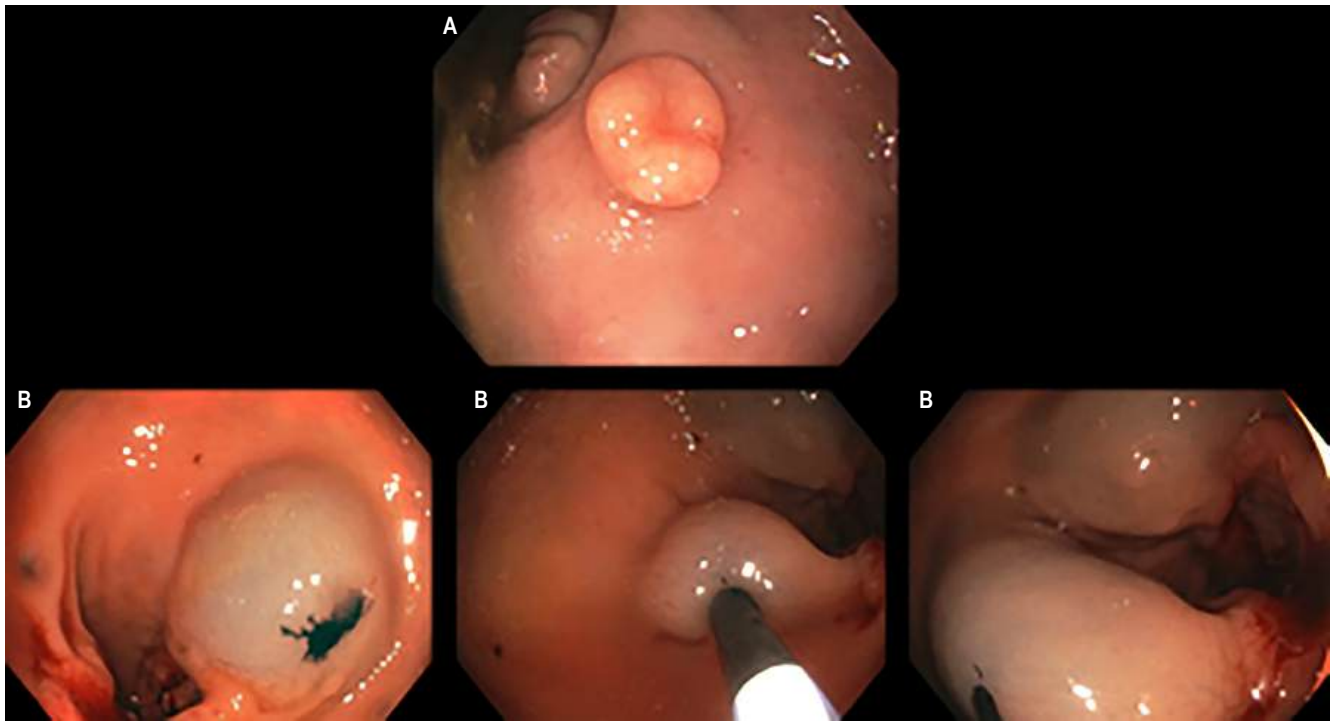


Figure 3. Subepithelial lesion of 15 x 15 x 5 mm in the upper rectum, fixed and with central ulceration, with high suspicion of rectal neuroendocrine tumor. **A.** Identification and characterization of the lesion in the upper rectum. **B.** Marking with India ink distal to the lesion on two contralateral sides (quadrants), allowing for easy identification for subsequent clinical monitoring and future resection. Images courtesy of Dr. Carlos Martínez - HOMIC.

PREOPERATIVE ENDOSCOPIC TATTOOING

Studies show an 88% success rate in the accurate localization of tumors through endoscopic tattooing, achieving adequate resection margins and lymph node harvest[12]. A prospective comparative study by Arteaga-González et al. found that tumor visualization was successful in 100% of patients in the preoperative tattoo group, compared to 80.8% in the non-tattoo group[9]. They also demonstrated shorter surgical time and less blood loss, with no related complications, while in the non-tattoo group, imprecise tumor visualization led to unnecessary resection of healthy colon and inadequate resection margins. It was concluded that preoperative endoscopic tattooing is a safe, effective, and superior method for the intraoperative localization of tumors, with lower rates of positive resection margins, in addition to highlighting its cost-effectiveness[13].

The international Delphi consensus has provided guidelines on the proper use of endoscopic tattooing, including its indications and technique[14]. Current research, such as trials by Barquero et al., among others, continues to evaluate the accuracy of tattooing and its technical variations, reinforcing evidence-based practice in modern endoscopy[15].

EFFECTS OF A WELL-EXECUTED COLORECTAL TATTOO ON THE MULTIDISCIPLINARY CARE TEAM

- Safety for the endoscopist and the surgeon.
- Confirmation of the type of resection to be performed (preoperative assessment).
- Prevention of incorrect trocar placement at the time of intraoperative identification.
- Reduction in the conversion rate from laparoscopic surgery to open surgery.

THE BEST SUBSTANCE FOR TATTOOING

The ASGE currently recommends a sterile carbon particle suspension as the ideal agent for endoscopic tattooing due to its high permanence, safety, and ease of implementation, essential characteristics for ensuring surgical localization. Other agents, such as India ink, methylene blue, and indigo carmine, have limitations, such as lesser permanence, potential infection risks, and complex preparation processes. The introduction of a sterile, biocompatible suspension based on carbon particles (such as Spot®, GI Supply, United States) has optimized the safety and accessibility of the procedure, though it is not yet available in our setting[16].

Studies conducted by Hammond et al. explored the efficacy of different compounds, including methylene blue, indigo carmine, indocyanine green, and India ink, in canine models, and demonstrated that India ink stood out for its prolonged permanence and low tissue reactivity[17]. Based on these studies, it was established that India ink provided the best long-term visibility, with tattoos evaluated up to ten years later without significant loss of intensity[18]. Its efficacy was confirmed in the surgical context, with a 97% intraoperative visibility rate in laparoscopic procedures, establishing it as the preferred substance for the accurate identification of lesions[19].

THE OPTIMAL PREOPERATIVE TIMING FOR ENDOSCOPIC TATTOOING

Although preliminary recommendations exist, the evidence establishing the optimal timing remains limited. In a prospective study, Conaghan et al.[20] identified variability in tattooing practices prior to laparoscopic colorectal surgery and highlighted the absence of a standardized protocol to guide this decision. Feingold et al.[12] suggest that performing the tattoo during the diagnostic colonoscopy allows for a permanent and lasting mark, ensuring the lesion is easily identifiable in future interventions.

Another alternative is to perform the tattoo the day before the planned laparoscopic colorectal resection, taking advantage of the preoperative bowel preparation to maximize the tattoo's visibility and accuracy. Based on this strategy, we recommend performing a routine tattoo on all suspicious lesions during the initial diagnostic colonoscopy and considering, in specific cases, repeating the tattoo the day before surgery to ensure optimal localization.

Despite these recommendations, future research should evaluate cost factors, the relationship with clinical outcomes, and the impact on operative safety and efficiency to establish clear guidelines that optimize both the effectiveness and feasibility of the procedure.

TECHNIQUE FOR PERFORMING AN ADEQUATE ENDOSCOPIC TATTOO

The ASGE recommends creating a submucosal bleb (wheal) by injecting saline solution before applying the tattooing agent (1 to 2 mL of saline solution) (**Figure 4A**). This technique helps ensure precise injection of the India ink (0.6 to 1 mL) into the submucosal plane, and a saline flush after the ink injection is also recommended (**Figure 4B**), to minimize the risk of transmural injection and significantly reduce associated complications, such as peritonitis and submucosal fibrosis, which can hinder future endoscopic interventions[19]. There are no recommendations to dilute India ink, and we suggest instilling it in its pure form under the volumes described. Furthermore, it is recommended to insert the injector at a 45° angle relative to the mucosa to optimize submucosal application and minimize the risk of intraperito-

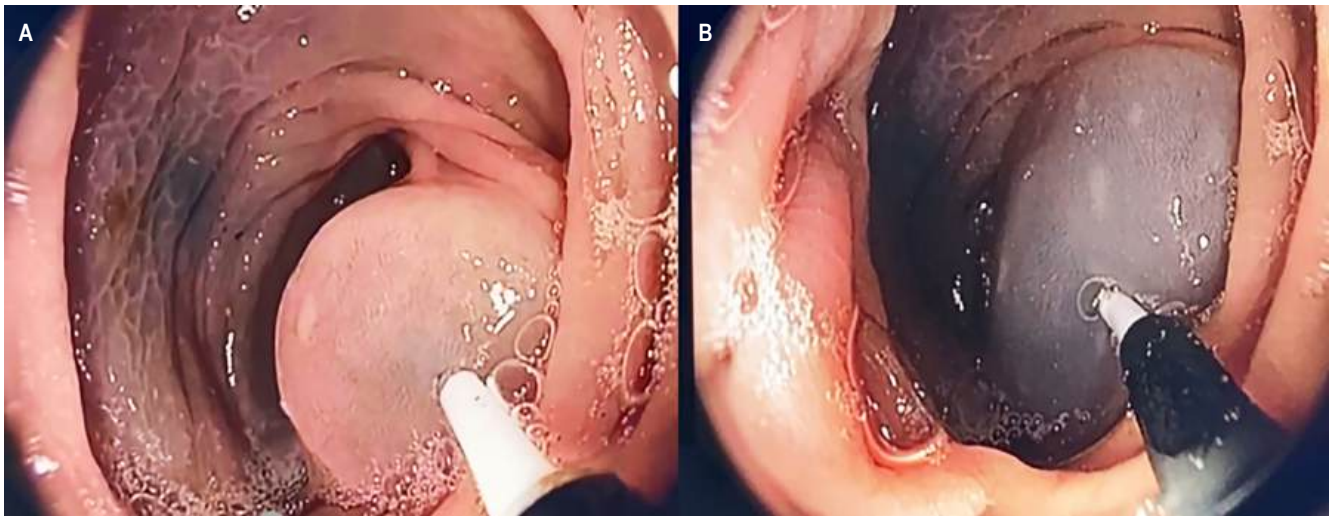


Figure 4. Technique for performing an adequate endoscopic tattoo. **A.** Submucosal bleb or wheal via injection of saline solution. **B.** Injection of India ink into the preformed bleb. Images courtesy of Dr. Nairo J. Senejoa – HOMIC.

neal spillage, which could induce inflammation and confuse the localization of the target tissue. The two-step technique demonstrated excellent lesion visualization (98%) and a lower complication rate (1.8%)[21].

LOCATION AND TECHNIQUE FOR TATTOO CONFIGURATION

Placing the tattoo at least 3 cm distal to the lesion is recommended, using two injections (marks) on opposite sides of the lumen to ensure its intraoperative visibility. We consider that more than two injections do not provide a significant difference during intraoperative tattoo identification, acknowledging the possibility that a single mark may not be prominent enough or may end up on the mesenteric side of the colon (**Figure 5**).

Documenting the exact location of the tattoo in the endoscopic report, accompanied by photographs, is essential to ensure standardization and improve the accuracy of surgical lesion identification[7]. This distance of 2 to 5 cm prevents the risk of tattoo dispersion towards the lesion (**Figure 6A**), decreases the possibility of submucosal fibrosis, and helps maintain the integrity of oncological margins, thereby avoiding complications that could compromise the patient's treatment in future procedures (**Figure 6B**)[10].

It is crucial to specify that marking or tattooing the colon to identify a lesion or plan a preoperative resection is recommended only for the transverse, descending, and sigmoid colon segments. For the cecum and ascending colon, the routine use of endoscopic tattoos is not advised. The location of tumors in these segments is usually defined in relation to precise anatomical references, such as the ileocecal valve, the appendiceal orifice, and the hepatic shadow. These references allow for reliable localization based on the approximate distance of the lesion in centimeters, as well as the contralateral position of the lesion on the colonic wall. However, for some special cases where localization in the ascending colon is unclear for the endoscopist, endoscopic tattooing can be considered as an additional strategy to ensure accurate lesion identification during subsequent surgical interventions.

ENDOSCOPIC TATTOOING FOR RECTAL TUMORS

The tattooing of rectal tumors remains a topic of debate. Traditionally, rectal polyps and tumors are not tattooed due to their proximity to the anus, which facilitates localization via proctoscopy or digital examination. Furthermore, the visualization of submucosal tattoos is complex in the rectum due to the density of the mesorectum, which can hinder their identification[10]. The rectum's own anatomical landmarks, such as the valves of Houston, can facilitate localization without the need for marking.

Another reason to avoid tattooing rectal tumors is the risk of dye absorption by local lymph nodes, which could lead to overstaging of rectal tumors on magnetic resonance imaging. Likewise, spillage of the tattoo into the mesorectal plane complicates surgical resections, whether open or laparoscopic, by distorting the anatomical planes necessary to complete a total mesorectal excision.

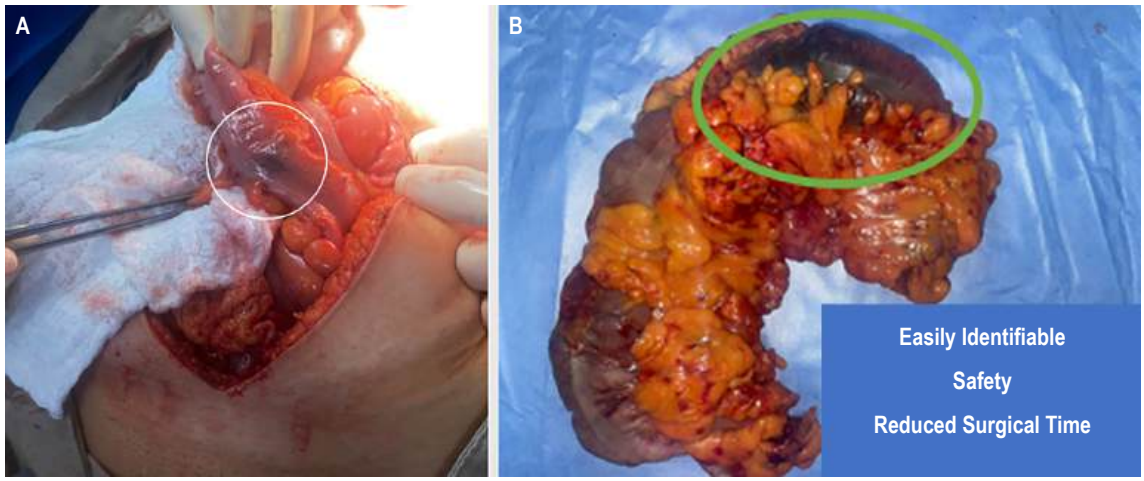


Figure 5. Appropriate identification of endoscopic tattoo. **A.** Identification of the endoscopic tattoo in open surgery. **B.** Identification of the endoscopic tattoo on a surgical specimen. Images property of the authors.

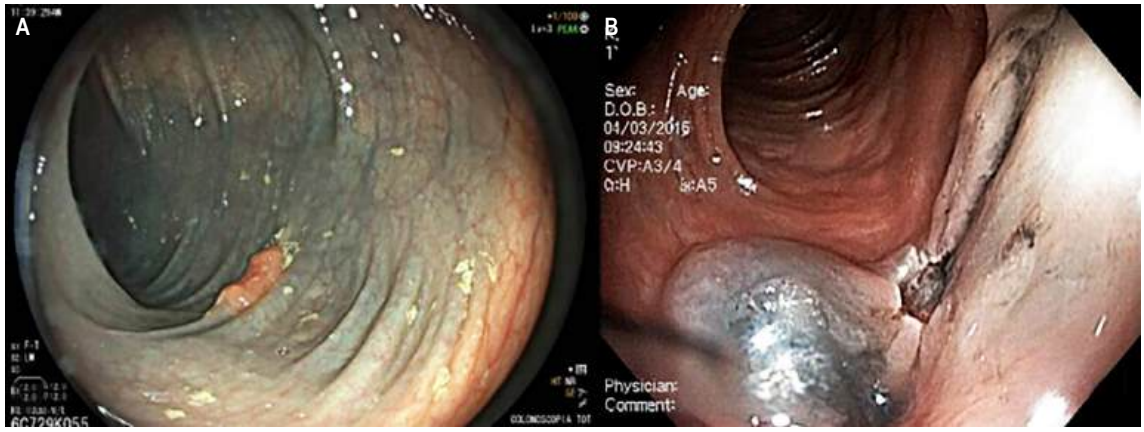


Figure 6. Tattoo dispersion towards the lesion. **A.** Occurs when a distance of 2 to 5 cm distal to the lesion suspicious for malignancy in the colon is not ensured. **B.** A distal distance from the resected lesion is not guaranteed, making a second endoscopic procedure technically more difficult if the margins are not R0 due to the submucosal fibrosis generated. Images property of the authors.

However, a retrospective study by Keller et al.[22] demonstrates benefits in using tattoos for rectal tumors in situations where immediate surgical management is not initially planned. They found that between 5% and 8% of apparently benign polyps removed during colonoscopy contained invasive carcinoma. In the absence of a tattoo, the precise identification of the resected polyp's location for adequate follow-up becomes difficult. Furthermore, endoscopists often face challenges in predicting the malignant potential of polyps. In this context, tattooing helped to accurately locate critical areas and facilitated the planning of resection margins for polyps with high-grade dysplasia.

The implications of not locating a rectal polyp accurately can be significant: inappropriate use of neoadjuvant therapy, unnecessarily extensive resections, or the creation of unnecessary or permanent stomas. Therefore, tattooing can be a useful tool in certain situations, such as for rectal polypectomies, incomplete resections, or before initiating neoadjuvant therapy. Nevertheless, the evidence is limited, highlighting the need for further studies to clearly define the benefits and risks of this practice compared to traditional localization methods.

TATTOOING IN THE CONTEXT OF MULTIPLE LESIONS

In cases where multiple synchronous lesions or tumors are identified in the colon, there are currently no specific guidelines on the optimal tattooing technique. In this context, we similarly recommend tattooing at a position at least 2 to 5 cm distal to both the most proximal and the most

distal lesion. This technique allows the surgeon to clearly distinguish between the anatomical margins required for resection, minimizing the possibility of confusion caused by multiple tattoos and visual saturation of the surgical field. Implementing an orderly tattooing method for multiple lesions contributes to improved surgical precision and oncological outcomes, underscoring the importance of a standardized protocol in these cases.

CONCLUSIONS

Endoscopic colon tattooing has transcended being a simple marking to become an essential tool in the planning and execution of colorectal surgery, with a direct impact on surgical precision, patient safety, and the optimization of oncological resection margins. Evidence supports the use of tattooing in the colon, reducing the need for additional interventions. Although the use of tattooing in the rectum remains a topic of discussion due to its anatomical proximity to identifiable structures, it can be beneficial in specific situations. The absence of standardized guidelines for determining the ideal timing of endoscopic tattooing and the need for protocols for identifying multiple lesions underscores the urgency for additional research to establish clear directives. Systematically applied endoscopic tattooing, aligned with oncological needs, provides greater security for both the surgeon and the endoscopist, impacting clinical outcomes and the survival of patients with colorectal cancer. Finally, it is important to highlight that with the advent of immunotherapy and the potential for complete endoscopic and radiological response, these patients should also undergo endoscopic tattooing for follow-up purposes.

REFERENCES

1. Sauntry JP, Knudtson KP. A technique for marking the mucosa of the gastrointestinal tract after polypectomy. Cancer. 1958;11(3):607-10. https://doi.org/10.1002/1097-0142(195805/06)11:3<607::aid-cncr2820110322>3.0.co;2-y
2. Knoernschild HE. The use of a tattooing instrument for marking colonic mucosa. Am J Surg. 1962;103:83-5. https://doi.org/10.1016/0002-9610(62)90019-3
3. Ponsky JL, King JF. Endoscopic marking of colonic lesions. Gastrointest Endosc. 1975;22(1):42-3. https://doi.org/10.1016/S0016-5107(75)73687-8
4. Vaziri K, Choxi SC, Orkin BA. Accuracy of colonoscopic localization. Surg Endosc. 2010;24(10):2502-5. https://doi.org/10.1007/s00464-010-0993-2
5. Borda F, Jiménez FJ, Borda A, Urman J, Goñi S, Ostiz M, et al. Endoscopic localization of colorectal cancer: study of its accuracy and possible error factors. Rev Esp Enferm Dig. 2012;104(10):512-7. https://doi.org/10.4321/S1130-01082012001000002
6. Bonjer HJ, Deijen CL, Abis GA, Cuesta MA, van der Pas MH, de Lange-de Klerk ES, et al. A randomized trial of laparoscopic versus open surgery for rectal cancer. N Engl J Med. 2015;372(14):1324-32. https://doi.org/10.1056/NEJMoa1414882
7. Elarini T, Wexner SD, Isenberg GA. The need for standardization of colonoscopic tattooing of colonic lesions. Dis Colon Rectum. 2015;58(2):264-7. https://doi.org/10.1097/DCR.0000000000000304
8. Feingold DL, Addona T, Forde KA, Arnell TD, Carter JJ, Huang EH, et al. Safety and reliability of tattooing colorectal neoplasms prior to laparoscopic resection. J Gastrointest Surg. 2004;8(5):543-6. https://doi.org/10.1016/j.gassur.2003.12.016
9. Arteaga-González I, Martín-Malagón A, Fernández EM, Arranz-Durán J, Parra-Blanco A, Nicolas-Perez D, et al. The use of preoperative endoscopic tattooing in laparoscopic colorectal cancer surgery for endoscopically advanced tumors: a prospective comparative clinical study. World J Surg. 2006;30(4):605-11. https://doi.org/10.1007/s00268-005-0473-3
10. Kirchoff DD, Hang JH, Cekic V, Baxter K, Kumar P, Shehebar J, et al. Endoscopic tattooing to mark distal margin for low anterior rectal and select sigmoid resections. Surg Innov. 2014;21(4):376-80. https://doi.org/10.1177/1553350613507147
11. ASGE Technology Committee; Kethu SR, Banerjee S, Desilets D, Diehl DL, Farraye FA, et al. Endoscopic tattooing. Gastrointest Endosc. 2010;72(4):681-5. https://doi.org/10.1016/j.gie.2010.06.020
12. Feingold DL, Addona T, Forde KA, Arnell TD, Carter JJ, Huang EH, et al. Safety and reliability of tattooing colorectal neoplasms prior to laparoscopic resection. J Gastrointest Surg. 2004;8(5):543-6. https://doi.org/10.1016/j.gassur.2003.12.016
13. Rodríguez de Santiago E, Dinis-Ribeiro M, Pohl H, Agrawal D, Arvanitakis M, Baddeley R, et al. Reducing the environmental footprint of gastrointestinal endoscopy: European Society of Gastrointestinal Endoscopy (ESGE) and European Society of Gastroenterology and Endoscopy Nurses and Associates (ESGENA) Position Statement. Endoscopy. 2022;54(8):797-826. https://doi.org/10.1055/a-1859-3726
14. Medina-Prado L, Hassan C, Dekker E, Bisschops R, Alfieri S, Bhandari P, et al. When and How To Use Endoscopic Tattooing in the Colon: An International Delphi Agreement. Clin Gastroenterol Hepatol. 2021;19(5):1038-1050. https://doi.org/10.1016/j.cgh.2021.01.024

15. Barquero D, González V, García O, Fernández A, Blasco A, Navarro M, et al. Ways to perform an endoscopic tattoo. Prospective and randomized study in patients with colorectal neoplasm. Rev Esp Enferm Dig. 2021;113(7):519-523. https://doi.org/10.17235/reed.2020.7310/2020
16. Askin MP, Waye JD, Fiedler L, Harpaz N. Tattoo of colonic neoplasms in 113 patients with a new sterile carbon compound. Gastrointest Endosc. 2002;56(3):339-42. https://doi.org/10.1067/mge.2002.126905
17. Hammond DC, Lane FR, Mackeigan JM, Passinault WJ. Endoscopic tattooing of the colon: clinical experience. Am Surg. 1993;59(3):205-10.
18. Shatz BA, Weinstock LB, Swanson PE, Thyssen EP. Long-term safety of India ink tattoos in the colon. Gastrointest Endosc. 1997;45(2):153-6. https://doi.org/10.1016/S0016-5107(97)70239-6
19. Park JW, Sohn DK, Hong CW, Han KS, Choi DH, Chang HJ, et al. The usefulness of preoperative colonoscopic tattooing using a saline test injection method with pre-packaged sterile India ink for localization in laparoscopic colorectal surgery. Surg Endosc. 2008;22(2):501-5. https://doi.org/10.1007/s00464-007-9495-2
20. Conaghan PJ, Maxwell-Armstrong CA, Garrioch MV, Hong L, Acheson AG. Leaving a mark: the frequency and accuracy of tattooing prior to laparoscopic colorectal surgery. Colorectal Dis. 2011;13(10):1184-7. https://doi.org/10.1111/j.1463-1318.2010.02423.x
21. Fu KI, Fujii T, Kato S, Sano Y, Koba I, Mera K, et al. A new endoscopic tattooing technique for identifying the location of colonic lesions during laparoscopic surgery: a comparison with the conventional technique. Endoscopy. 2001;33(8):687-91. https://doi.org/10.1055/s-2001-16217
22. Keller D, Jaffe J, Philp MM, Haluszka O, Khanna A. Should all endoscopically excised rectal polyps be tattooed? A plea for localization. Surg Endosc. 2012;26(11):3101-5. https://doi.org/10.1007/s00464-012-2346-9

https://doi.org/10.22516/25007440.1434

Review article

Research and Publication. Part 7. How to Organize and Present Bibliography

Ricardo Cepeda-Vásquez.[1*]

OPEN ACCESS

Citation:
Cepeda-Vásquez R. Research and Publication. Part 7. How to Organize and Present Bibliography. Revista. colomb. Gastroenterol. 2025;40(3):323-326. https://doi.org/10.22516/25007440.1434

[1] Specialist in Internal Medicine and Gastroenterology. Attending Gastroenterologist, Clínica del Country. Bogotá, Colombia.

***Correspondence:** Ricardo Cepeda-Vásquez.
doctorcepeda@gmail.com

Received: 24/07/2025
Accepted: 28/07/2025

Abstract

During the preparation of a scientific manuscript, accuracy in citations and the proper compilation of the bibliography are fundamental to ensuring data validity, source traceability, and compliance with editorial standards. This article describes the most common errors related to reference management and provides practical recommendations aimed at improving the quality of scientific work through careful and ethical handling of references.

Keywords

Bibliographic references, quality, scientific work.

INTRODUCTION

The correct citation of sources and the rigorous preparation of the bibliography are not merely formal requirements but also an essential component for ensuring the robustness of information and the academic integrity of an article[1,2]. References allow the reader to verify the data presented, identify the context of prior knowledge, and recognize the author's original contribution[1,2]. However, in editorial practice, errors that compromise the quality of scientific work are frequently encountered, such as the omission of key references[3], the use of outdated sources, formatting errors, and misplaced citations or those without a corresponding entry in the bibliography[1,2].

FAILURES IN BIBLIOGRAPHIC CITATIONS

To identify the most common citation failures and facilitate their understanding, they have been grouped into five categories: errors in preparing reference lists, failures in in-text citations, problems in source selection, practices that can lead to plagiarism, and errors derived from the use of technological tools such as reference managers and artificial intelligence applications. Based on this classification, a practical guide aimed at their prevention and the stimulation of good academic practices is offered.

Errors in the Reference List

One of the most common problems is non-compliance with the citation standards required by the journal or institution to which the document will be submitted, which often leads to corrections or rejections. It is also common to reproduce references without verifying the original sources, which perpetuates existing errors and diminishes the reliability of the content[2].

Other errors include imprecise bibliographic data, such as inappropriately abbreviated author names, incorrect

titles, or incomplete information on volumes and pagination, which hinders the traceability of sources[4]. Likewise, incorrectly applying authorship rules can cause confusion in the attribution of academic work[2].

Sometimes, unnecessary elements are included, such as the issue number or the exact publication date, which not only add no value but also contradict editorial guidelines[1]. On occasion, authors forget to adapt the style when resubmitting an article to a new journal, which can cause additional delays[2].

A frequent oversight is citing a digitally accessed document as a print source, in addition to omitting key data such as the DOI or access date[1,2]. A careful review of the reference list and rigorous adherence to editorial standards are essential to guarantee the quality of the document.

Common In-Text Citation Errors

This category includes problems such as the ambiguous grouping of multiple references, a lack of correspondence between in-text citations and the reference list, and the use of unverifiable sources[1]. Furthermore, faults such as citing in inappropriate sections, like the abstract or results, incorrect use of sequential order in numeric styles like Vancouver, and the omission of hyphens in ranges of consecutive citations are also detected[1,2].

Problems Related to Plagiarism

Plagiarism represents one of the most serious problems in scientific production, manifesting both in content and in the omission or manipulation of bibliographic citations[1]. Appropriating others' ideas or texts without due acknowledgment equates to a serious violation of professional ethics. Likewise, reusing fragments of previous works without the corresponding citation or excessively resorting to self-citation for self-promotion purposes affects the impartiality of the document[2].

Finally, the inclusion of irrelevant citations to increase the impact of certain journals also constitutes an ethical deviation[1,2].

Errors in Source Selection

Beyond formally correct citation, the quality of a scientific manuscript depends on the relevance and timeliness of the sources used[5]. Among the most relevant errors is omitting key or widely recognized works in the field of study[2]. Another frequent error is citing predominantly old sources, especially if they are more than five years old and are not fundamental texts[5]. These situations suggest that an adequate update of the literature has not been performed, weakening the relevance of the scientific content.

In summary, bibliographic selection must be strategic, incorporating current, diverse, and high-quality references that solidly support the author's arguments.

Errors in the Use of Technological Tools

The use of technological tools, such as reference managers and artificial intelligence, has transformed academic writing by facilitating the organization of references and the production of content. However, their unsupervised use can introduce new errors that compromise the quality of the article[6]. A common error is assuming that the reference manager guarantees accuracy. Although useful, these tools can generate errors in format, author names, punctuation, or bibliographic information, especially if the imported metadata is incorrect. Furthermore, the presence of duplicate references within the text can result in repeated citations in the final bibliography, affecting the coherence of the work[6].

In the case of artificial intelligence, such as ChatGPT, the primary risk is the generation of nonexistent or incorrect references. These models can produce convincing texts that contain false, inaccurate, or unsupported information[7]. Relying on artificial intelligence for tasks such as writing or preparing references without human verification increases the risk of introducing serious errors into the article. Similarly, there is also a potential risk of plagiarism when using texts generated or paraphrased by artificial intelligence, which may evade automated detection systems[7].

In summary, although these tools are valuable, their responsible use demands critical supervision by the author, who must manually verify each citation and source to ensure accuracy, originality, and compliance with editorial standards.

CATEGORIZED RECOMMENDATIONS TO AVOID ERRORS IN CITATION AND REFERENCING

Based on this classification, a guide aimed at their prevention is proposed to facilitate presentation and minimize grounds for non-acceptance.

Reference List

- Review the instructions for authors before starting your document[1] and confirm the bibliographic style required by the journal (APA, Vancouver, Chicago, among others)[1,2].
- Use a reference manager like Endnote, Mendeley, or Zotero, with its plugin for Word or LibreOffice, which

allows easy insertion or deletion of references, automatically updating the list[6].
- Create a folder per project from the beginning to store all information in a segmented manner without crossing information from one research project with another[6].
- Manually verify each entry: author names, year, title, journal, volume, pages, and DOI[1,2].
- Review and correct errors derived from automatic reference managers[6].
- Respect the authorship rules of the style used (for example, using "et al." only after a certain number of authors).
- Do not add unnecessary information, such as issue numbers or acceptance dates, if not requested[5].
- Adapt the format if the article is submitted to a different journal after a rejection[5].
- Adequately distinguish between digital and print sources, and include the DOI or URL whenever necessary[1,2].

In-Text Citation

- Place each citation next to the specific fragment it refers to[1].
- Avoid repeating the same citation multiple times within the same context or paragraph[1].
- Verify the exact correspondence between in-text citations and entries in the reference list[1,2].
- Respect the required format (numbers in parentheses, superscripts, names and dates, among others)[1,2].
- Do not use full author names if the style does not require it[1].
- Avoid citing in the abstract or results unless the journal's guidelines permit it[1].
- In numeric styles (like Vancouver), maintain the order of appearance and use hyphens for ranges (e.g., 2-4, to cite references 2 through 4)[1].

Plagiarism and Citation Ethics

- Always cite any idea, data, or text that is not your own, even if it has been paraphrased[1,2].
- Accompany any adaptation of external information with references[1,2].
- Avoid excessive self-citations, as this can be considered bias or academic self-promotion[1,2].
- Include only references with a clear and justifiable purpose in the body of the article[1,2].

Selection and Quality of Sources

- Include current, relevant sources directly linked to the article's topic[1,2].
- Prioritize original articles and systematic reviews of high methodological quality[1].
- Limit the use of grey literature (theses, technical reports, websites) that has not been peer-reviewed[1].
- Avoid citing marginal or irrelevant sources that do not provide solid evidence[1,2].
- Whenever possible, cite primary sources instead of secondary references[1].

Use of Technological Tools

- Keep your manager synchronized with the cloud or make external backups of your information[6].
- Review automatic errors generated by reference managers, such as incorrect punctuation or abbreviations[7].
- Verify the existence and accuracy of any source generated by artificial intelligence before including it[8]. You can use platforms like Scite.ai to review the current status of cited articles.
- Carefully supervise automated bibliographies, correcting inconsistencies with applications like Crossref or PubMed[6].
- Do not delegate your work to automated tools; the author's critical review remains indispensable.

CONCLUSIONS

Organizing and presenting the bibliography correctly is a fundamental task; it represents an indicator of quality, rigor, and academic responsibility. This document identifies the main failures related to the handling of references in biomedical texts. Each of these aspects, although sometimes minor in appearance, can significantly impact the evaluation of an article. Avoiding these errors requires attention to detail, knowledge of the required style, constant supervision, and responsible use of digital resources.

REFERENCES

1. Masic I. The importance of proper citation of references in biomedical articles. Acta Inform Med. 2013;21(3):148-55. https://doi.org/10.5455/aim.2013.21.148-155
2. Mohta A, Mohta M. Accurate References Add to the Credibility. Indian Pediatr. 2016;53(11):1003-1006. https://doi.org/10.1007/s13312-016-0976-z

3. Santini A. The Importance of Referencing. J Crit Care Med (Targu Mures). 2018 9;4(1):3-4. https://doi.org/10.1515/jccm-2018-0002
4. Thomson A. Citations and references. Midwifery. 2001;17(3):163. https://doi.org/10.1054/midw.2001.0283
5. Mensh B, Kording K. Ten simple rules for structuring papers. PLoS Comput Biol. 2017;13(9):e1005619. https://doi.org/10.1371/journal.pcbi.1005619
6. Altmae S, Sola-Leyva A, Salumets A. Artificial intelligence in scientific writing: a friend or a foe? Reprod Biomed Online. 2023;47(1):3-9. https://doi.org/10.1016/j.rbmo.2023.04.009
7. Balsameda C, Mederos M, Sarduy AS, García A. Integración de gestores bibliográficos y herramientas de inteligencia artificial para el manejo de información científica. Atenas. 2024;62:1-14.
8. Saxena R, Kaushik JS. Referencing Made Easy: Handling Reference Management Softwares: Author's Reply. Indian Pediatr. 2022;59(9):729.

https://doi.org/10.22516/25007440.1263

Case report

Intestinal Obstruction Due to Colorectal Cancer in a Pregnant Patient: A Case Report

Lía Jazmín Jiménez-Ramírez,[1*] Ricardo Mendoza,[2] Lina M. García,[3] Blanca V. Fajardo.[4]

OPEN ACCESS

Citation:
Jiménez-Ramírez LJ, Mendoza R, García LM, Fajardo BV. Intestinal Obstruction Due to Colorectal Cancer in a Pregnant Patient: A Case Report. Revista. colomb. Gastroenterol. 2025;40(3):327-332.
https://doi.org/10.22516/25007440.1263

[1] Specialist Physician in General Surgery, Universidad del Cauca. Popayán, Colombia.
[2] Specialist Physician in General Surgery, Universidad Metropolitana. Barranquilla, Colombia.
[3] General Practitioner, Universidad del Cauca. Popayán, Colombia.
[4] Specialist Physician in Pathology, Universidad del Cauca. Popayán, Colombia.

***Correspondence:** Lía Jazmín Jiménez-Ramírez.
liajimenez@unicauca.edu.co

Received: 05/08/2024
Accepted: 07/10/2024

Abstract

Introduction: Digestive cancer during pregnancy is defined as cancer diagnosed during gestation or within the first postpartum year, with an incidence of 1 in 13,000. Diagnosis is challenging due to symptoms that mimic normal pregnancy and limitations in performing imaging studies. **Case:** A 33-year-old female, G2A1, at 32.2 weeks of gestation, presented with one week of epigastric pain associated with vomiting. She was initially discharged after symptomatic improvement, but was readmitted 96 hours later with abdominal distension, persistent pain, and vomiting. MRI revealed intestinal obstruction due to a sigmoid tumor. Gynecology diagnosed hypertensive disorder and initiated vasodilators, prompting a cesarean section complicated by uterine atony, requiring a B-Lynch suture to control bleeding. Surgery subsequently performed a left hemicolectomy with side-to-side anastomosis, which required re-intervention. The patient was discharged seven days later. **Discussion:** Colorectal cancer is the fifth most common malignancy among women, yet data in pregnant patients are limited, making such cases atypical. Given the nonspecific symptoms, a thorough physical examination is essential, along with investigation of potential predisposing factors. Considering the lack of established management guidelines, screening may be recommended for women over 35 years with risk factors or a family history, to allow treatment prior to pregnancy or close monitoring during gestation.

Keywords

Colorectal cancer, pregnancy, intestinal obstruction.

INTRODUCTION

Gastrointestinal cancer in pregnancy is defined as a neoplasm diagnosed during pregnancy or within the first year postpartum[1,2]. The most common cancers during pregnancy are considered to be cervical and breast cancer[3], associated with variations in hormonal flow. Colorectal cancer at this stage of life is rare, but its incidence has been rising since 1950 from about 1 per 100,000 pregnancies to 1 per 13,000 pregnant women, with an average age at diagnosis of 32 years (fertile age range between 17-46 years)[4]. This increase is possibly related to the rise in advanced maternal age pregnancies in women who have a significant burden of risk factors[2].

Part of the challenges of this neoplasm during gestation is the difficulty in diagnosis because many symptoms mimic those of pregnancy, such as headache, nausea, vomiting, constipation, and abdominal distension[5], in addition to the limitation in performing early imaging studies, such as computed tomography (CT) scans, due to their association with and risk of teratogenicity[4,6].

The diagnosis of colorectal cancer in a pregnant woman presents a therapeutic challenge, not to mention the

psychological impact on the patient. Therefore, we present a case of colon adenocarcinoma in a pregnant woman that required emergency management and posed a diagnostic challenge for the treating team.

CASE DESCRIPTION

The patient is a 33-year-old female, in her second pregnancy with one prior abortion, at 32.2 weeks of gestation by ultrasound performed on 19/04/2023, who presented to the emergency department with a one-week history of epigastric pain associated with emesis and abdominal pain, poor oral intake, constipation, and present flatus, in the absence of other symptoms. She was admitted to the observation unit, where blood tests were performed within normal limits, showing no leukocytosis or neutrophilia, in addition to negative amylase and normal liver and renal function. She was evaluated by Gynecology and managed with analgesics and proton pump inhibitors, subsequently showing symptomatic improvement, and was discharged.

However, she returned 96 hours later due to the persistence of symptoms, now with increased emesis and abdominal pain. The admission physical examination revealed a patient with stable vital signs, a gravid uterus, adequate fetal well-being and positive fetal heart tones, with no signs of peritoneal irritation or abdominal pain on palpation. Admission was decided due to the persistence of symptoms and, given the suspicion of acid-peptic disease, blood chemistry studies were repeated showing no changes, and a total abdominal ultrasound was performed showing evidence of biliary microlithiasis without cholecystitis and no biliary duct dilation. For this reason, expectant management was decided upon due to suspicion of symptomatic cholelithiasis.

The patient was evaluated by Gynecology, where further workup was requested due to suspicion of a hypertensive disorder in pregnancy because of premonitory symptoms with blood pressure readings in the normal range (headache and epigastric pain), and positive proteinuria was found. Consequently, fetal lung maturation was initiated, and an abdominal magnetic resonance imaging (MRI) was requested by the surgery team due to abdominal distension.

During the hospital stay, she persisted with abdominal pain, absence of bowel movements despite multiple laxatives and enemas, no flatus, recurrent emesis, and abdominal distension despite management with a nasogastric tube and enteral rest. General Surgery reviewed an abdominal MRI (**Figure 1**), which revealed stair-step air-fluid levels, stacked coin signs, and distension of the large bowel up to the descending colon, without pneumoperitoneum and an absence of distal gas with an area of complete luminal occlusion in the sigmoid colon. In addition, a new complete blood count reported leukocytosis and neutrophilia.

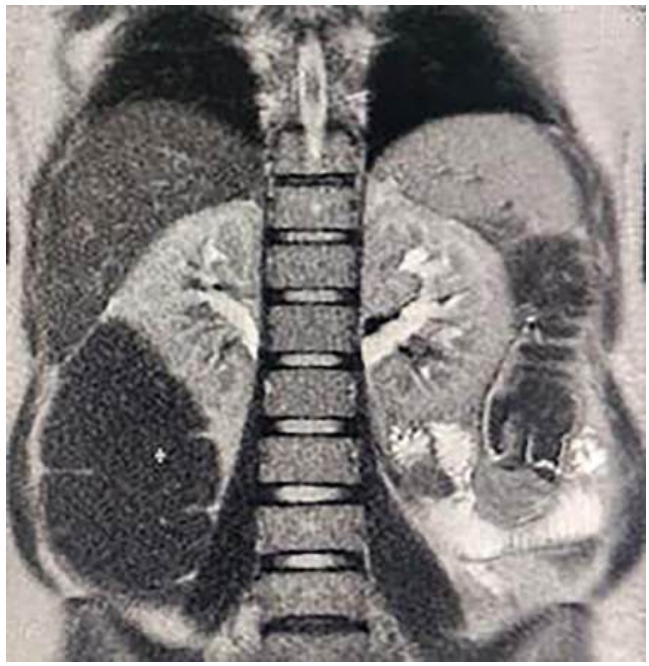


Figure 1. Magnetic resonance image showing the area of occlusion in the descending colon. Image property of the authors.

Furthermore, elevated blood pressure readings were documented with a mean arterial pressure of up to 100-120 mm Hg, so intravenous vasodilator management was initiated without improvement. It was then decided to take her for exploratory laparotomy due to suspected intestinal obstruction plus emergency cesarean section due to preeclampsia with severe features. During the surgical intervention, a live female product was obtained, depressed, with an Apgar score less than 7, not vigorous, with hypotonia and generalized cyanosis; she was resuscitated and taken to the Neonatal Intensive Care Unit (NICU). In the mother, uterine atony was observed, activating the code red protocol, with an indication for blood transfusion and a B-Lynch suture to control bleeding. In the subsequent intervention by General Surgery, a circumferential, stenosing tumor lesion obstructing 100% of the colonic lumen was identified at the junction of the descending and sigmoid colon, measuring approximately ± 7 cm (**Figure 2**), with lymphadenopathy in the mesocolon. A left hemicolectomy and latero-lateral anastomosis were performed, which were well tolerated. She was subsequently transferred to the Intensive Care Unit (ICU) to continue management and monitoring under sedation and with vasopressor requirements.

Forty-eight hours later, the patient experienced clinical deterioration, abdominal distension, and elevated acute-phase reactants, leading to the decision to perform a surgical re-exploration. This revealed a non-patent anastomosis due to edema and obstruction from the enlarged uterus.

Consequently, the anastomosis was resected, and the ends were closed with tied colonic stumps for a future reintervention. Two days later, a new anastomosis was performed and definitively closed.

The patient remained in the ICU during the postoperative period, managed with fasting, parenteral nutrition, broad-spectrum antibiotic therapy, and a rectal drainage tube. She had a successful recovery and was transferred to the general ward after seven days, tolerating oral intake and with controlled pain.

A carcinoembryonic antigen test was ordered, which was negative, and staging studies identified no locoregional or distant metastases. The pathology report described an infiltrating adenocarcinoma, histological grade 1, well-differentiated, with extensive involvement to the serosa, lymphovascular and perineural invasion, four regional lymph nodes all with metastatic tumor involvement, and surgical resection margins free of tumor. Immunohistochemistry showed no microsatellite instability with a Ki67 of 60%, intact MSH2, MSH6, MLH1, and PMS2, and absent HER2 (**Figure 3**).

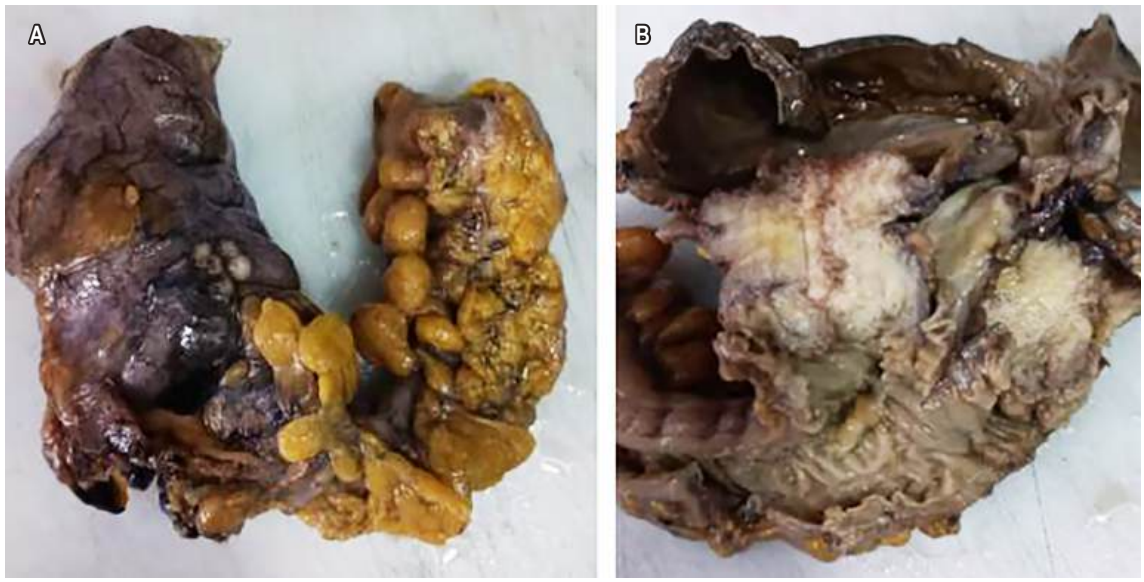


Figure 2. Surgical specimens from the clinical case. **A.** Left hemicolectomy. **B.** Segment with the tumor mass that occluded 100% of the colonic lumen. Images property of the authors.

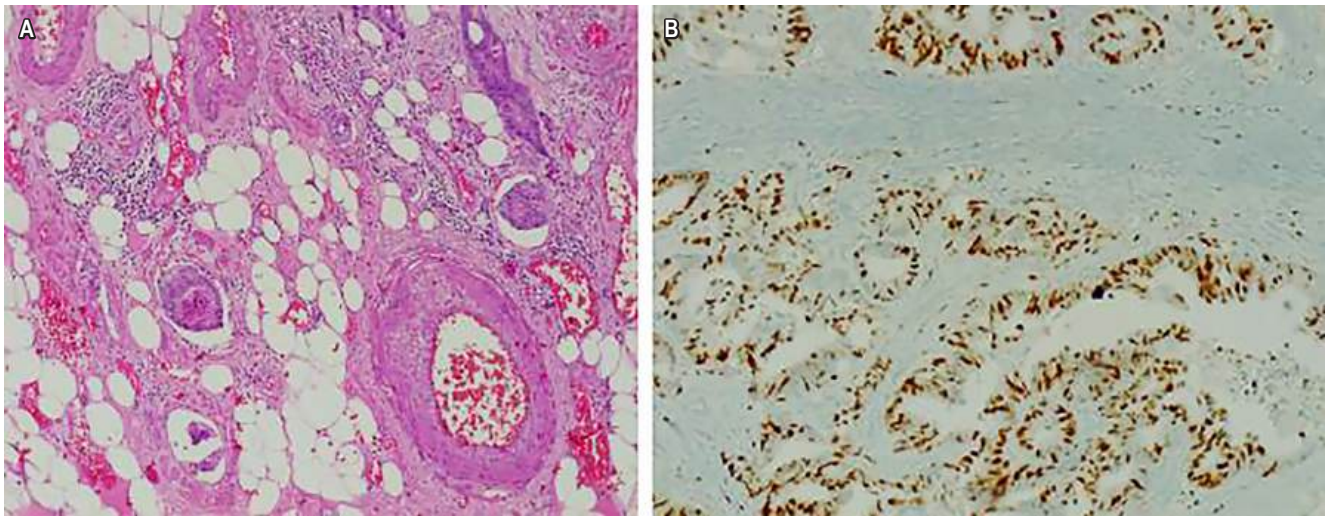


Figure 3. Examination results from the clinical case. **A.** Well-differentiated infiltrating adenocarcinoma with serosal and lymphovascular involvement. **B.** Ki67 at 60%. Images property of the authors.

The patient was discharged after 24 days of hospitalization. Outpatient placement of a permanent chemotherapy port was performed, and she initiated adjuvant chemotherapy with a FOLFOX regimen for six months, based on the tumor classification: sigmoid colon adenocarcinoma T3 N2a M0 G1, Stage IIIB. The patient is currently receiving oncological treatment with adequate tolerance.

DISCUSSION

The first reported case of colon cancer in the literature was in 1842, when a 32-year-old woman died four days after a breech delivery and was diagnosed with rectal carcinoma upon autopsy[7]. Since then, its incidence has been increasing, possibly associated with the observation of this trend in different types of individuals under 50 years of age[2], especially in low-resource countries[8]. Additionally, the average age at diagnosis of colon cancer in pregnant women is around 32 years[4], ranging between 30 and 39 years of age, the stage of highest fertility and case reporting[1], which also explains the increased number of publications on the topic in the last decade[9].

In Colombia, for 2021, colon cancer represented 4% of new cases and was the fifth cause for women, without mention of cases in pregnant women[10]. The presented case correlates with the age reported in the literature, with lymphatic involvement but without extension to the feto-placental unit. While vertical transmission of neoplasms during gestation occurs in some patients, it is not described for colorectal cancer cases in the literature[11,12].

Regarding etiology, the development of colorectal cancer has been associated with environmental or genetic factors, or usually a combination of both. Up to 30% to 34% of pregnant women with this neoplasm have predisposing risk factors such as family history, inflammatory bowel disease, or genetic neoplastic syndromes[13]; however, none were described in the patient's history or upon questioning her and her family. This makes such a finding during pregnancy even more complicated, as there is no established pathophysiological link between hormonal effects and the immunosuppressive state in gestation leading to the development of colorectal cancer. Nonetheless, results are contradictory, as some authors have reported elevated receptor levels while others have reported the opposite, without observing an increased risk in patients on hormone replacement therapy during menopause[4]. Further studies specifying the mechanisms of hormones in this type of cancer are required.

The diagnostic challenge arose from the similarity of the symptoms with those typical of pregnancy-related pathologies, initially confused with a case of hyperemesis gravidarum. However, the increasing distension and absence of bowel movements prompted the use of magnetic resonance imaging to better understand the clinical picture, which helped suspect a possible intestinal obstruction. A case series from Belgium reported that the acute diagnosis of the pathology is 24.4%, and among these, the predominant symptom was intestinal obstruction (9.8%), followed by intestinal perforation (7.3%); while the rest of the patients received a late diagnosis due to ambiguous symptoms that created confusion with other pathologies and suggested differential diagnoses. Symptoms such as rectal bleeding (46.3%), abdominal pain (17.1%), change in bowel habits (4.9%), and less frequently, weight loss, right shoulder pain, or abdominal mass (<3%); with the gestational trimester of presentation often being the second trimester, very possibly due to the compressive effect of the gravid uterus combined with the intestinal lumen obstruction seen in colorectal cancer[13]; this relates to the gestational age of our patient at the time of surgical intervention.

In addition to the symptoms, the available diagnostic tools are limited for use in pregnant women, not only due to teratogenic risk in early pregnancies (X-rays and CT scans) but also due to anatomical limitations from the occupying uterine cavity (ultrasounds). Reports show that pregnant women with nonspecific symptoms underwent various medical aids for diagnosis; among them, the most common was endoscopy (65.9%), followed by procedures like exploratory surgery (24.4%), and to a lesser extent, diagnostic imaging itself (MRI and ultrasounds) (9.8%); the first two are invasive and have direct effects on the gestational product, while the other imaging modalities are limited for the reasons already mentioned[13].

CONCLUSIONS

Although colorectal cancer is not a common pathology during gestation, it is necessary to perform a thorough physical examination of mothers with persistent gastrointestinal symptoms, in addition to inquiring about environmental risk factors and family history of cancer that might suggest or rule out this pathology. This is because, in the vast majority of cases, it goes unnoticed and is diagnosed incidentally through exploratory surgery, which increases the risk of complications during gestation, such as maternal-fetal death, abortion, preterm delivery, among others.

Even if diagnostic suspicion is considered, the physician remains limited by the difficulty with available diagnostic aids, both due to invasive effects (surgeries and endoscopies) and teratogenic effects (CT scans and X-rays), which increase potential obstetric and perinatal complications.

Currently, there is no standard recommendation or management guideline on how to diagnose and treat colorectal

cancer during pregnancy. Given the symptom overlap, this leads to the challenge of recognizing differential diagnoses and prioritizing non-invasive tests (such as MRI), until digestive tract cancer can be ruled out as the cause of gastrointestinal symptoms during the gestational stage.

Since the risk of developing cancer in different systems and organs increases with age, it is necessary to recommend pre-conception cancer screening for women of advanced maternal age (>35 years), with risk factors and a family history of cancer, conditions that predispose them to developing this pathology; providing treatment prior to gestation or implementing stricter control during pregnancy reduces complications in the gestational, delivery, and postpartum periods.

Informed Consent

We have the signed informed consent from the patient of the clinical case.

Conflicts of Interest

The authors declare no conflicts of interest.

Funding Source

This research was self-funded and did not receive any external financial assistance.

Use of Artificial Intelligence

The authors declare that they did not use artificial intelligence in any phase of the process.

Author Contributions

All authors collaborated in the execution of the study.

This study has not been presented in another journal, congress, or any other form of publication.

REFERENCES

1. Predescu D, Boeriu M, Constantin A, Socea B, Costea D, Constantinoiu S. Pregnancy and Colorectal Cancer, from Diagnosis to Therapeutical Management - Short Review. Chirurgia (Bucur). 2020 115(5):563-578. https://doi.org/10.21614/chirurgia.115.5.563
2. Rogers J, Woodard L, Gonzalez M, Dasari A, Johnson B, Morris K, et al, Colorectal cancer during pregnancy or postpartum: Case series and literature review. Obstet Med. 2022;15(2):118-124. https://doi.org/10.1177/1753495X211041228
3. Samadder N, Smith K, Wong J, Burt R, Curtin K. Colorectal cancer in the setting of pregnancy and familial risk. Int J Colorectal Dis. 2020;35(8):1559-1566. https://doi.org/10.1007/s00384-020-03579-x
4. Pellino G, Simillis C, Kontovounisios C, Baird D, Nikolaou S, Warren O, et al. Colorectal cancer diagnosed during pregnancy: systematic review and treatment pathways. Eur J Gastroenterol Hepatol. 2017 29(7):743-753. https://doi.org/10.1097/MEG.0000000000000863
5. Yaghoobi M, Koren G, Nulman I. Challenges to diagnosing colorectal cancer during pregnancy. Can Fam Physician. 2009 55(9):881-5.
6. Petruzzelli P, Zizzo R, Tavassoli E, Sutera M, Tin MCF, Petruzzelli L, et al. Colon Adenocarcinoma during Pregnancy: A Case Report and Review of the Literature. Case Rep Obstet Gynecol. 2020 22;2020:8894722. https://doi.org/10.1155/2020/8894722
7. Skilling JS. Colorectal cancer complicating pregnancy. Obstet Gynecol Clin North Am. 1998; 25(2):417-21. https://doi.org/10.1016/S0889-8545(05)70015-2
8. Akimoto N, Ugai T, Zhong R, Hamada T, Fujiyoshi K, Giannakis M, et al. Rising incidence of early-onset colorectal cancer - a call to action. Nat Rev Clin Oncol. 2021; 18(4):230-243. https://doi.org/10.1038/s41571-020-00445-1
9. Cao S, Okekpe C, Dombrovsky I, Valenzuela G, Roloff K. Colorectal Cancer Diagnosed During Pregnancy With Delayed Treatment. Cureus. 2020;12(5):e8261. https://doi.org/10.7759/cureus.8261
10. Instituto Nacional de Cancerología (INC). Anuario estadístico 2021 [Internet]. Bogotá, D. C.: INC; 2022 [consultado el 5 de agosto de 2023]. Disponible en: https://www.cancer.gov.co/conozca-sobre-cancer-1/publicaciones/anuario-estadistico-2021
11. Corredor E, Castillo M. Cáncer en mujeres embarazadas y su extensión a la unidad fetoplacentaria. Rev Colomb Obstet Ginecol. 2007;58(3):232-6. https://doi.org/10.18597/rcog.455
12. Morales Santana D, Czigany Z, Meister F, Wiltberger G, Caspers R, Enzensberger C, et al. Bowel Obstruction Due to Stenotic Sigmoid Colon Cancer in a 32-Year-Old Patient Presenting in the Third Trimester of Pregnancy: A Case Report of an Interval Surgical Approach. Am J Case Rep. 2022;23:e935920. https://doi.org/10.12659/AJCR.935920
13. Kocián P, de Haan J, Cardonick E, Uzan C, Lok CAR, Fruscio R, et at, Management and outcome of colorectal cancer during pregnancy: report of 41 cases. Acta Chir Belg. 2019;119(3):166-175. https://doi.org/10.1080/00015458.2018.1493821

https://doi.org/10.22516/25007440.1264

Case report

Collagenous Gastritis: An Unusual Cause of Anemia in Young Patients

Clara Eugenia Plata-García,[1*] Maria Alexandra Torres-Guerra,[2] Sandra Judith Huertas-Pacheco.[3]

OPEN ACCESS

Citation:
Plata-García CE, Torres-Guerra MA, Huertas-Pacheco SJ. Collagenous Gastritis: An Unusual Cause of Anemia in Young Patients. Revista. colomb. Gastroenterol. 2025;40(3):333-338.
https://doi.org/10.22516/25007440.1264

[1] Pediatrician and Specialist in Pediatric Gastroenterology, Universidad El Bosque. Faculty, Pontificia Universidad Javeriana, Hospital San Ignacio. Chief of Pediatric Gastroenterology, Hepatology and Nutrition Service, Hospital Universitario San Ignacio. Member and Current Bogotá Representative, Colombian College of Pediatric Gastroenterology, Hepatology and Nutrition. Bogotá, Colombia.
[2] Physician, Universidad de Los Andes. Specialist in Pediatrics, Universidad Militar Nueva Granada. Specialist in Epidemiology, Universidad Autónoma de Bucaramanga Clinic. Hospital Militar Central. Bogotá, Colombia.
[3] Physician and Specialist in Pathology and Epidemiology. Clinical and Anatomical Pathology, Universidad Nacional de Colombia. Occasional Postgraduate Faculty, School of Medicine, Universidad Nacional de Colombia. Pathology Faculty for the Gastroenterology Fellow Program, Unisanitas. Laboratory Pathologist, Clínica Universitaria Colombia, Colsanitas S. A. Chief of Pathology Service, Clínica Reina Sofía, Keralty Group. Bogotá, Colombia.

***Correspondence:** Clara Eugenia Plata-García.
claraplata@gmail.com

Received: 05/08/2024
Accepted: 04/09/2024

Abstract

Collagenous gastritis (CG) is a rare condition that, in most cases, presents with severe iron-deficiency anemia or recurrent abdominal pain. It is characterized by increased collagen deposition in the subepithelial mucosa, associated with inflammatory infiltrates in the lamina propria. Similar histological findings can be observed in collagenous enterocolitis. The pathophysiology and prognosis of the disease are not yet fully understood, and clinical presentation may vary according to age group.

This report describes a 15-year-old female patient referred by hematology for evaluation of chronic anemia, accompanied by asthenia, adynamia, pica, and abdominal pain. Esophagogastroduodenoscopy revealed severe mucosal alterations in the gastric body, and thorough pathological review confirmed the diagnosis of collagenous gastritis.

Histologically observed collagen deposits may be related to a generalized disease affecting different areas of the gastrointestinal tract. In light of this case, a review of the available literature was conducted.

Keywords

Gastritis, anemia, collagenous colitis, celiac disease.

INTRODUCTION

Collagenous gastritis is a rare type of gastritis, with fewer than 300 cases reported in the literature. It is characterized by the subepithelial deposition of a thick collagen band and a variable presence of inflammatory infiltrate in the lamina propria[1,2]. Due to its rare presentation profile, epidemiological data are scarce, and most information found in the literature corresponds to case reports. Some publications mention the association of collagenous gastritis with other pathologies, such as collagenous colitis, lymphocytic colitis, celiac disease, and other autoimmune diseases. However, the pathophysiology, prognosis, and treatment have not been precisely clarified.

CASE REPORT

The case involves a 15-year-old female patient, the daughter of non-consanguineous parents; the father had a history of splenomegaly of uncertain etiology, with no other

significant medical history. She was under follow-up by pediatric hematology for a case of iron deficiency anemia (microcytic hypochromic) two years prior to the gastroenterology consultation. Clinically, she reported symptoms of pica (excessive consumption of ice). She received iron salt supplementation on several occasions with improvement in erythrocyte indices, but the anemia recurred when supplementation was discontinued.

She had a history of irregular menstrual cycles, so a gynecological etiology for the anemia was suspected; this was ruled out due to lack of improvement with hormonal management and normal studies. Hematology investigated and ruled out hemolysis, primary and secondary hemostasis disorders, as well as platelet dysfunction (**Figure 1**). For a period, the patient remained asymptomatic and under hematology control, but the symptoms of pica, asthenia, and lethargy reappeared, and moderate anemia with very low ferritin was again found. A fecal occult blood test was requested, management with iron salts was restarted, and the patient was referred for evaluation by pediatric gastroenterology.

During the gastroenterology consultation, the patient reported long-standing abdominal pain associated with the anemia. On physical examination, the only relevant finding was an anal fissure. Anthropometric measurements were normal for her age (weight: 49.1 kg; height: 157.5 cm; height for age [H/A]: P24, -0.7 standard deviation [SD]; body mass index [BMI]: P39, -0.29 SD). During the consultation, she provided other paraclinical results: normal thyroid function and normal abdominal ultrasound. Further workup was considered to rule out inflammatory bowel disease, taking into account the persistence of anemia, systemic symptoms (asthenia and lethargy), and the finding of an anal fissure (**Table 1**).

Table 1. Laboratory Results

Laboratory	Test Value	Reference Range
Hemoglobin (g/dL)	11.4	12.3-15.3
MCV (fL)	78.8	80-100
Iron (µg/mL)	35.68	30-109
IgA (g/L)	1.81	0.4-2.93
Gliadin Antibodies IgG (U/mL)	71.3	Positive >12
Gliadin Antibodies IgA (U)	28.7	Positive >20
Transglutaminase Antibodies IgA (U/mL)	2	Positive >10
Fecal Calprotectin (µg/g)	798.4	Elevated >200
Endomysial Antibodies IgA	Negative	≥1/5
Endomysial Antibodies IgG	Negative	≥1/5

IgA: immunoglobulin A; IgG: immunoglobulin G; MCV: mean corpuscular volume. Table prepared by the authors.

An upper gastrointestinal endoscopy (UGIE) (**Figure 2**) and a total ileocolonoscopy were performed. The significant finding was a cobblestone-appearing mucosa in the gastric body with severely thickened folds and a spared antrum

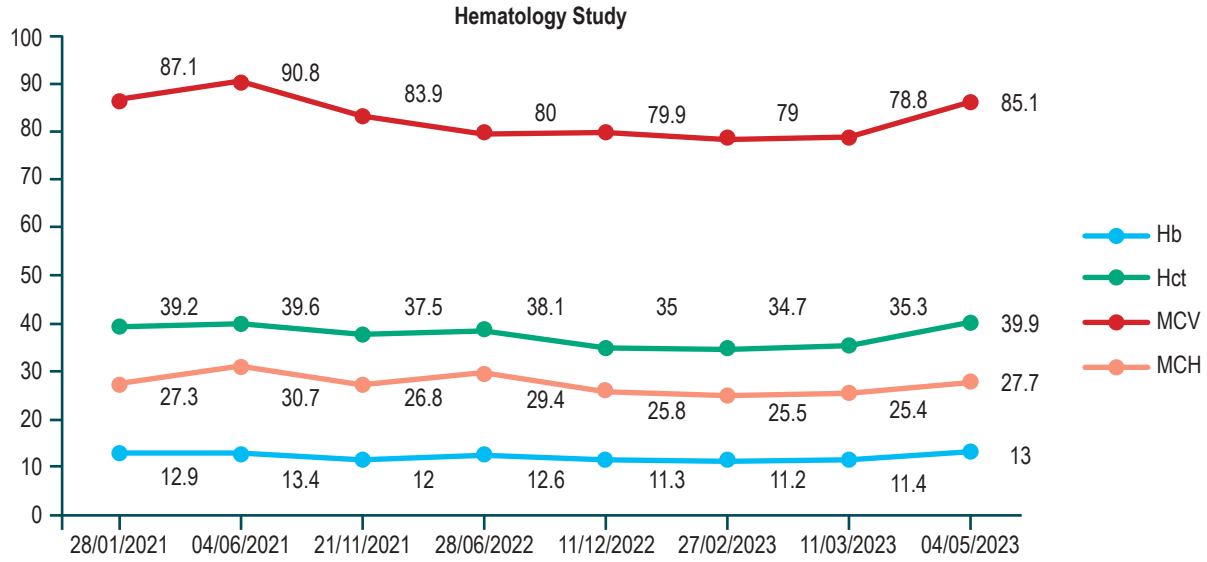


Figure 1. Hemoglobin curve. Hb: hemoglobin; MCH: mean corpuscular hemoglobin; Hct: hematocrit; MCV: mean corpuscular volume. Image property of the authors.

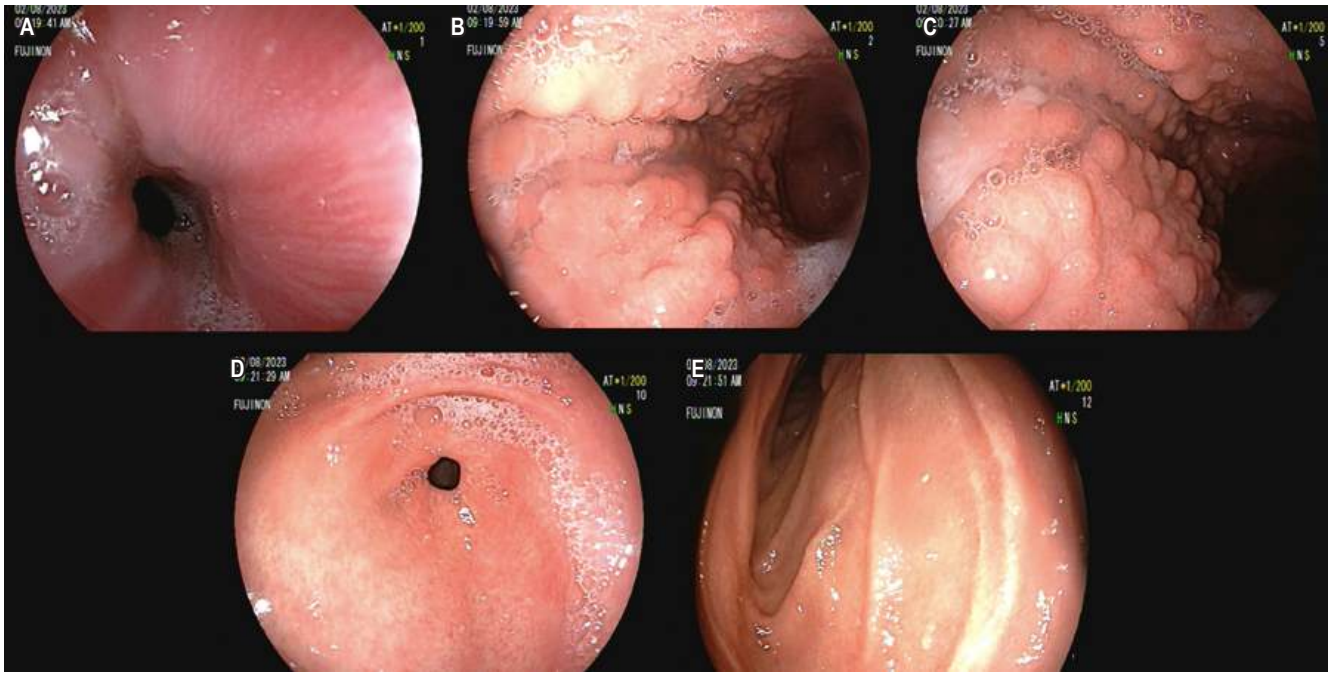


Figure 2. Esophagogastroduodenoscopy. **A.** Normal mucosa. **B and C.** Body with thickened folds and cobblestone-appearing mucosa. **D.** Normal antrum. **E.** Normal duodenum. Images property of the authors.

with usual appearance. The other segments (esophagus, duodenum, ileum, and colon) also appeared normal. Due to the significant elevation of calprotectin (798 µg/g), an enterography MRI was requested, which was normal.

The initial report of the gastric mucosa biopsies (**Figure 3**) described moderate, diffuse, chronic, non-active, non-atrophic gastritis with an absence of *Helicobacter pylori*. Given the severe mucosal alteration observed during endoscopy and the unusual finding of exclusive involvement of the body without findings in the antrum, a second histological review was requested. Special stains were performed and reported an increased chronic inflammatory infiltrate in the lamina propria of the body and patchy thickening of the subepithelial collagen with entrapped lymphocytes, findings compatible with colla-

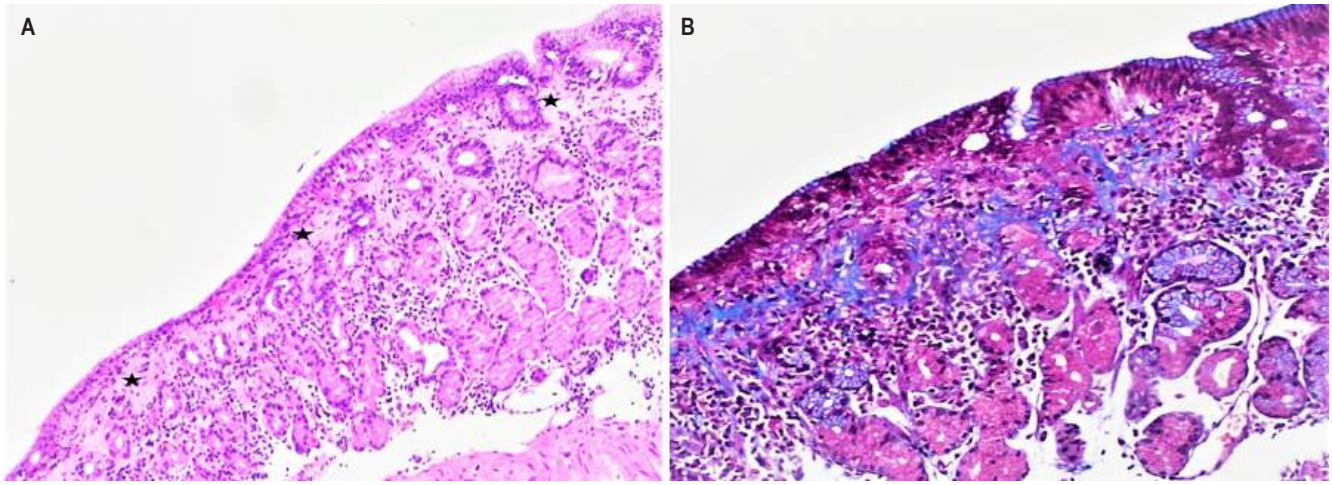


Figure 3. Histological review with stains. **A.** Hematoxylin and eosin (20X). Body mucosa with an irregular subepithelial collagen band (stars) approximately 80 to 180 microns thick, surrounding some capillary vessels and accompanied by chronic inflammation, with occasional intraepithelial lymphocytes (less than 25 per 100 epithelial cells). **B.** Masson's trichrome (20X). Highlights the collagen band in blue, extending irregularly to the middle third of the lamina propria. Images property of the authors.

genous gastritis, a diagnosis that explained the patient's clinical picture. The remaining biopsies from the different segments, including the antrum and intestine, were normal.

The patient was also evaluated by pediatric rheumatology, where further workup for autoimmune gastritis and Immunoglobulin G4 (IgG4)-related disease as a cause of the collagenous gastritis was considered; these results were normal. Treatment was initiated with a high-dose proton pump inhibitor (PPI). Due to the elevated fecal calprotectin and positive anti-gliadin IgA antibodies, a trial of wheat restriction was considered for a possible associated gluten sensitivity. Following this, there was an improvement in abdominal pain and resolution of the anemia.

DISCUSSION

Collagenous gastritis is a rare disease. A study conducted in Sweden reported an incidence of collagenous gastritis in pediatrics of 0.25/100,000 inhabitants and a prevalence of 2.1%[2]. There are no other epidemiological data[1,2]. In most pediatric cases, mucosal inflammation is restricted to the stomach, unlike in adults, where the intestine or colon is frequently also affected.

Clinically, in the pediatric population, most cases present with severe iron deficiency anemia or recurrent abdominal pain; however, a study from Italy, which compiled 71 pediatric cases of collagenous gastritis from the literature, mentioned other symptoms such as dyspepsia, nausea, dysphagia, diarrhea, constipation, and weight loss. In adults, the predominant symptoms are diarrhea and malabsorption, considering the association with collagenous colitis[2-4].

Collagenous gastritis is histologically characterized by the presence of a subepithelial collagen band >10 μm associated with a chronic inflammatory infiltrate in the lamina propria. The inflammatory infiltrate can vary, with a predominance of lymphocytes (pattern similar to lymphocytic gastritis), plasma cells, and eosinophils (eosinophil-rich pattern), the latter described more frequently in pediatric presentations. However, in our case, the infiltrate was mixed among lymphocytes, plasma cells, and eosinophils, without a predominance of any cell line, and the intraepithelial lymphocytosis was discrete. An atrophic gastritis pattern, more common in adults, has also been described.

Collagenous gastritis with a predominance of eosinophilic infiltrate is part of the differential diagnosis of eosinophilic gastritis; therefore, eosinophilia should prompt a search for a subepithelial collagen band when present[5]. Several available studies describe the persistence of the subepithelial collagen band during follow-up, which has been found up to 10 years after the initial biopsy. To detect this collagen band, some immunohistochemical studies (tenascin, type IV collagen) have been described as potentially useful in the histological diagnosis of collagenous gastritis[6] and may have superior sensitivity to hematoxylin-eosin and trichrome for its detection; however, they are not routinely available in pathology laboratories, and studies proving their superiority over histochemistry are lacking.

The pathophysiology of this condition is still unknown; however, the most accepted theory considers the subepithelial collagen deposition to be a repair process in response to chronic inflammation caused by intraluminal toxic or infectious agents[3]. Other potential causes of this inflammation to consider are allergic reactions, medications, and an increase in IgG4-type plasma cells[7]. Another well-regarded hypothesis is the presence of primary vascular anomalies that increase vascular permeability, resulting in protein extravasation and collagen deposition, in addition to a fibrotic reaction secondary to a primary inflammatory process in susceptible individuals[4]. Although the etiology of collagenous gastritis is unclear, some studies demonstrate that the collagen isolated in the subepithelial bands corresponds mainly to types III and VI collagen[8]. Furthermore, it is considered that the collagen band present in both the gastric and colonic mucosa is a consequence of the same pathogenic factor in susceptible patients, and the host response would be greater at the gastric level in both the pediatric population and the adult population with colonic predominance[9].

Regarding endoscopic findings, mucosal edema and a nodular appearance in the body, antrum, and gastric fundus are most frequently found; hypertrophic mucosa with erythema in the gastric body; and nodular changes in the bulb, which may raise suspicion for other diseases. Other described endoscopic findings are polypoid lesions and hyperplastic, coarse folds[2,3].

Case reports in the literature document the association of collagenous gastritis with celiac disease, as well as other autoimmune disorders such as collagenous enteritis and colitis, Sjögren's syndrome, systemic lupus erythematosus, rheumatoid arthritis, autoimmune thyroiditis, type 1 diabetes *mellitus*, and common variable immunodeficiency. These entities are more associated with the adult phenotype of collagenous gastritis than the pediatric one, although the reason for this association is unclear. In patients diagnosed with collagenous gastritis, studies should be considered to exclude these pathologies[10-12].

A specific therapy has not yet been established, although most pediatric patients are treated with iron supplementation and high-dose PPIs. In refractory cases, elimination diets, systemic and topical steroids, and local anti-inflammatories (mesalamine) have been used, with clinical improvement in most cases[13].

In our patient's case, she presented with chronic anemia associated with abdominal pain, asthenia, and lethargy. These are symptoms that can be confused with various gas-

trointestinal pathologies, but the persistence of chronic anemia without a clear etiology led to endoscopic studies. These revealed the severe alteration with hypertrophic and nodular-appearing mucosa exclusively in the body, as reported in the literature, and at the histopathological level, the presence of patchy subepithelial collagen with entrapped lymphocytes, which diagnosed collagenous gastritis. Since it is mentioned that this pathology may be related to celiac disease, pertinent studies were performed, which found positive anti-gliadin IgG antibodies. While these are not diagnostic of celiac disease, they suggest possible gluten sensitivity. Therefore, a therapeutic trial of gluten restriction was considered, in addition to management with a high-dose PPI, which produced an improvement in the patient's symptoms.

CONCLUSION

A specific treatment or long-term monitoring recommendations for this disease are not yet established in the literature, considering the possibility of association with autoimmune pathology or malignant potential in the context of chronic inflammation. Although collagenous gastritis is a rare disease, it should be considered in the differential diagnoses to be evaluated in children with gastrointestinal symptoms and persistent iron deficiency anemia. Similarly, at the histological level, special stains can be useful to highlight the characteristic thickened subepithelial collagen band associated with this entity.

REFERENCES

1. Genta RM, Turner KO, Morgan CJ, Sonnenberg A. Collagenous gastritis: Epidemiology and clinical associations. Dig Liver Dis. 2021;53(9):1136-1140. https://doi.org/10.1016/j.dld.2021.03.010
2. Käppi T, Wanders A, Wolving M, Lingblom C, Davidsson Bården B, et al. Collagenous gastritis in children: Incidence, disease course, and associations with autoimmunity and inflammatory markers. Clin Transl Gastroenterol. 2020;11(8):e00219. https://doi.org/10.14309/ctg.0000000000000219
3. Liu Y, Luo YY, Gu WZ, Tang HF, Chen J. [Collagenous gastritis in Chinese]. Zhonghua Er Ke Za Zhi. 2022;60(12):1339-1341. https://doi.org/10.3760/cma.j.cn112140-20220309-00186
4. Isoldi S, Viola F, Cucchiara S, Dilillo A, Iorfida D, Testi AM, et al. Management of collagenous gastritis in children: Case series and literature review. Indian J Gastroenterol. 2024;43(3):567-577. https://doi.org/10.1007/s12664-023-01472-3
5. Arnason T, Brown IS, Goldsmith JD, Anderson W, O'Brien BH, Wilson C, et al. Collagenous gastritis: A morphologic and immunohistochemical study of 40 patients. Mod Pathol. 2015;28(4):533-544. https://doi.org/10.1038/modpathol.2014.119
6. Müller S, Neureiter D, Stolte M, Verbeke C, Heuschmann P, Kirchner T, et al. Tenascin: A sensitive and specific diagnostic marker of minimal collagenous colitis. Virchows Arch. 2001;438(5):435-441. https://doi.org/10.1007/s004280000375
7. Nielsen OH, Riis LB, Danese S, Bojesen RD, Soendergaard C. Proximal collagenous gastroenteritides: Clinical management. A systematic review. Ann Med. 2014;46(5):311-317. https://doi.org/10.3109/07853890.2014.899102
8. Kori M, Cohen S, Levine A, Givony S, Sokolovskaia-Ziv N, Melzer E, et al. Collagenous gastritis: A rare cause of abdominal pain and iron-deficiency anemia. J Pediatr Gastroenterol Nutr. 2007;45(5):603-606. https://doi.org/10.1097/MPG.0b013e31803cd545
9. Brain O, Rajaguru C, Warren B, Booth J, Travis S. Collagenous gastritis: Reports and systematic review. Eur J Gastroenterol Hepatol. 2009;21(12):1419-1424. https://doi.org/10.1097/MEG.0b013e32832770fa
10. Matta J, Alex G, Cameron DJS, Chow CW, Hardikar W, Heine RG. Pediatric collagenous gastritis and colitis: A case series and review of the literature. J Pediatr Gastroenterol Nutr. 2018;67(3):328-334. https://doi.org/10.1097/MPG.0000000000001975
11. Ma C, Park JY, Montgomery EA, Arnold CA, McDonald OG, Liu TC, et al. A comparative clinicopathologic study of collagenous gastritis in children and adults. Am J Surg Pathol. 2015;39(6):802-812. https://doi.org/10.1097/PAS.0000000000000441
12. Leung ST, Chandan VS, Murray JA, Wu TT. Collagenous gastritis. Am J Surg Pathol. 2009;33(5):788-798. https://doi.org/10.1097/PAS.0b013e318196a67f
13. Kozai L, Tan A, Nebrejas KE, Warashina C, Nishimura Y. Collagenous gastritis is an underdiagnosed cause of anemia and abdominal pain: Systematic scoping review. Dig Dis Sci. 2023;68(7):3103-3114. https://doi.org/10.1007/s10620-023-07938-w

https://doi.org/10.22516/25007440.1271

Case report

Type 1 Refractory Celiac Disease: Report of Two Cases with Different Therapeutic Approaches

Lorete María da Silva-Kotze,[1] Luis Roberto Kotze,[2] César Lazzarotto,[3] Luana Fanho-Souto,[4] Emanueli Taine-Schadek,[5] Renato Nisihara.[6*]

OPEN ACCESS

Citation:
da Silva-Kotze LM, Kotze LR, Lazzarotto C, Fanho-Souto L, Taine-Schadek E, Nisihara R. Type 1 Refractory Celiac Disease: Report of Two Cases with Different Therapeutic Approaches. Revista. colomb. Gastroenterol. 2025;40(3):339-345. https://doi.org/10.22516/25007440.1271

[1] Physician, specialist in Internal Medicine and Gastroenterology, PhD in Clinical Gastroenterology, Universidade Federal de São Paulo. Full Professor, Universidade Federal do Paraná, Curitiba, Paraná.
[2] Pathologist Physician, Universidade Federal do Paraná. Curitiba, Brazil.
[3] Gastroenterologist Physician, Unisul Pedra Branca. Florianopolis, Brazil.
[4] Gastroenterologist Physician, Vidar Clinic. Blumenau, Brazil.
[5] Medical Student, Faculdade Evangélica Mackenzie do Paraná. Curitiba, Brazil.
[6] PhD in Clinical Medicine. Professor of Medicine, Faculdade Evangélica Mackenzie do Paraná. Universidade Federal do Paraná, Mackenzie do Paraná. Curitiba, Brazil.

***Correspondence:** Renato Nisihara.
renatonisihara@gmail.com

Received: 12/08/2024
Accepted: 06/11/2024

Abstract

Background: Lifelong strict adherence to a gluten-free diet (GFD) is the effective treatment for celiac disease (CD), leading to symptom remission and mucosal healing. Refractory celiac disease (RCD) is defined as the persistence or relapse of symptoms and intestinal damage in individuals previously diagnosed with CD after at least 12 months of strict GFD adherence, occurring in a minority of CD patients. Diagnosis and differentiation of RCD type are performed via specific immunohistochemistry on duodenal biopsy. **Case 1:** A 52-year-old male with a prior CD diagnosis presented with persistent symptoms even after five years of strict GFD adherence. He was diagnosed with type 1 refractory RCD and treated with oral budesonide (9 mg/day for 8 months), achieving clinical remission, with normalization of duodenal mucosal histopathology. **Case 2:** A 62-year-old female with a prior CD diagnosis and two years of strict GFD adherence presented with severe symptoms. She was diagnosed with type 1 RCD and treated with azathioprine at 2 mg/kg/day for 24 months, resulting in complete symptom remission and restoration of duodenal mucosal integrity. **Conclusions:** In addition to strict adherence to a healthy gluten-free diet, both oral budesonide and azathioprine were effective in treating type 1 RCD, as patients achieved and maintained clinical remission without drug-related adverse effects. Histological response, demonstrating complete normalization of duodenal mucosal architecture, confirmed the success of therapy.

Keywords

Celiac disease, treatment, diagnosis, gluten-free diet, budesonide, azathioprine.

INTRODUCTION

Celiac disease (CD) is a permanent immune-mediated disorder of T cells, triggered and maintained by the ingestion of gluten present in wheat, barley, and rye in genetically susceptible individuals. Strict, lifelong adherence to a gluten-free diet (GFD) is the cornerstone of effective treatment for CD, leading to symptom remission and mucosal healing within 12 months[1-3]. However, in a minority of patients, full clinical and mucosal recovery does not occur, and symptoms may persist despite strict adherence to a gluten-free diet[4]. Approximately 15% of patients on a GFD never recover[5]. Non-responsive celiac disease (NRCD), which affects 7% to 30% of individuals with CD on a GFD, is defined as persistent symptoms, signs, or laboratory abnormalities typical of CD despite strict adherence to a GFD for 6 to 12 months[6,7]. If NRCD is suspected, confirmation of the initial CD diagnosis is mandatory, as is the absence of any intentional or unintentional gluten consumption, and re-evaluation of duodenal histopathology[1,2,6]. At the same time, differential diagnosis is crucial to investigate other diseases that overlap with CD and cause similar symptoms[1-3,7].

© 2025 Asociación Colombiana de Gastroenterología

Persistent villous atrophy without evidence of gluten contamination may indicate a subset of patients who are sensitive to very small amounts of gluten (hypersensitive). Patients are considered to have a slow response when complete recovery may occur between 18 and 29 months on a gluten-free diet (GFD). However, in cases of slow healing, refractory celiac disease (RCD) should be investigated[1-7]. This is defined as the persistence or relapse of symptoms and intestinal damage in individuals previously diagnosed with celiac disease, after at least 12 months of strict adherence to a GFD[6]. RCD is classified into two types based on molecular and immunophenotypic characteristics[8,9]. Flow cytometry is recommended for the differential diagnosis between the two forms, RCD1 and RCD2. For this purpose, the biopsy set must be preserved in saline solution and not in formalin[8,9]. In type 1 RCD (RCD1), intraepithelial lymphocytes (IELs) are polyclonal expansions of T cells with a normal phenotype (surface CD3+ and CD8+)[8,9]. In these cases, steroids, preferably budesonide, and immunosuppressive drugs such as azathioprine (AZA) can be prescribed[10]. Type 2 RCD (RCD2), on the other hand, is characterized by clonal expansions of IELs with an aberrant phenotype (surface CD3-, cytoplasmic CD3+, and CD8-), which is associated with higher morbidity and mortality[8]. Treatment may include steroids like budesonide, and prednisone is an alternative if budesonide is not available; however, immunosuppressants are not indicated in these cases[10].

Therefore, defining the type of RCD is crucial in clinical practice to plan the appropriate treatment and consider the prognosis[2,6,8,11]. In Brazil, there is only one reported case of RCD2[12].

Here we report two cases of RCD1 showing the patients' clinical and laboratory findings and treatment plan.

METHODS

This study was approved by the Institutional Ethics Committee under protocol 4770592. It is a retrospective study conducted through a review of medical records. The same physician treated the patients at a private medical office in the city of Curitiba, Brazil, and the same pathologist evaluated the biopsies.

Extradigestive and gastrointestinal symptoms at the time of RCD diagnosis were investigated from transcripts of patients' subjective reports. Routine laboratory tests were required to determine the patients' nutritional status and diagnose disorders that could overlap with CD. Serum levels of immunoglobulin A (IgA) and anti-transglutaminase IgA (anti-tTG) were measured to assess adherence to a GFD.

All patients underwent an upper gastrointestinal endoscopy. Duodenal biopsies were performed according to the following recommendations: 1 or 2 fragments from the bulb (at the 9 and 12 o'clock positions) and 4 to 5 samples from the duodenum[1,13]. Samples were fixed in 10% formalin to standardize histological examination. CD was classified using the Marsh-Oberhuber score[14,15]. Furthermore, upon clinical suspicion of RCD, an immunohistochemistry method with anti-CD3 and anti-CD8 antibodies was performed on paraffin sections[9,16]. A colonoscopy was required for diagnosis, exclusion of microscopic colitis[17] and malignancies[18,19]. Imaging exams were required to allow for the early detection of small lesions and EATL (enteropathy-associated T-cell lymphoma). DEXA (dual-energy X-ray absorptiometry) was used to assess bone disease.

CASE REPORTS

Case 1

A 52-year-old Caucasian male with a previous diagnosis of CD presented with symptoms even after 5 years of strict adherence to a GFD. He presented with asthenia, weight loss, diarrhea, aphthous ulcers, and gastroesophageal reflux. Laboratory results showed decreased serum vitamin D levels and fecal elastase. However, serum concentrations of negative anti-tTG IgA, iron, vitamin B_{12}, and albumin were normal. The patient reported a previous diagnosis of lactose intolerance. Exocrine pancreatic insufficiency was also diagnosed. He was undergoing treatment for osteoporosis. Colonoscopy revealed a polyp detected in the sigmoid colon, and histopathology indicated a tubular adenoma without dysplasia.

Case 2

The case involves a 62-year-old Caucasian female with a previous diagnosis of CD and two years of strict adherence to a GFD, yet she presented with severe symptoms. She reported bloating, weight loss, diarrhea, aphthous ulcers, gastroesophageal reflux, epigastric pain, nausea, and flatulence. Laboratory results showed decreased serum levels of iron, vitamin B_{12}, and vitamin D. Furthermore, anti-tTG IgA was negative, and serum albumin was normal. The patient reported a previous diagnosis of lactose intolerance, asthma, hypothyroidism, and breast tumor ablation several years prior to the CD diagnosis. Exocrine pancreatic insufficiency was diagnosed. She was also undergoing treatment for osteoporosis. Colonoscopy results were normal.

Imaging tests (computed tomography [CT] or magnetic resonance imaging [MRI]) showed no abnormalities in either case. DEXA confirmed osteoporosis in both patients.

Table 1 shows the histopathological findings of the duodenal mucosa before and after treatment.

Table 1. Histopathological findings of the duodenal mucosa before and after treatment

Test	Case 1	Case 2
Biopsy at CD diagnosis*	Marsh III-C	Marsh III-C
Duration of GFD treatment	5 years	2 Years
Biopsy at RCD diagnosis	Marsh III-A	Marsh III-B
Immunohistochemistry	RCD1	RCD1
Treatment (period)	Budesonide (8 months)	Azathioprine (24 months)
Biopsy after treatment	Marsh 0	Marsh 0
Immunohistochemistry	Normal	Normal

*Marsh-Oberhuber classification. GFD: gluten-free diet; CD: celiac disease; RCD1: type 1 refractory celiac disease. Table prepared by the authors.

In Case 1, oral budesonide was administered at a dose of 9 mg/day, divided into three doses of 3 mg each, based on the findings of Mukewar et al.[20]. The rationale for this approach is that oral budesonide likely provides adequate drug delivery. With this administration form, budesonide is distributed uniformly throughout the small intestine. Budesonide is available in 3 mg hard gelatin capsules containing the prescribed medication. The active drug is contained within an insoluble ethylcellulose polymer, which provides time-dependent release of budesonide. It is hypothesized that opening the gelatin capsule and crushing the drug in the teeth will initiate the release of budesonide from the ethylcellulose polymer matrix, resulting in a more immediate action in the proximal small intestine[21]. This regimen was used for 8 months, at which point clinical remission was achieved and duodenal mucosal histopathology showed normality (**Figure 1**). The patient reported no side effects.

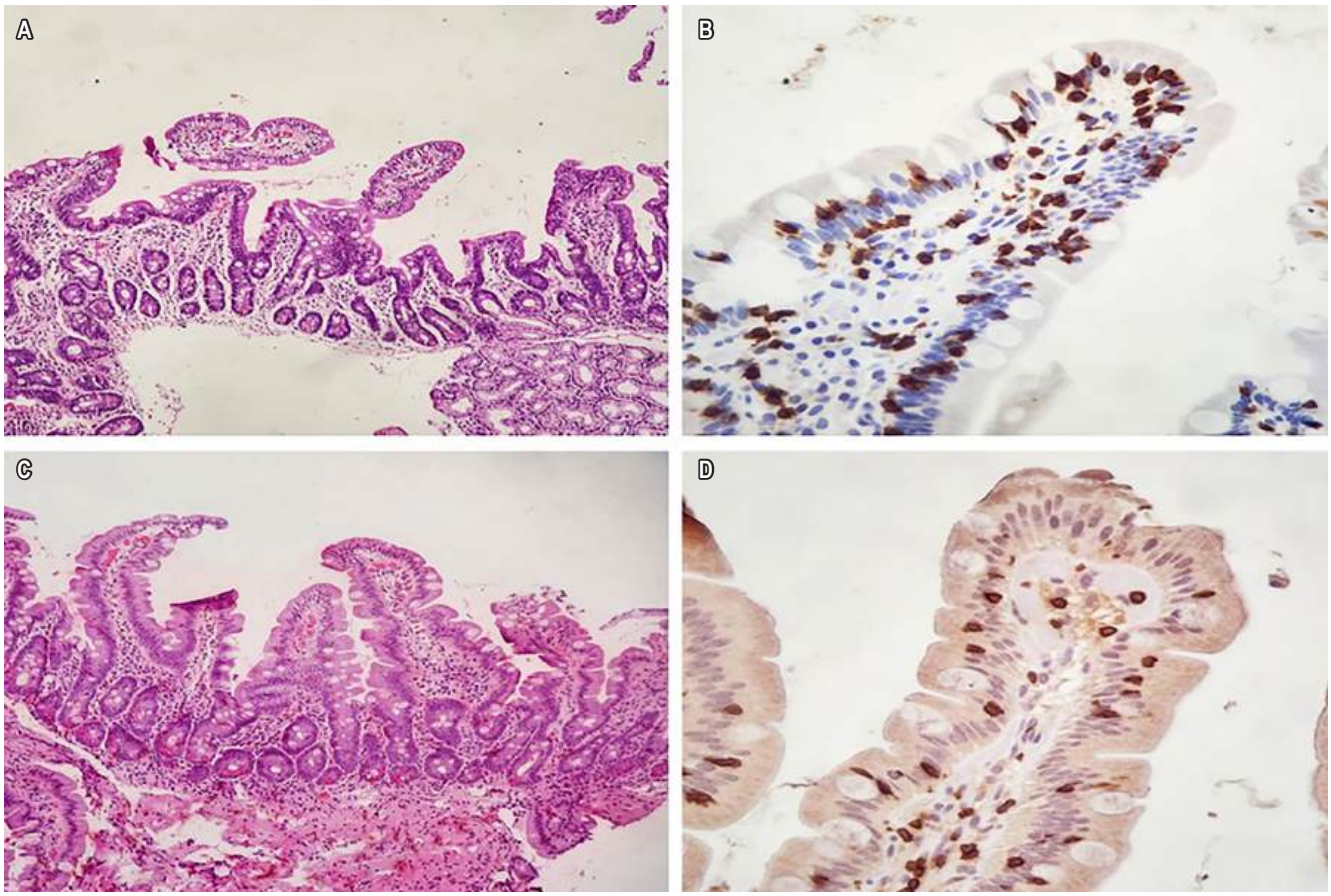


Figure 1. Histopathology of the duodenal mucosa. **A.** Duodenal biopsy before treatment; hematoxylin-eosin showing Marsh 3-A (100X). **B.** Immunohistochemistry before treatment showing a high number of IELs: CD8 >50% of IELs, compatible with type 1 RCD (400X). **C.** Duodenal biopsy after treatment; hematoxylin-eosin showing Marsh 0 (100X). **D.** Immunohistochemistry after treatment showing a normal CD8 count (400X). Images property of the authors.

For the second case, since the patient had previously used prednisone for asthma, azathioprine was initiated at a dose of 2 mg/kg/day. This improves the effect of steroids and allows for lower doses. Goerres et al.[10] used azathioprine to treat patients with RCD1, starting with an induction therapy of prednisone. The benefit could result from the therapeutic effect of both agents and avoiding the side effects of prednisone, through the steroid-sparing effect of azathioprine[10]. The total duration of treatment for azathioprine has not yet been established, although Goerres et al. recommended one year[10]. Iqbal et al.[23] reported a case where azathioprine was used for seven years. Azathioprine was discontinued at 24 months because the patient was asymptomatic and had regained her pre-CD diagnosis weight. Her laboratory tests were normal, and the duodenal mucosa had returned to Marsh-0 (**Figure 2**). The patient reported no side effects.

DISCUSSION

It is extremely important to alert treating physicians that the differential diagnosis between NRCD and RCD is crucial in those patients who adhere to a GFD yet maintain symptoms. RCD generally occurs after the age of 50[6], as was also found in our patients. RCD can be clinically classified as primary (patients who showed no clinical/histopathological improvement from the time a GFD was initiated) or secondary (patients who experienced a sudden clinical worsening after many years of a very good response to a GFD)[8]. The cases described in this report fall into the latter group.

Before labeling a patient as having RCD, it is mandatory to confirm whether the initial CD diagnosis was correct[2,6]. In our cases, a re-evaluation of the duodenal histopathology was requested and CD was confirmed. Classifying RCD

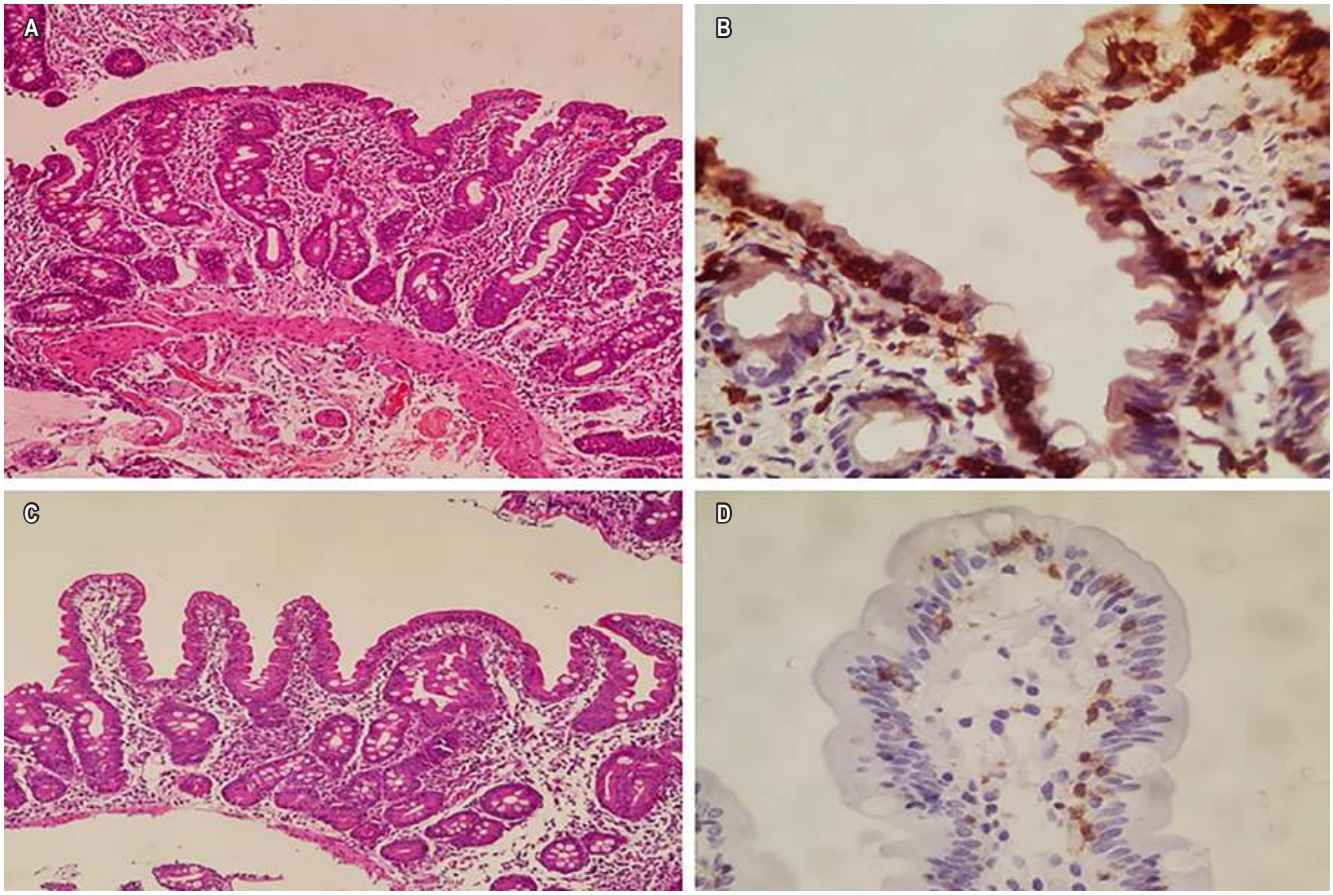


Figure 2. Histology of the duodenal mucosa. **A.** Duodenal biopsy before treatment; hematoxylin-eosin showing Marsh 3-B (100X). **B.** Immunohistochemistry before treatment showing a high number of IELs: CD8 >50% of IELs, compatible with RCD1 (400X). **C.** Duodenal biopsy after treatment; hematoxylin-eosin showing Marsh 0 (100X). **D.**Immunohistochemistry after treatment showing a normal CD8 count (400X). Images property of the authors.

as type 1 or 2 is crucial for treatment and prognosis[8,11]. Although cytometric analysis of IELs with an aberrant phenotype is considered the gold standard, the diagnosis of RCD can be confirmed by immunohistochemistry[9,16], as was performed in our case studies.

When CD is confirmed after strict adherence to a GFD for at least 12 months, the serological level of anti-tTG IgA can be negative or positive at low levels[6]. In our patients, anti-tTG IgA levels were negative, suggesting strong adherence to a GFD, as reported by the patients.

Macro- and micronutrient deficiencies are common in CD at the time of diagnosis and during treatment. Deficits in iron, vitamin B_{12}, and vitamin D were detected in our patients. The GFD combined with dietary support, as well as the repletion of detected mineral/vitamin deficiencies and the treatment of comorbidities, resulted in an improvement of the clinical picture.

In the presented cases, the diagnosis of NRCD was suspected at the first appointment considering the clinical presentation after 5 years (Case 1) and 24 months (Case 2) of strict adherence to a GFD with duodenal histology showing Marsh III-C. Disorders potentially overlapping with CD were ruled out. Since individuals on a GFD who have persistent symptoms have a significantly higher rate of exocrine pancreatic insufficiency (28.4%)[24], pancreatic elastase levels were determined. Both patients had lower levels and were prescribed pancreatic enzyme replacement.

Requesting immunohistochemistry on the duodenal biopsy is essential to differentiate between type 1 and type 2 RCD, and this result is crucial for defining treatment and prognosis. The treatment of RCD involves close monitoring of the GFD, aggressive nutritional support, and immune suppression to reduce inflammation in the small intestine[25]. Regarding prescribed medications, oral budesonide is recommended as the first line of treatment, followed by azathioprine[10]. Raiteri et al.[26] reported a relatively high level of agreement among guidelines from different scientific societies for treating RCD.

Regarding the disease prognosis, RCD1 has a positive and excellent response to steroids and immunosuppressive drugs, as shown in our cases, and a very good 5-year survival outcome, ranging from 80% to 96%, which is the expected outcome for our patients[2,6,11]. Both patients continue under follow-up.

CONCLUSION

In addition to strict adherence to a GFD, both oral budesonide and azathioprine were effective in the treatment of RCD1, as the patients achieved and maintained clinical remission without drug side effects. The histological response, which showed complete normalization of the duodenal mucosal architecture, confirmed the success of the therapy.

REFERENCES

1. Al-Toma A, Volta U, Auricchio R, Castillejo G, Sanders DS, Cellier C, et al. European Society for the Study of Coeliac Disease (ESsCD) guideline for coeliac disease and other gluten-related disorders. United European Gastroenterol J. 2019;7(5):583-613. https://doi.org/10.1177/2050640619844125
2. Green PHR, Paski S, Ko CW, Rubio-Tapia A. AGA Clinical Practice Update on Management of Refractory Celiac Disease: Expert Review. Gastroenterology. 2022;163(5):1461-1469. https://doi.org/10.1053/j.gastro.2022.07.086
3. Rubio-Tapia A, Hill ID, Semrad C, Kelly CP, Greer KB, Limketkai BN, et al. American College of Gastroenterology Guidelines Update: Diagnosis and Management of Celiac Disease. Am J Gastroenterol. 2023;118(1):59-76. https://doi.org/10.14309/ajg.0000000000002075
4. Tye-Din JA. Review article: Follow-up of coeliac disease. Aliment Pharmacol Ther. 2022;56 Suppl 1(Suppl 1):S49-S63. https://doi.org/10.1111/apt.16847
5. Silvester JA, Therrien A, Kelly CP. Celiac Disease: Fallacies and Facts. Am J Gastroenterol. 2021;116(6):1148-1155. https://doi.org/10.14309/ajg.0000000000001218
6. Volta U, Caio G, De Giorgio R. Mistakes in refractory coeliac disease and how to avoid them. UEG Education. 2019;19:15–18.
7. Penny HA, Baggus EMR, Rej A, Snowden JA, Sanders DS. Non-Responsive Coeliac Disease: A Comprehensive Review from the NHS England National Centre for Refractory Coeliac Disease. Nutrients. 2020;12(1):216. https://doi.org/10.3390/nu12010216
8. Rubio-Tapia A, Murray JA. Classification and management of refractory coeliac disease. Gut. 2010;59(4):547-57. https://doi.org/10.1136/gut.2009.195131
9. van Wanrooij RL, Müller DM, Neefjes-Borst EA, Meijer J, Koudstaal LG, Heideman DA, et al. Optimal strategies to identify aberrant intra-epithelial lymphocytes in refractory coeliac disease. J Clin Immunol. 2014;34(7):828-35. https://doi.org/10.1007/s10875-014-0075-7

10. Goerres MS, Meijer JW, Wahab PJ, Kerckhaert JA, Groenen PJ, Van Krieken JH, et al. Azathioprine and prednisone combination therapy in refractory coeliac disease. Aliment Pharmacol Ther. 2003;18(5):487-94. https://doi.org/10.1046/j.1365-2036.2003.01687.x
11. Malamut G, Afchain P, Verkarre V, Lecomte T, Amiot A, Damotte D, et al. Presentation and long-term follow-up of refractory celiac disease: comparison of type I with type II. Gastroenterology. 2009;136(1):81-90. https://doi.org/10.1053/j.gastro.2008.09.069
12. Soldera J, Salgado K, Pêgas KL. Refractory celiac disease type 2: how to diagnose and treat? Rev Assoc Med Bras (1992). 2021;67(2):168-172. https://doi.org/10.1590/1806-9282.67.02.20200618
13. Rubio-Tapia A, Hill ID, Kelly CP, Calderwood AH, Murray JA; American College of Gastroenterology. ACG clinical guidelines: diagnosis and management of celiac disease. Am J Gastroenterol. 2013;108(5):656-76; quiz 677. https://doi.org/10.1038/ajg.2013.79
14. Marsh MN. Mucosal pathology in gluten sensitivity. En: Marsh MN (editor). Coeliac disease. Oxford: Blackwell Scientific Publications; 1992. p. 136-991.
15. Oberhuber G, Granditsch G, Vogelsang H. The histopathology of coeliac disease: time for a standardized report scheme for pathologists. Eur J Gastroenterol Hepatol. 1999;11(10):1185-94. https://doi.org/10.1097/00042737-199910000-00019
16. Patey-Mariaud De Serre N, Cellier C, Jabri B, Delabesse E, Verkarre V, Roche B, et al. Distinction between coeliac disease and refractory sprue: a simple immunohistochemical method. Histopathology. 2000;37(1):70-7. https://doi.org/10.1046/j.1365-2559.2000.00926.x
17. Aziz M, Haghbin H, Khan RS, Khan Z, Weissman S, Kamal F, et al. Celiac Disease Is Associated with Microscopic Colitis in Refractory Cases in Adults: A Systematic Review and Meta-Analysis of Observational Studies. Dig Dis Sci. 2022;67(8):3529-3542. https://doi.org/10.1007/s10620-021-07232-7
18. Demiroren K. Possible relationship between refractory celiac disease and malignancies. World J Clin Oncol. 2022;13(3):200-208. https://doi.org/10.5306/wjco.v13.i3.200
19. Packova B, Kohout P, Dastych M, Prokesova J, Grolich T, Kroupa R. Malignant complications of celiac disease: a case series and review of the literature. J Med Case Rep. 2022;16(1):460. https://doi.org/10.1186/s13256-022-03682-3
20. Mukewar SS, Sharma A, Rubio-Tapia A, Wu TT, Jabri B, Murray JA. Open-Capsule Budesonide for Refractory Celiac Disease Am J Gastroenterol. 2017;112(6):959-967. https://doi.org/10.1038/ajg.2017.71
21. Edsbäcker S, Bengtsson B, Larsson P, Lundin P, Nilsson A, Ulmius J, et al. A pharmacoscintigraphic evaluation of oral budesonide given as controlled-release (Entocort) capsules. Aliment Pharmacol Ther. 2003;17(4):525-36. https://doi.org/10.1046/j.1365-2036.2003.01426.x
22. Tack GJ, van Asseldonk DP, van Wanrooij RL, van Bodegraven AA, Mulder CJ. Tioguanine in the treatment of refractory coeliac disease--a single centre experience. Aliment Pharmacol Ther. 2012;36(3):274-81. https://doi.org/10.1111/j.1365-2036.2012.05154.x
23. Iqbal U, Chaudhary A, Karim MA, Anwar H, Merrell N. Refractory celiac disease successfully treated with azathioprine. Gastroenterology Res. 2017;10(3):199-201. https://doi.org/10.14740/gr819w
24. Jiang C, Barkin JA, Barkin JS. Exocrine Pancreatic Insufficiency Is Common in Celiac Disease: A Systematic Review and Meta-Analysis. Dig Dis Sci. 2023;68(8):3421-3427. https://doi.org/10.1007/s10620-023-07965-7
25. Leonard MM, Cureton P, Fasano A. Indications and Use of the Gluten Contamination Elimination Diet for Patients with Non-Responsive Celiac Disease. Nutrients. 2017;9(10):1129. https://doi.org/10.3390/nu9101129
26. Raiteri A, Granito A, Giamperoli A, Catenaro T, Negrini G, Tovoli F. Current guidelines for the management of celiac disease: A systematic review with comparative analysis. World J Gastroenterol. 2022;28(1):154-175. https://doi.org/10.3748/wjg.v28.i1.154

https://doi.org/10.22516/25007440.1273

Case report

Duodenal Adenocarcinoma: A Rare Finding. A Case Report

Cristian Tarazona-León,[1] Mauricio Vanegas-Ballesteros,[1] Fabio Alejandro Vergara-Suárez,[1] Gianmarco Camelo-Pardo,[2*] Luis Felipe Murcia,[3] Niyireth Alicia Trillos-Padilla.[4]

OPEN ACCESS

Citation:
Tarazona-León C, Vanegas-Ballesteros M, Vergara-Suárez FA, Camelo-Pardo G, Murcia LF, Trillos-Padilla NA. Duodenal Adenocarcinoma: A Rare Finding. A Case Report. Revista. colomb. Gastroenterol. 2025;40(3):346-351. https://doi.org/10.22516/25007440.1273

[1] Surgeon, specialist in General Surgery, subspecialist in Transplant and Hepatopancreatobiliary Surgery, Hospital Internacional de Colombia, Fundación Cardiovascular. Bucaramanga, Colombia.
[2] Emergency Department Physician, Fundación Cardiovascular. Master's Student in Epidemiology, Hospital Internacional de Colombia. Bucaramanga, Colombia.
[3] Internal Medicine Physician, Fundación Cardiovascular de Colombia. Bucaramanga, Colombia.
[4] Physician, General Surgery Service, Fundación Cardiovascular de Colombia, Hospital Internacional. Bucaramanga, Colombia.

***Correspondence:** Gianmarco Camelo-Pardo.
gianmarconacional@hotmail.com

Received: 12/08/2024
Accepted: 08/11/2024

Abstract

Introduction: Duodenal adenocarcinoma is an uncommon but aggressive malignancy. Surgical resection is the cornerstone of treatment, and in some cases, pancreatoduodenectomy or segmental duodenal resection is required. In multimodal management, chemotherapy and radiotherapy play a fundamental role. **Objective:** To describe the case of an elderly patient with a tomographic finding of a duodenal mass causing near-complete luminal obstruction, who underwent open duodenectomy and cholecystectomy, revealing intraoperatively a tumor in the third and fourth portions of the duodenum with involvement of retroperitoneal tissues. **Discussion:** Duodenal neoplasms are extremely rare. Surgical intervention remains the treatment of choice for this pathology. **Conclusions:** Duodenal adenocarcinoma is a very rare condition. Its clinical presentation is nonspecific, necessitating suspicion in patients with associated risk factors.

Keywords

Adenocarcinoma, duodenal diseases, abdominal pain, general surgery.

INTRODUCTION

Duodenal adenocarcinoma is an uncommon condition, with an incidence of less than 1% of gastrointestinal cancers[1]. Compared to other periampullary oncologic pathologies, more favorable outcomes can be achieved with surgical treatment for this entity[2]. Most duodenal adenocarcinomas originate in the second portion of the duodenum, followed by the third and fourth portions, but those in the first portion are even rarer[1]. There are different risk factors associated with the development of this pathology, including dietary changes, alcoholism, smoking, presence of familial adenomatous polyposis, Gardner's syndrome, among others[1,3].

Its clinical presentation is generally non-specific, although symptoms such as nausea, vomiting, asthenia, lethargy, or weight loss may be present[4], with abdominal pain being the most frequent symptom[5,6]. The presence of anemia, jaundice, or gastrointestinal obstructive symptoms suggests advanced disease[6,7]. Due to its non-specific symptomatology, many patients are diagnosed late[5-7]. Esophagogastroduodenoscopy is an alternative that allows for visualization of the duodenum and performance of biopsies; however, contrast-enhanced computed tomogra-

© 2025 Asociación Colombiana de Gastroenterología

phy helps assess nearby structural involvement, resection margins, and surgical planning[8,9]. For this type of pathology, abdominal ultrasound is not useful for tumors smaller than 2 cm in diameter[2].

The objective of this case report is to present a patient with duodenal adenocarcinoma, a pathology that represents a diagnostic and surgical challenge.

CASE DESCRIPTION

This involves a 75-year-old male patient with a history of hypothyroidism, arterial hypertension, benign prostatic hyperplasia, cholelithiasis, and chronic cholecystitis. He presented with a clinical picture of vomiting and involuntary weight loss of approximately 30 kilograms over six months. Consequently, he was evaluated at an external institution where an esophagogastroduodenoscopy was performed. This revealed the esophagus and stomach with normal morphology and caliber, but in the duodenum, an ulcerated polypoid lesion with irregular borders and an infiltrative appearance was found, causing a 90% reduction in the lumen caliber (**Figure 1**). A biopsy was therefore performed, which reported seven fragments of duodenal mucosa, all showing malignant tumor lesions of epithelial origin, moderately differentiated, and composed of intermediate-sized cells with scant cytoplasm and hyperchromatic, moderately pleomorphic nuclei. The samples were arranged in tubes, glands, papillae, and digitiform projections that infiltrated the full thickness of the evaluated fragments. A moderate mononuclear inflammatory infiltrate and a slight desmoplastic response were also present, without vascular or lymphatic invasion or perineural invasion by the tumor cellular elements.

As a result, he was referred to our institution, where staging studies were performed: a contrast-enhanced computed tomography of the abdomen and pelvis, which reported an irregular thickening of the walls in the third portion of the duodenum, reaching a thickness of up to 15 mm, in addition to adjacent mesenteric lymphadenopathy, cholelithiasis, atherosclerosis of the aorta, and an enlarged prostate (**Figure 2**).

He was evaluated by hepatobiliary surgery, where an open duodenectomy and cholecystectomy were considered. Intraoperative findings revealed a mass involving the third and fourth portions of the duodenum with involvement of retroperitoneal tissues, without contact with the pancreas (**Figure 3**). A duodenectomy plus a lateral-lateral duodenojejunal reconstruction plus placement of a nasoduodenal

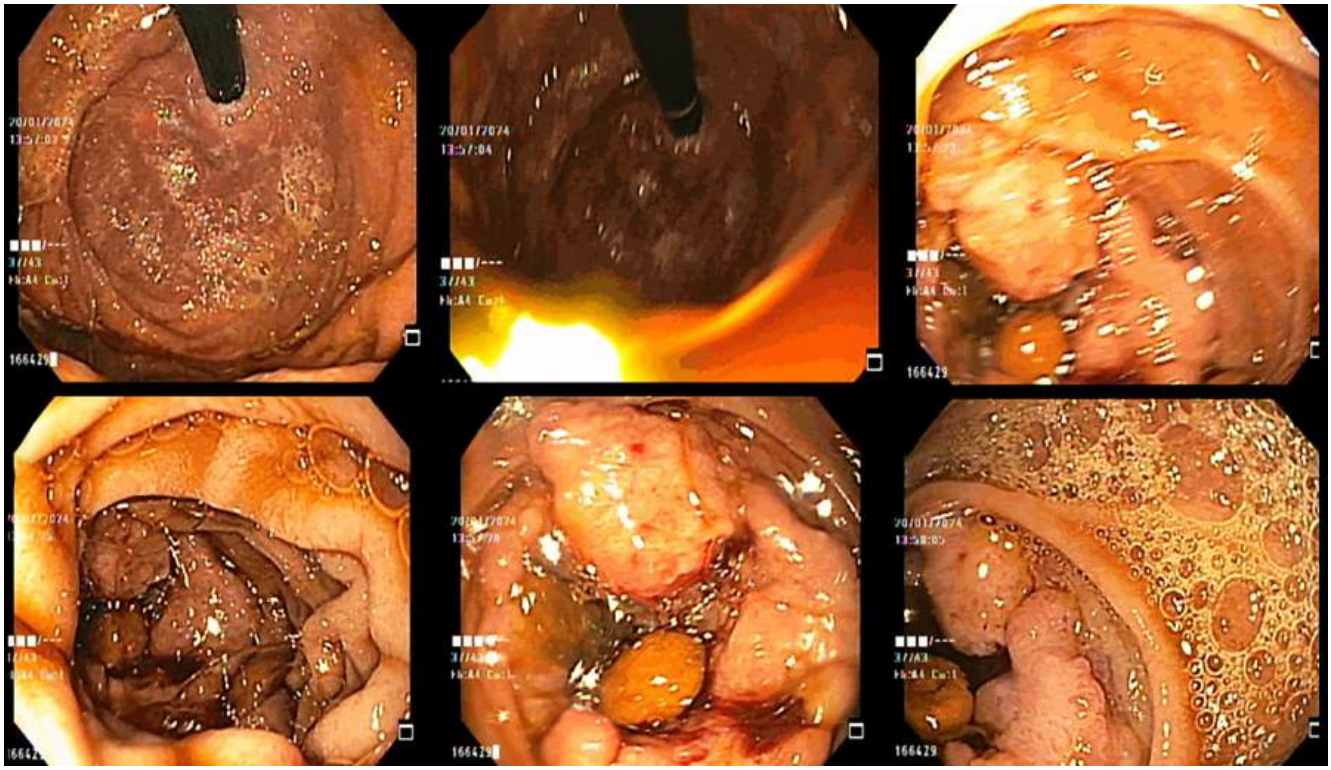


Figure 1. External esophagogastroduodenoscopy showing an ulcerated polypoid lesion. Source: Gastroenterology Service, Specialists Center. Selected by the authors.

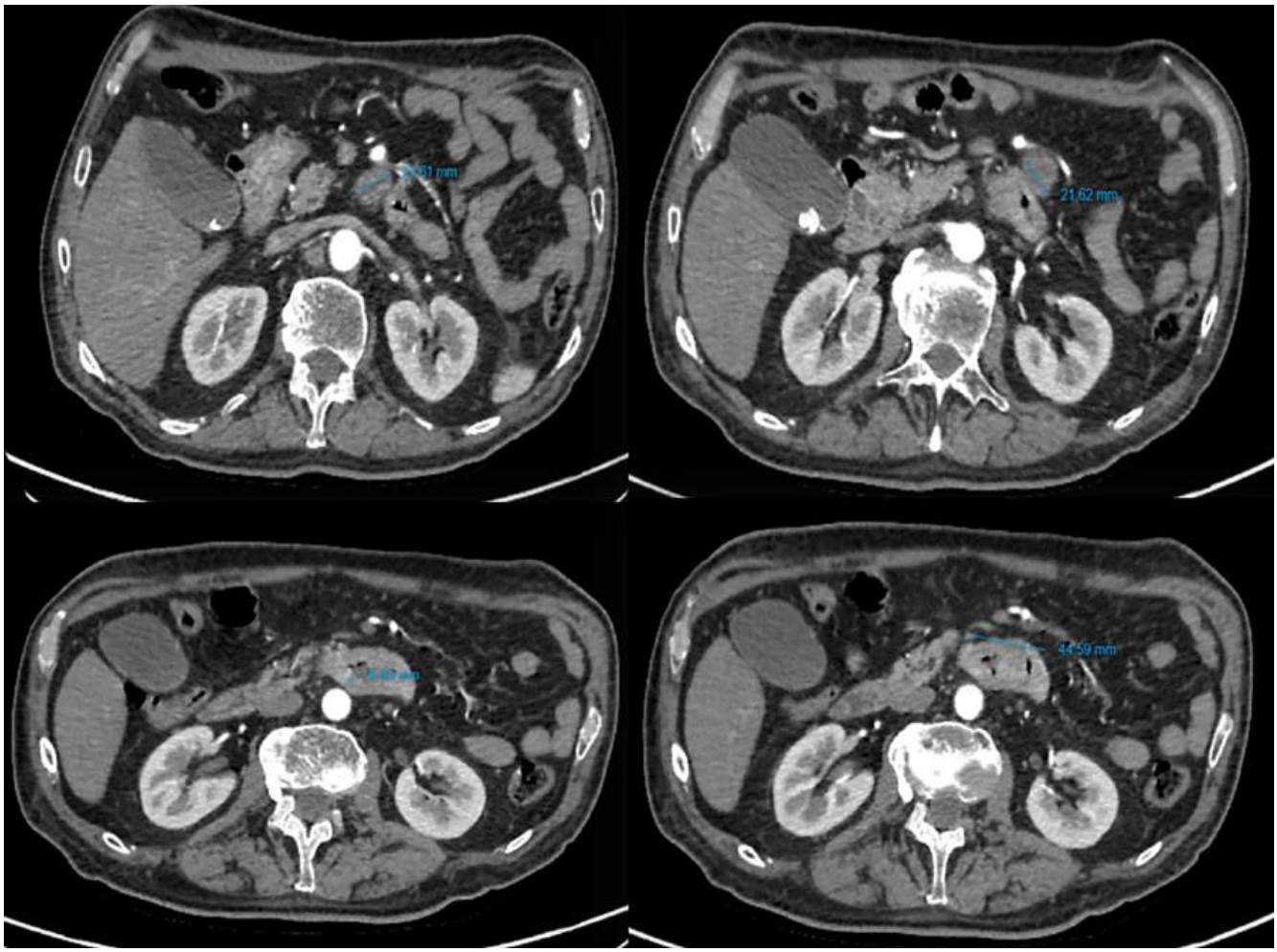


Figure 2. Contrast-enhanced computed tomography of the abdomen and pelvis reporting an irregular thickening of the walls in the third portion of the duodenum, adjacent mesenteric lymphadenopathy, cholelithiasis, atherosclerosis of the aorta, and an enlarged prostate. Source: Radiology Service, Hospital Internacional de Colombia. Selected by the authors.

feeding tube and a cholecystectomy were performed. The histopathological study found a poorly differentiated grade 3 adenocarcinoma located in the third and fourth portions of the duodenum, with tumor invasion through the muscularis propria into the subserosa and mesenteric tissue without serosal penetration, and no lymphovascular invasion. The proximal and distal margins were free of tumor involvement, and at the nodal level, 12 lymph nodes were involved by the malignant tumor lesion. The pathological staging (pTNM, AJCC 8th edition) was: pT3, pN1.

The patient had a complicated postoperative course due to mechanical ileus and was re-evaluated by hepatobiliary surgery, where an exploratory laparotomy and adhesiolysis were considered. Findings included severe adhesive syndrome from previous surgery, multiple adhesions, an area of small bowel volvulus due to adhesions, a pinpoint stenosis in the jejunum 50 cm from the duodenojejunal anastomosis, and multiple segments of the small intestine with severe edema and marked stenosis with retrograde dilation. There were also stenotic and edematous areas, a segment of jejunum approximately 25 cm long, a segment of ileum, a distal ileum segment of 20 cm, and the previous duodenojejunal anastomosis without signs of stenosis.

Despite this, the patient maintained persistent intestinal ileus, along with gastroparesis and peristalsis alterations possibly associated with his surgical pathology, so treatment with prucalopride was initiated, with subsequent improvement. Regarding the nodal involvement documented in the postoperative histopathological study, he was evaluated by oncology with an indication for systemic therapy pending geriatrics assessment; however, geriatrics considered that, given the patient's sarcopenia, previous

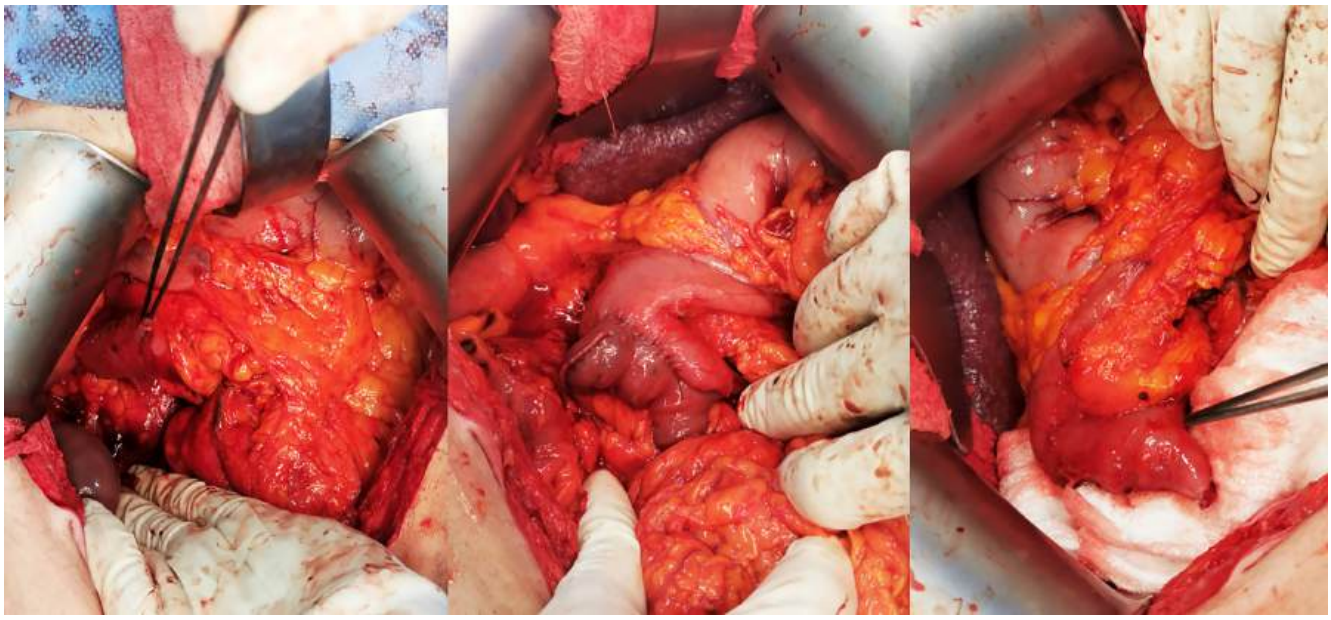


Figure 3. Intraoperative Finding: mass involving the third and fourth portions of the duodenum with involvement of retroperitoneal tissues. Procedure: duodenectomy plus lateral-lateral duodenojejunal reconstruction plus placement of a nasoduodenal feeding tube and cholecystectomy. Source: Surgery Service, Hospital Internacional de Colombia. Selected by the authors.

mixed delirium, and malnutrition, initiating systemic therapy was not recommended due to the high risk of chemotoxicity, which could further affect his quality of life and clinical status until his nutritional status was optimized. During his prolonged stay, he was managed multidisciplinary, with daily follow-up until he was discharged with respective follow-up appointments. He was evaluated at one week and one month post-discharge, with no abdominal symptomatology during this period.

DISCUSSION

Duodenal adenocarcinoma is a rare entity[10]. The origin of most ileal tumors is neuroendocrine; however, adenocarcinoma is the most common cancer in the duodenum[1]. It is most frequently located in the second portion of the duodenum, followed by the third and fourth portions[10]. Its symptoms are not very pronounced initially, which delays diagnosis. In most cases, clinical manifestations appear only when the tumor reaches a sufficiently large size, sometimes being detected at an advanced stage[11]. The triad of weight loss, vomiting, and nausea have been described as initial symptoms, as well as an association of these symptoms with jaundice, gastrointestinal bleeding, and diarrhea[10].

For diagnosis, on one hand, barium follow-through has a sensitivity of around 85%, and on the other hand, upper gastrointestinal endoscopy achieves a sensitivity of up to 90% and allows for visualization and biopsy of the lesion[1,10]. Ultrasound and computed tomography are more useful for staging and determining the resectability options of the lesion[11], as in the presented clinical case, since the size of the lesion documented during endoscopy necessitated staging and understanding of the anatomy, which allowed for defining additional therapeutic approaches. Surgery is considered the only option when attempting curative treatment, and pancreatoduodenectomy is the technique of choice for tumors located in the second portion of the duodenum because it allows for an en bloc resection. It is advised that this technique always be accompanied by regional lymphadenectomy[1,10,11]. For tumors located in other duodenal portions, some authors propose, in addition to pancreatoduodenectomy, performing a segmental resection, considering it a lower surgical risk alternative with equal oncological validity, provided that clear surgical margins are obtained[1,10]. The most common causes of unresectability are distant metastases and infiltration of the mesenteric root, which confers a worse prognosis for patients. Duodenal adenocarcinoma has a great tendency for local invasion, particularly into the liver, more so than distant metastasis.

Regardless of the approach, the status of the surgical margins affects survival. In a study conducted by Sohn et al., the experience from Johns Hopkins was reported, showing a 5-year survival of 58% in patients with negative margins compared to 0% in patients with positive margins[1]. In another

study from a high-complexity center, 5-year rates of 55% and 0% were found for R0 and R1 patients, respectively[1]. Similarly, in another population group, the 5-year survival was about 51%[11]. Surgery and lymph node infiltration are the main determinants of survival[1,11], and a higher lymph node retrieval has been independently associated with better survival for patients with duodenal adenocarcinoma[1]. In the case of patients eligible for palliative surgery who present with gastroduodenal obstruction, procedures such as gastrojejunostomy or duodenojejunostomy can be an alternative[1]. In our case, given the persistence of the patient's symptoms, rapid surgical intervention was necessary, which allowed for symptom control; however, the marked presence of nodal involvement necessitated a multidisciplinary evaluation, which, given the nutritional deterioration, deemed it inadvisable to initiate systemic therapy as an additional treatment. This underscores the importance of timely diagnosis to avoid reaching advanced stages of the disease, as well as the importance of multidisciplinary assessment at the beginning, during, and after diagnosis.

The utility of adjuvant therapies remains to be determined, as a clear benefit has not been demonstrated to date. Further studies are needed to evaluate other management possibilities, such as chemotherapy and radiotherapy, since the small number of patients does not currently allow for valid conclusions to be drawn.

CONCLUSION

Duodenal adenocarcinoma is a very uncommon pathology. Its clinical presentation is often very non-specific, so it should be suspected in those patients with associated risk factors. Diagnosis should be made by gastroscopy or duodenoscopy in conjunction with other techniques, such as tomography, to delineate the tumor involvement. The main prognostic factor in this pathology is lymphatic involvement.

Acknowledgments

We thank all the people who were part of this study, contributing in different ways to its development.

Ethical Responsibilities

This work was conducted in accordance with the governing standards of current clinical research and received prior approval from the institution's scientific committee. Authorization and informed consent were obtained from the patient. The guidelines established in Resolution 008430 of 1993 from the Colombian Ministry of Health and the Declaration of Helsinki established in 1964, adapted to its latest revision in October 2013, were followed. The recommendations of good clinical practice guidelines in clinical research and the basic ethical principles inherent to this type of research design—respect for persons, beneficence, and justice from the Belmont Report—were applied.

Protection of People and Animals

The authors declare that no experiments were performed on humans or animals for this research.

Conflicts of Interest

The authors declared no conflicts of interest.

Sources of Funding

Self-funded by the authors.

Use of Artificial Intelligence

The authors declared that they did not use artificial intelligence (AI)-assisted technologies (such as large language models, chatbots, or image creators) in the production of this work.

Author Contributions

All authors participated in the design and development of the research protocol, collection of patient data, discussion of the clinical course, and preparation of the manuscript.

REFERENCES

1. Cloyd JM, George E, Visser BC. Duodenal adenocarcinoma: Advances in diagnosis and surgical management. World J Gastrointest Surg. 2016;8(3):212-21. https://doi.org/10.4240/wjgs.v8.i3.212
2. Durham K, Zhang X, Bosch DE, Ashat M. Duodenal adenocarcinoma presenting as duodenal cystic dystrophy. Gastrointest Endosc. 2022;96(2):378-380. https://doi.org/10.1016/j.gie.2022.04.021
3. Yabuuchi Y, Yoshida M, Kakushima N, Kato M, Iguchi M, Yamamoto Y, et al. Risk Factors for Non-Ampullary Duodenal Adenocarcinoma: A Systematic Review. Dig Dis. 2022;40(2):147-155. https://doi.org/10.1159/000516561

4. Peño Muñoz L, Plana Campos L, Ferrer Barceló L, Sanchís Artero L, Larrey Ruiz L, Núñez Martínez P, et al. Adenocarcinoma duodenal: un diagnóstico poco frecuente. Rev Gastroenterol Perú. 2016;36(2):172-174.
5. Salmón Olavarría P, Cebrián García A, Carrascosa Gil J, Hervás Palacios N, Arrubla Gamboa A, Ruiz-Clavijo García D, et al. Primary adenocarcinoma of the fourth portion of the duodenum, an unsuspected diagnosis. Rev Esp Enferm Dig. 2022;114(7):437-438. https://doi.org/10.17235/reed.2022.8732/2022
6. Varshney VK, Varshney B, Khera S, Sureka B. Adenocarcinoma of the fourth portion of duodenum presenting as intussusception: an unusual manifestation of rare pathology. BMJ Case Rep. 2021;14(7):e244034. https://doi.org/10.1136/bcr-2021-244034
7. Ojeda Gómez A, Íñigo Chaves AM, Barragán Martínez J, Madero Velázquez L, Picó Sala MD, García Soria A, at al. What are the odds? Duodenum adenocarcinoma as a primary metachronic neoplasia. Rev Esp Enferm Dig. 2021;113(11):793-794. https://doi.org/10.17235/reed.2021.8200/2021
8. Gelsomino F, Balsano R, De Lorenzo S, Garajová I. Small Bowel Adenocarcinoma: From Molecular Insights to Clinical Management. Curr Oncol. 2022;29(2):1223-1236. https://doi.org/10.3390/curroncol29020104
9. Woo CG, Lee J, Son SM. Adenocarcinoma arising from heterotopic pancreas at the first portion of the duodenum: a case report. J Int Med Res. 2023;51(8):3000605231194902. https://doi.org/10.1177/03000605231194902
10. Ramia JM, Villar J, Palomeque A, Muffak K, Mansilla A, Garrote D, et al. Adenocarcinoma de duodeno. Cir Esp. 2005;77(4):208-12. https://doi.org/10.1016/S0009-739X(05)70839-3
11. Tocchi A, Mazzoni G, Puma F, Miccini M, Cassini D, Bettelli E, Tagliacozzo S. Adenocarcinoma of the third and fourth portions of the duodenum: results of surgical treatment. Arch Surg. 2003;138(1):80-5. https://doi.org/10.1001/archsurg.138.1.80

https://doi.org/10.22516/25007440.1274

Case report

Incarcerated Littre's Hernia: A Case Report

Álvaro Flechas,[1*] Carlos Moya-Ortiz,[1] Paulo Cabrera-Rivera,[2] Alejandro González,[2] Natalia Quintana-Montejo.[3]

OPEN ACCESS

Citation:
Flechas A, Moya-Ortiz C, Cabrera-Rivera P, González A, Quintana-Montejo N. Incarcerated Littre's Hernia: A Case Report. Revista. colomb. Gastroenterol. 2025;40(3):352-356.
https://doi.org/10.22516/25007440.1274

[1] Surgical Research Group GRINCIR, Fundación Cardioinfantil - LaCardio. Universidad del Rosario, School of Medicine and Health Sciences. Bogotá, Colombia.
[2] Surgical Research Group GRINCIR, Department of General Surgery, Fundación Cardioinfantil - LaCardio. Bogotá, Colombia.
[3] Surgical Research Group GRINCIR, Fundación Cardioinfantil - LaCardio. Bogotá, Colombia.

***Correspondence:** Álvaro Flechas.
alvaro.flechas08@hotmail.com

Received: 20/08/2024
Accepted: 21/10/2024

Abstract

Introduction: Meckel's diverticulum is a congenital anomaly of the gastrointestinal tract. It is usually asymptomatic and occurs in approximately 0.6% to 4% of individuals. A Littre's hernia is defined as the presence of a Meckel's diverticulum within a hernia sac. Littre's hernias can occur at various anatomical sites, including inguinal, femoral, and umbilical locations. **Clinical Case:** An 80-year-old female presented to the emergency department of a quaternary care center with a 14-hour history of symptoms compatible with a right inguinal hernia (indirect) incarcerated NYHUS IIIB, containing a narrow-necked Meckel's diverticulum, constituting a mixed Littre's hernia. **Results:** Few cases of Littre's hernias have been reported in the literature, with an approximate incidence of 1% among patients with a Meckel's diverticulum. Diagnosis is typically intraoperative, with clinical manifestations including abdominal pain and distension. Complications such as obstruction and incarceration occur similarly to other abdominal wall hernias. Management is based on both hernia repair and resection of the diverticulum. **Conclusions:** To date, no standardized consensus exists regarding the surgical approach for this condition, particularly when it is an incidental finding. Surgical technique may depend on multiple factors, making knowledge of anatomy, clinical presentation, and diagnostic imaging crucial for timely diagnosis and treatment of Littre's hernia.

Keywords

Inguinal hernia, ileal diverticulum, inguinal canal, acute abdomen, indirect inguinal hernia.

INTRODUCTION

Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract, with a reported incidence of approximately 0.6%-4%[(1)]. It is a true diverticulum, containing all three layers of the intestinal wall, and is attributed to failure of the omphalomesenteric duct to close during the fifth week of gestation; this duct typically regresses between the fifth and ninth weeks of gestation[(1,2)]. Meckel's diverticulum is usually asymptomatic and, in most cases, is an incidental finding during laparoscopic procedures or may be seen on imaging studies[(3)]. It has a long-term complication incidence of 4.2%, which decreases with age; complications include intestinal obstruction, bleeding, intussusception, perforation, among others[(2)]. One of the rarest and most uncommon complications occurs when the Meckel's diverticulum enters the hernial sac, a condition known as *Littre's hernia*.

Littre's hernias are considered a relatively uncommon pathology. According to Malling et al., by 2020, only 50 cases had been reported in the literature over the previous 300 years[(4)]. A Littre's hernia can present in various forms and its anatomical site is variable; they can present as femoral, inguinal, or umbilical hernias with symptoms and

© 2025 Asociación Colombiana de Gastroenterología

complications similar to any other hernia containing small bowel[3]. Littre's hernia can become obstructed, incarcerated, or strangulated, like the complications of any abdominal wall hernia. This case report presents a female patient with an incarcerated Littre's hernia due to the herniation of a Meckel's diverticulum found intraoperatively.

CASE PRESENTATION

An 80-year-old female patient with a history of arterial hypertension and hypothyroidism on replacement therapy, and no history of abdominal surgery, presented to the emergency department of a hospital in Bogotá with a 14-hour clinical picture consisting of generalized, moderate-intensity abdominal pain, associated with two episodes of diarrhea. She had no symptoms suggestive of intestinal obstruction. She was evaluated by the general surgery service, and a contrast-enhanced computed tomography scan of the abdomen was requested by the emergency department.

Physical examination revealed a non-distended abdomen, with a painful, non-reducible right inguinal hernia defect upon palpation, without signs of strangulation or peritoneal irritation. Complete blood count and arterial blood gas analysis revealed leukocytosis due to neutrophils and hyperlactatemia.

The abdominal CT report revealed a right indirect inguinal hernia with partial protrusion of the distal portion of the ileum, mild regular concentric thickening of its walls with an inflammatory appearance, and a slight amount of peripheral fluid with a reactive inflammatory appearance. There was no intestinal obstructive pattern (**Figure 1**).

Considering the above, the decision was made to proceed with an urgent surgical procedure under general anesthesia. An open inguinal herniorrhaphy was performed via a posterior preperitoneal approach (Nyhus technique). Findings included an incarcerated right inguinal hernia Nyhus IIIB (involvement of the posterior wall of the inguinal canal and a dilated deep inguinal ring) and a hernial sac with edematous and congestive ileal loops. As an incidental finding, a narrow-based Meckel's diverticulum approximately 1.5 cm in base width and 5 cm in length, arising from the incarcerated ileal segment, was found (**Figure 2**).

Reduction of the intestinal loops was performed, along with diverticulectomy using a linear stapler, high ligation of the hernial sac, and defect correction with a tension-free technique using a polypropylene mesh. During the immediate postoperative period, the patient was in good general condition, with adequate pain control and oral intake tolerance, but with signs of systemic inflammatory response syndrome (SIRS), evidenced by leukocytosis with neutrophilia (13,100 WBC, PMN 80%) and tachycardia >90 beats per minute (bpm), which was expected postoperatively. Abdominal physical examination revealed a surgical wound in good condition, with perilesional ecchymosis, without signs of infection or stigmata of active bleeding, so she was discharged from the service with follow-up instructions for the next six months. At the postoperative consultation one month later, she showed adequate clinical progress. The pathology result confirmed the presence of Meckel's diverticulum with moderate chronic inflammation and the presence of heterotopic gastric mucosa without ulceration or perforation.

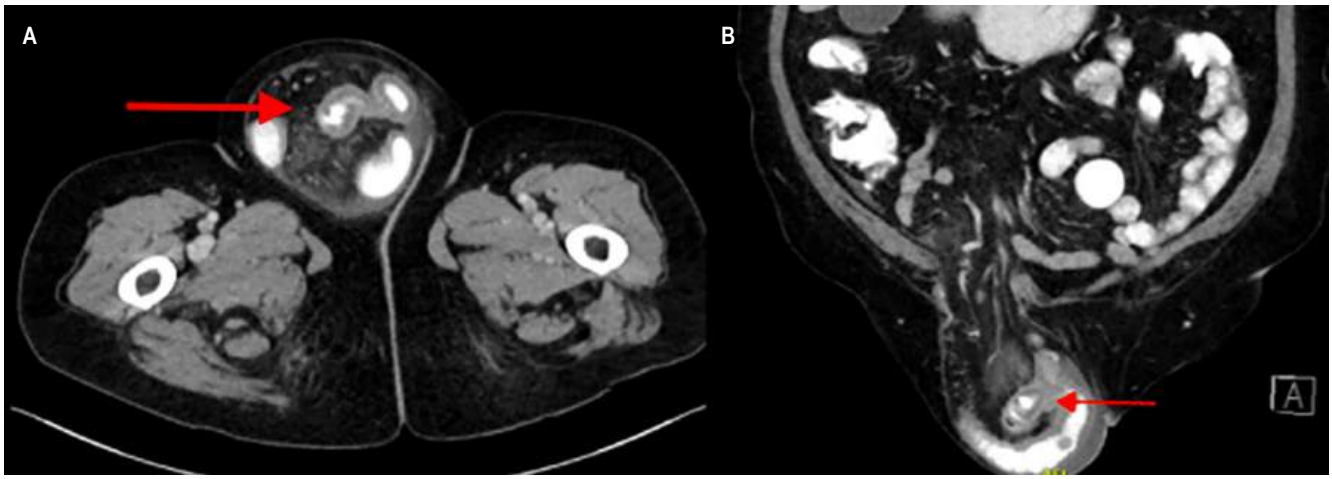


Figure 1. Axial computed tomography of the abdomen. **A.** Axial view. **B.** Coronal view. Hernial defect indicated by red line. Images property of the authors.

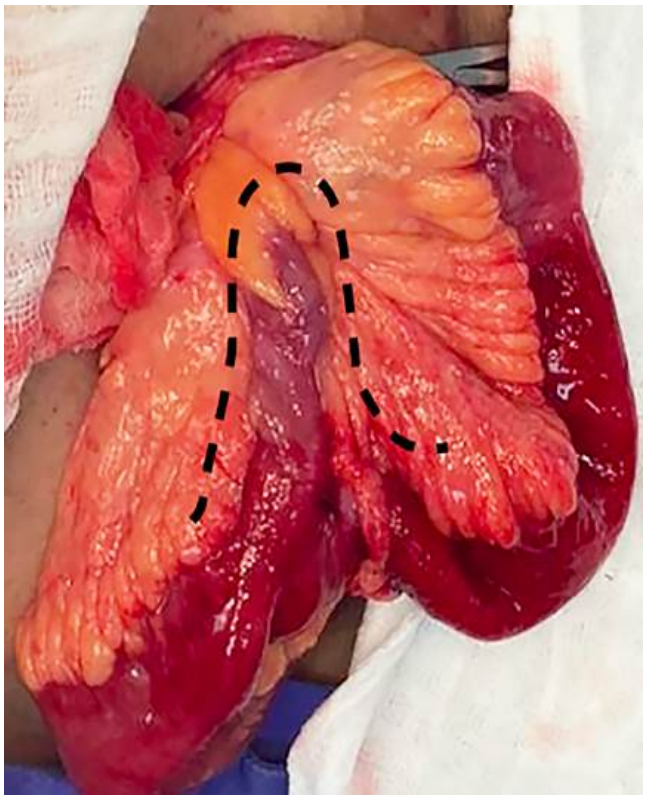


Figure 2. Intraoperative findings of congestive, edematous intestinal loops, with Meckel's diverticulum outlined in the image by the dotted line. Images property of the authors.

DISCUSSION

A Littre's hernia is defined as the presence of a Meckel's diverticulum within the hernial sac, with the first case reported in 1700 by the French surgeon Alexis Littré[5,6]. Although there is no consensus on the current incidence of this complication, it is estimated that approximately 1% of patients with a Meckel's diverticulum will develop a Littre's hernia[6]. A report by M. Racy mentioned that one in 680 strangulated femoral hernias and four in 654 strangulated inguinal hernias contain a Meckel's diverticulum[7].

It is important to understand the morphological and anatomical distinction of Meckel's diverticulum to promptly identify this variation of the hernial defect. It is defined as the most common congenital gastrointestinal tract defect, consisting of a pouch with all intestinal layers, and is present in 0.3%-3% of the adult population[6]. It is an embryological remnant of the omphalomesenteric duct and arises from its incomplete obliteration during the fifth week of gestation[8].

Small bowel diverticula can be classified as false or true. False diverticula are acquired and characterized by involving only two layers of the intestine: the mucosa and submucosa, which herniate through the muscular layer of the intestine at points of weakness, usually where the *vasa vasorum* penetrate the intestinal wall. Consequently, they are found on the mesenteric border of the small intestine. The thin wall and the morphology of the diverticulum's neck prevent fluid from escaping freely, resulting in the presence of fluid levels within the diverticulum. In contrast, true diverticula contain all layers of the intestine: mucosa, submucosa, and muscular layer. They do not present with fluid levels and usually occur on the antimesenteric border of the intestine, with Meckel's diverticulum being the only example[8].

Generally, Meckel's diverticulum is asymptomatic, and its diagnosis may be incidental through imaging or intraoperative. However, patients can present with lower gastrointestinal bleeding (hematochezia), acute intestinal obstruction, infection (diverticulitis), and, in specific cases, peritonitis due to diverticular perforation[9]. Age less than 50 years, male sex, diverticulum length >2 cm, and the presence of histologically abnormal tissue constitute the main risk factors for a symptomatic Meckel's diverticulum in adults[6].

The diagnosis of Littre's hernia is usually intraoperative, and although imaging methods such as non-contrast abdominal computed tomography (CT) and abdominal ultrasonography can be used, they do not lead to a definitive diagnosis[9]. Littre's hernias can present as inguinal, femoral, and umbilical hernias. A meta-analysis conducted by Schizas and Katsaros in 2018 mentions that, out of 53 hernias meeting the inclusion criteria, femoral and inguinal hernias accounted for 39.6% and 34% of cases, respectively[6]. Among inguinal hernias, 98% are right-sided, as in the reported case.

On the other hand, the study explains that while Meckel's diverticulum is more common in men, Littre's hernias occur more frequently in women, primarily due to the high incidence of femoral and obturator hernias[6]. Littre's hernia has been classified in the literature as true when the hernial sac contains only the Meckel's diverticulum, or mixed (7 times less common), when the Meckel's diverticulum is accompanied by ileal loops or other intra-abdominal organs.

Littre's hernia presents with atypical manifestations such as abdominal pain, distension, and nausea with or without vomiting episodes, and the clinical picture is gradual compared to other hernial defects. Physical examination may reveal incomplete reduction of the hernia or an enterocutaneous fistula through the hernial sac[9].

It is estimated that patients present to the emergency department between 5 hours and 11 days after the onset of symptoms, as in the case presented, where the patient had an insidious clinical picture that led her to seek consultation 14 hours after its onset. Some complications include incarceration, strangulation, and perforation, the latter resulting from vascular compromise or peptic ulceration related to gastric acid[5,6].

Repair of a Littre's hernia is based on repairing the hernial defect along with resection of the Meckel's diverticulum (diverticulectomy). The surgical treatment of Meckel's diverticulum depends on the location of the diverticulum and the progression and severity of the disease[9]. Complete resection, including all ectopic tissue, is always recommended to prevent hemorrhage. However, to date, there is no standardized management plan for the incidental and asymptomatic finding of a diverticulum; some authors suggest not resecting diverticula with a wide opening, thin walls, and no adhesions[2]. If surgical management is chosen, three approaches have been described: segmental resection and anastomosis, wedge resection, and tangential stapled diverticulectomy.

T-resection with primary anastomosis is indicated when inflammation and ischemia of the ileum, perforation, bleeding ulcer are found, or when the base is identified with macroscopic injury, edema, inflammation, or perforation[7,9,10]. For long diverticula, diverticulectomy alone is suggested, as diverticula with length/diameter ratios >2 cm usually have ectopic tissue in the body and tip, while wide diverticula usually have it at the base[9].

Nevertheless, to date, there is no universal consensus on the absolute indications for performing diverticulectomy. In 2005, a group from the Mayo Clinic published the results of a retrospective study of 1476 patients who underwent diverticulectomy, finding that age less than 50 years, male sex, diverticulum length >2 cm, and macroscopic findings suggesting the presence of ectopic mucosa increase the risk of complications to up to 70% when all criteria are present (Park et al. criteria)[11].

CONCLUSION

Knowledge of the anatomical, clinical, and imaging features of Littre's hernia is important to achieve timely diagnosis and treatment, thereby preventing some of the mentioned complications. In the presented case, the rapid onset of the clinical picture, along with signs of incarceration of the hernial defect, were the main considerations for performing urgent inguinal herniorrhaphy, in addition to complete diverticulectomy due to the long diverticulum and high suspicion of ectopic tissue, aiming to prevent complications from the presence of ectopic tissue, such as gastrointestinal bleeding or intestinal obstruction. However, this is still considered a demanding scenario for the surgeon, especially due to the lack of scientific evidence and studies with high epidemiological weight that outline objective criteria for deciding to perform diverticulectomy.

Ethical Considerations and Consent to Participate

This study was conducted in accordance with ethical standards and was approved by the Fundación Cardioinfantil (LaCardio) in Bogotá, Colombia. Written informed consent was obtained from the patient for their participation in this study.

Consent for Publication

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images in accordance with institutional protocols. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Availability of Supporting Data

All relevant data supporting the findings of this study are included in the article. Additional data may be available upon request from the corresponding author.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Sources of Funding

No funding was received for the development of this article.

Author Contributions

Álvaro Flechas, Carlos Moya, Paulo Cabrera, Alejandro González, and Natalia Quintana participated in the design and conception of the study, data acquisition, and data analysis and interpretation. Critical revision was performed by Paulo Cabrera, Alejandro González, and Natalia Quintana. Finally, the manuscript was written by Álvaro Flechas and Carlos Moya.

Use of Artificial Intelligence

No artificial intelligence tools were used in the development of this article.

Acknowledgments

The authors wish to thank the Fundación Cardioinfantil (LaCardio) in Bogotá, Colombia, for their contributions to this study.

REFERENCES

1. Usman A, Rashid MH, Ghaffar U, Farooque U, Shabbir A. Littré's Hernia: A Rare Intraoperative Finding. Cureus. 2020;12(10):e11065. https://doi.org/10.7759/cureus.11065
2. Puentes JA, Salcedo JD, Luna DR. Divertículo de Meckel en el adulto mayor: una causa de sangrado digestivo revisión de la literatura y reporte de un caso. Rev Colomb Cir. 2015;30(2):151-5. https://doi.org/10.30944/20117582.325
3. Sánchez-Castellanos ME, Sandoval-Tress C, Hernández-Torres M. Persistencia del conducto onfalomesentérico. Diagnóstico diferencial de granuloma umbilical en la infancia. Actas Dermo-Sifiliográficas. 2006;97(6):404-5. https://doi.org/10.1016/S0001-7310(06)73429-9
4. Malling B, Karlsen AA, Hern J. Littre Hernia: A Rare Case of an Incarcerated Meckel's Diverticulum. Ultrasound Int Open. 2017;3(2):E91-E92. https://doi.org/10.1055/s-0043-102179
5. Bains HK, Agostinho N, Hamilton AE, Byrne C. What is in the sac? Littré hernia. ANZ J Surg. 2020;90(5):896-8. https://doi.org/10.1111/ans.15353
6. Schizas D, Katsaros I, Tsapralis D, Moris D, Michalinos A, Tsilimigras DI, et al. Littre's hernia: a systematic review of the literature. Hernia. 2019;23(1):125-30. https://doi.org/10.1007/s10029-018-1867-0
7. Racy M, Ramesh S. Littré meets de garengeot: meckel's diverticulum and appendix in a femoral hernia. Ann R Coll Surg Engl. 2013;95(6):e97-8. https://doi.org/10.1308/003588413X13629960047399
8. Lamb R, Kahlon A, Sukumar S, Layton B. Small bowel diverticulosis: imaging appearances, complications, and pitfalls. Clin Radiol. 2022;77(4):264-273. https://doi.org/10.1016/j.crad.2021.12.003
9. Essobiyou TB, Pali E, Keheou AP, Issa M, Dosseh ED. Unusual form of inguinal hernia: A case report of Littré's hernia strangled. Int J Surg Case Rep. 2022:98:107570. https://doi.org/10.1016/j.ijscr.2022.107570
10. Keese D, Rolle U, Gfroerer S, Fiegel H. Symptomatic Meckel's Diverticulum in Pediatric Patients—Case Reports and Systematic Review of the Literature. Front Pediatr. 2019;7:267. https://doi.org/10.3389/fped.2019.00267
11. Park JJ, Wolff BG, Tollefson MK, Walsh EE, Larson DR. Meckel Diverticulum: The Mayo Clinic Experience With 1476 Patients (1950–2002). Ann Surg. 2005;241(3):529-33. https://doi.org/10.1097/01.sla.0000154270.14308.5f

https://doi.org/10.22516/25007440.1275

Case report

Diagnosis of Dubin–Johnson Syndrome in an Adult Patient: A Case Report

Angie Daniela Torres-Gil,[1*] Jamir Muñoz-Torres.[1]

OPEN ACCESS

Citation:
Torres-Gil AD, Muñoz-Torres J. Diagnosis of Dubin–Johnson Syndrome in an Adult Patient: A Case Report. Revista. colomb. Gastroenterol. 2025;40(3):357-361. https://doi.org/10.22516/25007440.1275

[1] General Practitioner, Hospital Regional Valle de Tenza. Guateque, Boyacá, Colombia.

***Correspondence:** Angie Daniela Torres-Gil.
angiedanielatorres1@gmail.com

Received: 16/08/2024
Accepted: 21/02/2025

Abstract

Dubin–Johnson syndrome (DJS) is an inherited disorder caused by a genetic mutation in the *ABCC2* gene, which affects the synthesis of the MRP2 transport protein. This results in impaired excretion of direct bilirubin from hepatocytes. As DJS is a rare condition, it is usually diagnosed incidentally, which may initially lead to confusion with other clinical entities. We present the case of a 40-year-old man with an atypical and nonspecific clinical presentation, characterized by isolated elevation of direct bilirubin without impairment of liver function. Liver biopsy revealed findings consistent with DJS. Although DJS does not require specific treatment, early diagnosis is crucial to avoid unnecessary invasive procedures and to rule out conditions requiring targeted therapies, thereby preventing progressive liver damage.

Keywords

Jaundice, biopsy, hyperbilirubinemia, Dubin–Johnson syndrome.

INTRODUCTION

Dubin-Johnson syndrome is a rare, hereditary disorder[(1)] characterized by chronic, intermittent non-hemolytic hyperbilirubinemia[(2-5)]. It was first described in 1954 in adults[(1)] and occurs in approximately two cases per 100,000 inhabitants[(2-5)]. The pathophysiology of this entity is related to a mutation in the *ABCC2* gene[(2,3,6,7)], which encodes the MRP2 transporter protein. This protein plays a crucial role in secreting direct bilirubin out of hepatocytes into the bile canaliculi[(2)]. Consequently, this genetic mutation causes a blockage in bilirubin excretion, triggering intracellular accumulation and subsequent diffusion into the circulation, where it is detected in the serum; laboratory tests reveal this characteristic pattern of mildly elevated direct bilirubin in the absence of other abnormalities in liver biochemical tests[(2-5)]. Dubin-Johnson syndrome is generally asymptomatic, but it can present with symptoms such as asthenia, anorexia, abdominal pain, hepatomegaly, dark urine, nausea, vomiting, or diarrhea[(2,6)].

The diagnosis of the syndrome is most often made as an incidental finding during adolescence or in young adults[(2)]. It is also diagnosed through laboratory tests, histological studies, and macroscopic liver findings. Liver biopsy shows the accumulation of dark pigment and brown melanin-like granules in the lysosomes of centrilobular hepatocytes[(2,4-6,8)]. The liver exhibits a characteristic blackish discoloration in this pathology[(3)]. Furthermore, urine tests have been used to assess the excretion of urinary coproporphyrins, which show a significant increase (>80%) in the type I isomer compared to normal values (45%) and a reduction in the elimination of the type III isomer[(3,4,6)]. Meanwhile, the

bromsulphalein clearance test, previously considered the gold standard for diagnosis, has been withdrawn from the market due to associated adverse effects, including the risk of respiratory and cardiac failure and anaphylactic shock[4].

CASE PRESENTATION

A 40-year-old male patient with a history of Gilbert's syndrome (diagnosed in childhood) and cholecystectomy at age 9 for cholelithiasis presented to the emergency department with multiple episodes of vomiting associated with diarrhea and right upper quadrant abdominal pain. Physical examination revealed pain on palpation in the upper abdomen, a negative Murphy's sign, and a slight icteric tint in the sclera and skin.

From a paraclinical perspective, serial reports during hospitalization showed persistent mixed hyperbilirubinemia with a predominance of direct bilirubin. The rest of the liver biochemical tests were within normal limits, except for a mild elevation of alanine aminotransferase (ALT) upon admission to the institution, which was attributed to the presence of hepatic steatosis (assessed by ultrasound) and subsequently normalized (**Table 1**). Furthermore, secondary infection by hepatotropic viruses and autoimmune hepatitis were ruled out (**Table 2**). The observed cholestatic pattern suggested the possibility of a biliary obstructive syndrome, so a magnetic resonance cholangiopancreatography was performed. This test demonstrated that the intra- and extrahepatic bile ducts had a normal caliber, with a common bile duct diameter of 3 mm, and a moderate increase in the size of the liver and spleen was observed.

Given the persistence of chronic hyperbilirubinemia (for one year) predominantly due to direct bilirubin, without other abnormalities in the liver panel and absence of evidence of autoimmune, infectious, or structural involvement on imaging, the accuracy of the initial diagnosis of Gilbert's syndrome was questioned. Considering the possibility of a different hereditary metabolic pathology, a percutaneous liver biopsy was suggested to obtain a more precise diagnosis and guide appropriate management.

Following the receipt of the histopathological report of the liver biopsy (**Figure 1**), the diagnosis of Dubin-Johnson syndrome was confirmed, which was found to be consistent with the clinical symptoms and previously described paraclinical findings.

Portal triads of usual morphology with present ducts and vessels without lobular alterations showed preserved architecture with usual trabecular architecture; some triads showed a very discrete, scattered mononuclear inflammatory infiltrate, and the presence of only an ochre-colored

Table 1. Laboratory Record

Test	Previous Hx (09/03/2020)	First Control (06/12/21)	Second Control (08/12/21)	Third Control (10/12/21)
Complete Blood Count	WBC: 12,100, N: 91.1%, Hb: 17, Hct: 50.2%, PLT: 314,000	WBC: 6900, N: 62%, Hb: 16.2, Hct: 46%, PLT: 262,000		WBC: 5700, N: 62%, Hb: 15.1, Hct: 44.3%, PLT: 328,000
CRP		61.3		
Amylase	93	50		
ALT		52	33	37
AST		39	25	33
Total Bilirubin	8.43	10.8	9.6	8.32
Indirect Bilirubin	2.72	3.26		2.1
Direct Bilirubin	2.41	7.6	7.5	6.0
Alkaline Phosphatase		77	58	62
GGT			66	
PT				10.9
Albumin				4
Creatinine	0.7	0.70		
BUN	19	11		

ALT: alanine aminotransferase; AST: aspartate aminotransferase; BUN: blood urea nitrogen; GGT: γ-glutamyl transferase; Hb: hemoglobin; Hct: hematocrit; N: neutrophils; PLT: platelets; CRP: C-reactive protein; PT: prothrombin time; WBC: white blood cells. Table prepared by the authors.

Table 2. Infectious and Immunological Profile

Test	Result
Anti-smooth muscle antibody	Negative: titer less than 1/20
Antinuclear antibody	Negative
Hepatitis C antibody	0.01
Hepatitis A IgG	0.35 (non-reactive)
Anti-HBc IgM	0.03 (non-reactive)

Hb: hemoglobin; IgG: immunoglobulin G; IgM: immunoglobulin M.

intracytoplasmic pigment, reminiscent of lipofuscin in small granules and which was negative with iron staining, was notable. The Masson-Fontana stain was positive for the described ochre pigment. There was no degree of fibrosis.

DISCUSSION

Dubin-Johnson syndrome is a rare, hereditary entity, with an estimated prevalence of less than 1 case per 100,000 inhabitants in the general population. However, a higher prevalence has been reported in Jewish and Iranian populations in the Middle East and Asia, with a frequency of approximately 1 case per 1,300 inhabitants[3]. Due to its low frequency and lack of awareness, Dubin-Johnson syndrome is an underdiagnosed condition that requires, on average, 13 years from the onset of symptoms to reach an accurate diagnosis. Dubin-Johnson syndrome typically manifests in adolescence or young adulthood, usually in the second decade of life, with an earlier onset in males[2].

Regarding the clinical picture, most patients with Dubin-Johnson syndrome are asymptomatic, and the diagnosis is made incidentally on routine laboratory tests, which show a predominant elevation of the direct bilirubin fraction (>50% of the total) and bilirubin levels typically ranging from 2 to 5 mg/dL[2]. However, in some cases, Dubin-Johnson syndrome can present with symptoms, including mild jaundice, weakness, abdominal pain, diarrhea, and localized pain in the right upper quadrant[3].

The first description of this pathology dates back to 1954, when a histological study of liver biopsies revealed the presence of a strange intracellular pigment in 12 patients with mild, chronic, non-hemolytic direct hyperbilirubinemia

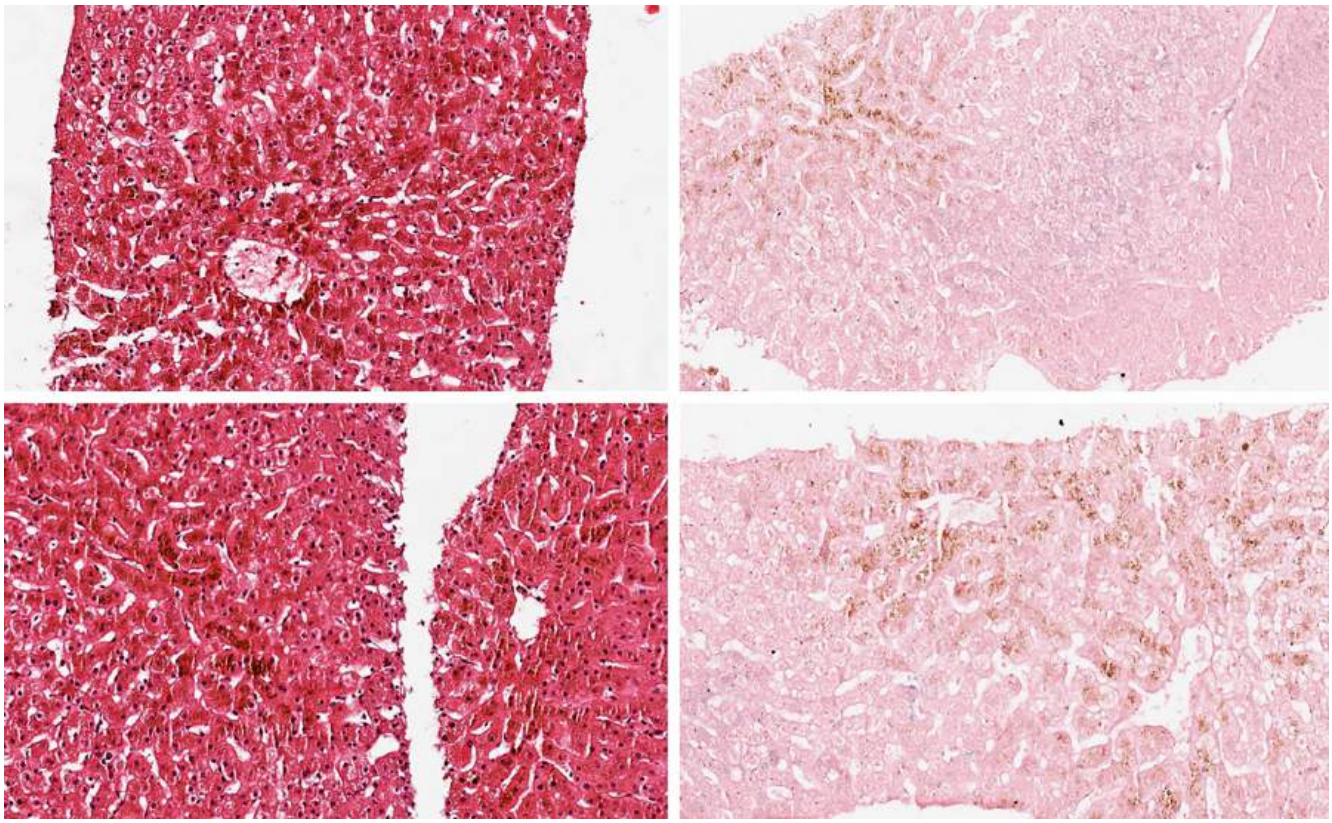


Figure 1. Liver biopsy of the patient with Dubin-Johnson syndrome. Images property of the authors.

without an apparent cause[1,2,7]. Subsequently, other studies confirmed the presence of dark deposits of melanin-like lysosomal pigment, suggesting the existence of a new, previously undescribed clinico-pathological entity.

It is now known that Dubin-Johnson syndrome is an autosomal recessive liver disease caused by a defect in the *ABCC2* gene[6,7]. Various mutations in this gene have been identified, including deletions, nonsense mutations, and splice-site mutations[6], resulting in impaired synthesis of the MRP2 protein. This protein plays a crucial role in transporting substances essential for the secretion of direct bilirubin out of the hepatocyte into the biliary collecting system[2].

The most recent research has focused on the genetic component of the disease, finding that a large proportion of cases present with typical clinical features, two mutated *ABCC2* alleles, and high genetic homogeneity. The aim is to deepen the understanding of the relationship between different mutation variables and the different genotypes and presentation phenotypes, especially in patients with neonatal cholestasis.

Togawa et al.[7] conducted a multicenter study on neonatal Dubin-Johnson syndrome and demonstrated that only 38% of the individuals analyzed with a positive genetic diagnosis presented typical histological findings and macroscopic characteristics. This suggests there is a variant of clinical presentation in neonates with cholestasis that is not the typical form of the syndrome. Furthermore, it was found that melanin-like pigment deposits in hepatocytes accumulate gradually after birth, which gives value to genetic and immunohistochemical tests, especially in the context of atypical presentations such as in neonates[7].

This case is noteworthy due to the presentation of clinical manifestations that are uncommon for Dubin-Johnson syndrome, particularly the late onset of these manifestations compared to what is reported in the literature[2,3]. Additionally, the case presents the cardinal paraclinical pattern characteristic of this disease, which is isolated direct hyperbilirubinemia. This alteration is typical of hereditary pathologies of bilirubin metabolism and excretion, such as Dubin-Johnson syndrome and Rotor syndrome[9]. The histopathological finding of a positive Masson-Fontana stain for the ochre pigment in centrilobular cells is characteristic of Dubin-Johnson syndrome[10], as this intracytoplasmic pigment is not found in Rotor syndrome[1,2]. These findings are sufficient to confirm the diagnosis of Dubin-Johnson syndrome.

Dubin-Johnson syndrome is an uncommon clinical entity that, due to its asymptomatic nature or non-specific presentation, is often underdiagnosed or confused with other diagnoses. This can lead to unnecessary invasive procedures, which carry risks and financial costs. Although it is a benign disease that does not progress to fibrosis or cirrhosis and does not require specific treatment[2], an accurate diagnosis is crucial to rule out other causes of clinical jaundice that can have a significant impact on morbidity and mortality[4]. A timely diagnosis allows for the provision of appropriate treatment and improves the prognosis of similar pathologies.

CONCLUSIONS

Dubin-Johnson syndrome is a rare hereditary pathological entity that, due to its asymptomatic nature or non-specific presentation, is often misdiagnosed and found as an incidental finding. Therefore, it is essential to suspect this condition to rule out other hepatobiliary disorders that could cause liver injury, to identify those patients who may be potentially treatable, and to avoid performing unnecessary invasive procedures. Liver biopsy is a safe and definitive diagnostic method for identifying this pathology.

Conflicts of Interest

The authors declare no conflicts of interest.

Sources of Funding

None.

REFERENCES

1. Dubin IN, Johnson FB. Chronic idiopathic jaundice with unidentified pigment in liver cells; a new clinicopathologic entity with a report of 12 cases. Medicine (Baltimore). 1954;33(3):155-197. https://doi.org/10.1097/00005792-195409000-00001
2. Talaga ZJ, Vaidya PN. Dubin Johnson Syndrome. [Actualizado el 13 de julio de 2021]. En: StatPearls [Internet]. Treasure Island (FL): Publicación de StatPearls; 2022 ene-. Disponible en: https://www.ncbi.nlm.nih.gov/books/NBK536994/
3. Bosia J, D'Ascenzo M, Borzi S, Cozzi S, Defelitto J, Curciarello J. Síndrome de Dubin Johnson: presentación de un caso y revisión de la literatura. Acta Gastroenterol Latinoam. 2008;38(3):194-198.
4. Strassburg CP. Hyperbilirubinemia syndromes (Gilbert-Meulengracht, Crigler-Najjar, Dubin-Johnson, and Rotor syndrome). Best Pract Res Clin Gastroenterol.

2010;24(5):555-71.
https://doi.org/10.1016/j.bpg.2010.07.007
5. Memon N, Weinberger B, Hegyi T, Aleksunes L. Inherited disorders of bilirubin clearance. Pediatr Res. 2016;79(3):378-86.
https://doi.org/10.1038/pr.2015.247
6. Wu H, Zha X, Zhu J. Clinical characteristics and ABCC2 genotype in Dubin-Johnson syndrome: A case report and review of the literature. World J Clin Cases. 2021;9(4):878-885.
https://doi.org/10.12998/wjcc.v9.i4.878
7. Togawa T, Mizuochi T, Sugiura T, Kusano H, Tanikawa K, Sasaki T, et al. Clinical, Pathologic, and Genetic Features of Neonatal Dubin-Johnson Syndrome: A Multicenter Study in Japan. J Pediatr. 2018;196:161-7.e1.
https://doi.org/10.1016/j.jpeds.2017.12.058
8. Wolkoff AW. The Hyperbilirubinemias. En: Loscalzo J, Fauci A, Kasper D, Hauser S, Longo D, Jameson J (editores). Harrison's Principles of Internal Medicine. 21.ª edición. McGraw Hill; 2022. p. 2557-61.
9. Herrero J, Arrese M. Ictericias y enfermedades de las vías biliares. En: Rozman C, Cardellach F (editores). Farreras | Rozman. Medicina interna. España: Elsevier; 2020. p. 263-8.
10. Rockey D, Caldwell S, Goodman Z, Rendon N, Smith A. Liver Biopsy. American Association for the Study of Liver Diseases. Hepatology. 2009;49(3):1017-44.
https://doi.org/10.1002/hep.22742

https://doi.org/10.22516/25007440.1278

Case report

Modified Endoluminal Vacuum Therapy for the Treatment of Colorectal Fistula: Experience from a Gastroenterology Unit in a High-Complexity Institution

Stefano Valsangiacomo-Avendaño,[1*] Diego Augusto Moreno-Díaz,[1] Juan Diego Cantillo-Quintero,[2] Luis Felipe Murcia-Cárdenas,[3] Rómulo Arturo Bonilla-Garnica,[4] Gonzalo Rojas-Hernández.[4]

OPEN ACCESS

Citation:
Valsangiacomo-Avendaño S, Moreno-Díaz DA, Cantillo-Quintero JD, Murcia-Cárdenas LF, Bonilla-Garnica RA, Rojas-Hernández G. Modified Endoluminal Vacuum Therapy for the Treatment of Colorectal Fistula: Experience from a Gastroenterology Unit in a High-Complexity Institution. Revista. colomb. Gastroenterol. 2025;40(3):362-366. https://doi.org/10.22516/25007440.1278

[1] Resident Physician, Internal Medicine, Universidad Industrial de Santander, Hospital Universitario de Santander. Bucaramanga, Santander, Colombia.
[2] Physician and Surgeon, Universidad Industrial de Santander. Bucaramanga, Santander, Colombia.
[3] Internal Medicine Physician, Universidad Autónoma de Bucaramanga. Bucaramanga, Santander, Colombia.
[4] Gastroenterologist, Gastroenterology Unit, Hospital Universitario de Santander. Bucaramanga, Santander, Colombia.

***Correspondence:** Stefano Valsangiacomo-Avendaño.
stefanovalsangiacomo@gmail.com

Received: 22/08/2024
Accepted: 09/12/2024

Abstract

Endoluminal vacuum therapy (Endo-Vac) may be a promising option for the endoscopic management of challenging gastrointestinal fistulas or perforations. However, one of the barriers to its implementation is the high cost associated with conventional systems. Consequently, modified techniques using readily available and lower-cost materials have been developed. This report describes the successful endoscopic closure of a colorectal anastomotic fistula using a modified Endo-Vac technique. Despite using materials different from those in conventional systems, this approach may represent an effective and lower-cost alternative for managing anastomotic complications, facilitating its implementation in settings with limited resources.

Keywords

Endoscopy, gastrointestinal fistula, surgical anastomosis.

INTRODUCTION

One of the most serious complications following intestinal anastomosis is anastomotic leak[(1)], with an incidence ranging from 1% to 24% in lower gastrointestinal tract surgery[(2,3)]. Various strategies exist for managing this complication, one of the most novel being endoluminal vacuum therapy (Endo-VAC), which combines the principles of endoscopy and vacuum therapy, allowing for a reduction in inflammation and stimulating the formation of granulation tissue. A fundamental aspect to consider for implementing this therapy is its cost, which has led to the development of alternative strategies to mitigate the economic impact. Among these is modified Endo-VAC therapy, which uses low-cost and easily accessible materials and has shown promising results both in Latin America and worldwide. This report presents a successful case managed in northeastern Colombia, where modified Endo-VAC therapy was applied to treat a colorectal anastomotic leak following tumor resection surgery.

CASE REPORT

The case involves a 58-year-old male patient diagnosed with stage IIIA (T3N1M0) distal rectal adenocarcinoma, moderately differentiated, ulcerated, and infiltrating, with

© 2025 Asociación Colombiana de Gastroenterología

a classic pattern. He underwent neoadjuvant treatment followed by surgical resection of the tumor in the extraperitoneal lower rectum, five centimeters from the anal verge. During the surgical intervention, a colorectal anastomosis was performed, and a protective ileostomy was created.

On the eighth day after surgery, the patient began presenting symptoms suggestive of a possible anastomotic leak, with fecaloid material in the drainage system located in the pelvic fossa, tachycardia, food intolerance, and postprandial abdominal distension. Furthermore, a notable increase in output through the ileostomy was observed. Although complete blood count results showed no leukocytosis, a significant elevation in acute-phase reactants was evident. Given these findings, the patient was jointly evaluated by specialists in Coloproctology, Internal Medicine, and Gastroenterology, who concluded that the patient had an anastomotic leak, probably associated with abdominal sepsis. An abdominopelvic computed tomography scan confirmed the presence of a small collection in the pelvic region, so broad-spectrum empirical antibiotic treatment was initiated, without considering percutaneous drainage necessary at that time. A watchful waiting approach was maintained for one more week, with a follow-up evaluation scheduled.

As the patient's course continued, a constant output through the ileostomy was observed; the ileostomy remained functional throughout the entire postoperative period, without bleeding, productive, and viable. However, due to the increased output, possible ileostomy failure was suspected, leading to a rigid sigmoidoscopy, which identified two fistulous orifices located four centimeters from the anal verge, with diameters of 8 mm and 15 mm, respectively (**Figure 1A**).

In view of these findings, it was determined that the patient was a candidate for modified Endo-VAC therapy aimed at closing the fistulous defects. For this purpose, a modified Endo-VAC device, fabricated in the Gastroenterology Unit using a 12 Fr nasogastric tube (**Figure 1B**), was introduced, applying a negative pressure of -80 mm Hg, with strict medical monitoring during the procedure.

After seven days, a new endoscopic study showed the persistence of both fistulous orifices, although signs of granulation tissue and a notable reduction in their diameters—now measuring 4 mm and 7 mm, respectively—were observed (**Figure 1C**). Given the reduction in the size of the orifices, it was decided to continue endoluminal vacuum therapy using a 10 Fr tube and a negative pressure of -80 mm Hg, with reevaluation scheduled for the following week.

In this new assessment by the Gastroenterology team, the fistulous orifices were observed with a considerable amount of granulation tissue. The decision was made to proceed with closure of the residual defect using three hemoclips (**Figure 1D**). The procedure was performed without complications, and the patient was discharged safely.

At the follow-up conducted two months after the aforementioned intervention, an adequate colorectal anastomosis was observed, with a visible suture line and no evidence of new fistulous orifices or additional complications. Based on these results, it was concluded that the patient had experienced complete resolution of his clinical condition.

DISCUSSION

This article describes the successful closure of a colorectal fistula in a patient who underwent resection for distal rectal adenocarcinoma, using modified Endo-VAC therapy. Two device exchanges resulted in partial closure of the defect, followed by the insertion of three clips to achieve complete fistula closure, with an adequate clinical course and outpatient follow-up.

Gastrointestinal tract surgery is a common procedure, and complications arising from these interventions must be managed appropriately and promptly. The occurrence of a colorectal anastomotic leak is one of the most serious complications patients can experience following intestinal surgery[4]. Its incidence ranges from 1% to 24% after lower digestive tract surgery[2,3], which has a deleterious effect on both oncological prognosis and intestinal function[4].

Despite advances in surgical technique and optimization of the patient's preoperative status, the risk of anastomotic leakage has not been completely eliminated[4]. Traditionally, such leaks have been managed surgically; however, the use of non-invasive techniques has increased in recent years. Among the management options for anastomotic defects is Endo-VAC therapy, which aims to reduce the potential impact of complications associated with localized sepsis, as well as the need for additional and more radical interventions[4].

This therapy is based on the controlled introduction of a vacuum device via endoscopy, allowing for the application of gentle, continuous suction to the affected area of the gastrointestinal tract. Its mechanisms of action are diverse and include macrodeformation, which occurs when the applied suction pulls the edges of the defect, causing them to contract. Similarly, microdeformation initiates signaling cascades that culminate in the release of growth factors, which promotes cell proliferation, improves perfusion, increases neovascularization, and reduces local edema[5].

Endo-VAC has been used in bariatric surgery, as well as in the management of esophageal, gastric, and duodenal perforations and fistulas; pancreatic fistulas; anal abscesses; colorectal defects; among others[6,7]. The technique has shown considerable success rates, with data from retrospective studies reporting 86% success for gastric defects, 100% for small bowel alterations, and 60% for colonic disorders[8]. In Colombia, the successful use of this the-

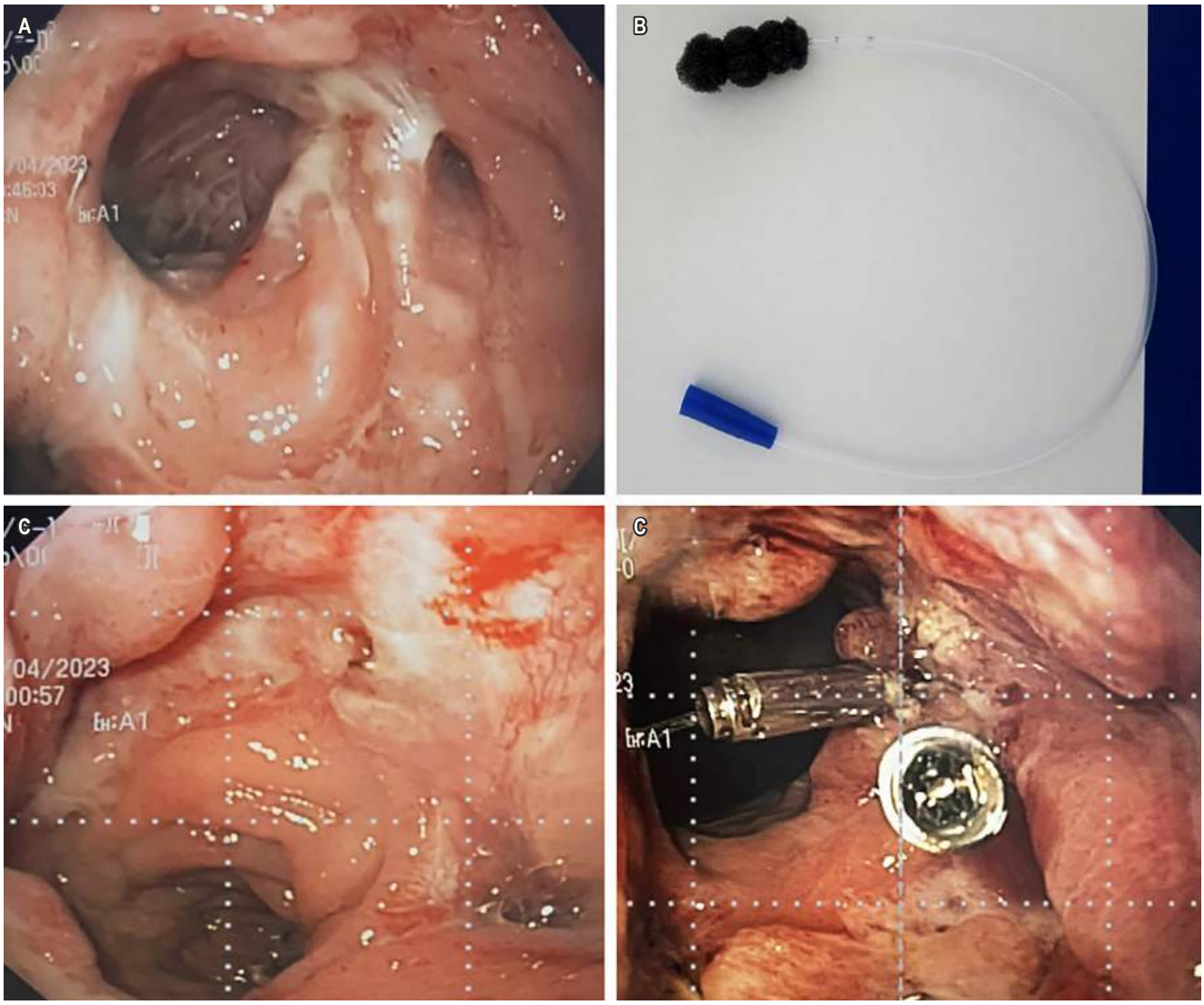


Figure 1. Endoscopic images of the clinical case. **A.** Endoscopic visualization of the colorectal fistula. **B.** Modified Endo-VAC device made with a 12 Fr nasogastric tube, with a sponge fragment at its tip, secured with a transfixing suture, at a pressure of -80 mmHg. **C.** Endoscopic follow-up after one week of management with the modified Endo-VAC system. **D.** Visualization of hemostatic clips following the use of the modified Endo-VAC system. Images property of the authors.

rapy has been documented for managing late postoperative colocutaneous anastomotic leak[9].

The cost of Endo-VAC therapy is high. According to approximate data, a 25-day treatment with eight Endo-VAC device exchanges per patient has a total cost of approximately USD 10,188, equivalent to about COP 40 million[10]. In this context, the economic factor is a crucial aspect to consider when implementing this type of therapy in our setting. Since the pandemic, poverty in Latin America and the Caribbean has increased, rising from 24% to 26.5% in 2021. Furthermore, economic growth prospects for 2023 have been reduced to 1.4%[11]).

The implementation of this technology can represent a significant challenge, not only for economic reasons, as mentioned previously, but also due to the potential lack of availability of specific devices in local markets. To address this issue, modifications to this therapy have been developed, using more economical and easily accessible materials, aiming to reduce production costs without compromising the efficacy of the original methods[4].

Various reports have demonstrated the effectiveness of vacuum technology in treating patients with colorectal anastomotic leak, even using inexpensive and readily available materials[12]. One therapy that has gained relevance is

the modified form of Endo-VAC, developed by Dr. Diogo de Moura's group[4,13-15]. In this variant, the aim is to replace the polyurethane sponge originally used, which is manufactured in Germany and has a high cost for Latin American countries. This adaptation employs an open-pore film for the therapy, using low-cost materials.

The procedure consists of three fundamental steps:

1. Creation of the modified Endo-VAC device: The first step involves cutting a gauze in half to cover the fenestrated portion of the tube. The gauze is then wrapped around the fenestrated portion of the tube, completely covering the apertures. Subsequently, the gauze wrap is trimmed to match the size of the fenestrated portion of the tube, and the sponge is secured with suture.
2. Endoscopic testing of the device: The second step involves the endoscopic placement of the pre-prepared device.
3. Application of negative pressure: The third step consists of connecting the tube to suction to prevent device migration during endoscope withdrawal. Then, the connection of the modified Endo-VAC tube to the suction line connected to wall suction is sealed. Finally, a 20 G intravenous catheter is connected to the suction tube to maintain a negative pressure between 75 and 150 mm Hg[12,13,15].

This technique has had multiple applications due to its easy adaptation and the low cost of the materials used, and it has demonstrated adequate safety and clinical success in most patients, with low complication rates[6]. As observed in the reported patient, it could be a valuable therapeutic option for those patients requiring Endo-VAC therapy in countries with economic constraints or when conventional therapy presents difficulties or complications.

CONCLUSION

This case illustrates the successful resolution of a colorectal fistula in a patient with distal rectal adenocarcinoma through the implementation of modified Endo-VAC therapy. Despite the economic and logistical challenges associated with adopting innovative technologies, this technique presents itself as a viable, economical, and effective alternative for the treatment of colorectal anastomotic fistulas. It can not only contribute to improved clinical outcomes but also optimize comprehensive patient care. Continued research and development of new strategies are essential to ensure effective management of complications and promote a more sustainable and accessible care model.

REFERENCES

1. Lee WS, Yun SH, Roh YN, Yun HR, Lee WY, Cho YB, et al. Risk factors and clinical outcome for anastomotic leakage after total mesorectal excision for rectal cancer. World J Surg. 2008;32(6):1124-9. https://doi.org/10.1007/s00268-007-9451-2
2. Matthiessen P, Hallböök O, Andersson M, Rutegård J, Sjödahl R. Risk factors for anastomotic leakage after anterior resection of the rectum. Colorectal Dis. 2004;6(6):462-9. https://doi.org/10.1111/j.1463-1318.2004.00657.x
3. Pinilla RE, Aramendiz MC, Williams E, Caycedo-Marulanda A. Endo-VAC customization for sinus/anastomotic-leaks/dehiscence after colorectal anastomosis. Tech Coloproctol. 2020;24(10):1095-1096. Tech Coloproctol. 2021;25(3):355. https://doi.org/10.1007/s10151-020-02326-2
4. de Moura DTH, de Moura BFBH, Manfredi MA, Hathorn KE, Bazarbashi AN, Ribeiro IB, et al. Role of endoscopic vacuum therapy in the management of gastrointestinal transmural defects. World J Gastrointest Endosc. 2019;11(5):329-344. https://doi.org/10.4253/wjge.v11.i5.329
5. Loske G, Rucktaeschel F, Schorsch T, Moenkemueller K, Mueller CT. Endoscopic negative pressure therapy (ENPT) for duodenal leakage - novel repair technique using open-pore film (OFD) and polyurethane-foam drainages (OPD). Endosc Int Open. 2019;7(11): E1424-E1431. https://doi.org/10.1055/a-0972-9660
6. Ramírez Barranco R, Cañadas Garrido RA, Cáceres Escobar D. Terapia de vacío endoluminal (Endo-Vac) en el manejo de la fístula de anastomosis esofagogástrica. Rev Colomb Gastroenterol. 2022;37(1):83-9. https://doi.org/10.22516/25007440.710
7. Mencio MA, Ontiveros E, Burdick JS, Leeds SG. Use of a novel technique to manage gastrointestinal leaks with endoluminal negative pressure: a single institution experience. Surg Endosc. 2018;32(7):3349-3356. https://doi.org/10.1007/s00464-018-6055-x
8. Saavedra JEM, Carrillo CAT, Valbuena GLM. Outpatient closure in a late colo-cutaneous postoperative anastomotic leak managed with EVAC in Bucaramanga, Colombia. Case report. Int J Surg Case Rep. 2022;100:107737. https://doi.org/10.1016/j.ijscr.2022.107737
9. Ooi G, Burton P, Packiyanathan A, Loh D, Chen R, Shaw K, et al. Indications and efficacy of endoscopic vacuum-assisted closure therapy for upper gastrointestinal perforations. ANZ J Surg. 2018;88(4):E257-E263. https://doi.org/10.1111/ans.13837
10. Banco Mundial. América Latina y el Caribe: panorama general. Banco Mundial; 2023 [consultado el 21 de agosto

de 2023]. Disponible en: https://www.bancomundial.org/es/region/lac/overview
11. Kiko I, Nehring D, Ma T. Creation of a Custom Endoluminal Vacuum-Assisted Device for Salvage of Ileal Pouch-Anal Anastomotic Leak. Cureus. 2023;15(11):e49754. https://doi.org/10.7759/cureus.49754
12. de Moura DTH, Hirsch BS, McCarty TR, Lera Dos Santos ME, Guedes HG, Gomes GF, et al. Homemade endoscopic vacuum therapy device for the management of transmural gastrointestinal defects. Dig Endosc. 2023;35(6):745-756. https://doi.org/10.1111/den.14518
13. de Moura DTH, Hirsch BS, Do Monte Junior ES, McCarty TR, de Medeiros FS, Thompson CC, et al. Cost-effective modified endoscopic vacuum therapy for the treatment of gastrointestinal transmural defects: step-by-step process of manufacturing and its advantages. VideoGIE. 2021;6(12):523-528. https://doi.org/10.1016/j.vgie.2021.08.002
14. de Moura DTH, do Monte Junior ES, Hathorn KE, de Medeiros FS, Thompson CC, de Moura EGH. Modified endoscopic vacuum therapy in the management of a duodenal transmural defect. Endoscopy. 2021;53(1):E17-E18. https://doi.org/10.1055/a-1173-7282
15. de Moura DTH, do Monte Junior ES, Hathorn KE, Ribeiro IB, de Medeiros FS, Thompson CC, et al. The use of novel modified endoscopic vacuum therapies in the management of a transmural rectal wall defect. Endoscopy. 2021;53(1):E27-E28. https://doi.org/10.1055/a-1173-7727

https://doi.org/10.22516/25007440.1279

Case report

Esophageal Leukoplakia and Its Clinical Significance: Does It Imply Risk?

Aldair José Chaar-Hernández,[1*] Hernando José Vergara-Segrera,[2] Jesús Antonio Rodríguez-Fajardo.[2]

OPEN ACCESS

Citation:
Chaar-Hernández AJ, Vergara-Segrera HJ, Rodríguez-Fajardo JA. Esophageal Leukoplakia and Its Clinical Significance: Does It Imply Risk?. Revista. colomb. Gastroenterol. 2025;40(2):367-371.
https://doi.org/10.22516/25007440.1279

[1] Gastroenterology Fellow, Department of Gastroenterology and Endoscopy, Hospital Universitario San Ignacio, Pontificia Universidad Javeriana. Bogotá, Colombia.
[2] Gastroenterology Specialist and Clinical Adjunct Professor of Gastroenterology, Department of Gastroenterology and Endoscopy, Hospital Universitario San Ignacio, Pontificia Universidad Javeriana. Bogotá, Colombia.

***Correspondence:** Aldair José Chaar-Hernández.
chaarha@javeriana.edu.co

Received: 02/09/2024
Accepted: 08/10/2024

Abstract

Esophageal leukoplakia is an extremely rare condition. It typically occurs in patients who smoke, frequently consume alcohol, or have chronic mucosal irritation from gastroesophageal reflux. Endoscopically, well-circumscribed whitish plaques are commonly observed in the middle or distal third of the esophagus. These lesions can be easily mistaken for glycogenic acanthosis, esophageal papilloma, eosinophilic esophagitis, or Candida esophagitis. Timely recognition and management are essential, as esophageal leukoplakia is considered a precursor to squamous cell carcinoma.

Keywords

Leukoplakia, esophagus, esophageal diseases, epidermolytic hyperkeratosis, endoscopy, squamous cell carcinoma.

INTRODUCTION

Leukoplakia is the term used to describe whitish plaques or patches on mucous membranes that cannot be "scraped off" and are not clinically characterized as another disease. Its oral form is the most frequently described in the literature, with a worldwide prevalence of 4.11%; it is characteristically painless, associated with alcohol consumption or smoking, and is a known risk factor for squamous cell carcinoma[1].

It is a rare finding in the esophagus, described mainly in case reports and small series, with an established prevalence of 0.19% in patients undergoing biopsy for any other reason[2-4]. Its risk factors are similar to those of the oral form, primarily smoking, alcohol consumption, and chronic mucosal irritation. Endoscopically, it is characterized by well-demarcated whitish lesions with surrounding healthy tissue, located mainly in the middle or distal third of the esophagus, with local or diffuse distribution. The histological term defining this entity is *epidermoid metaplasia*, characterized by squamous epithelium with orthokeratosis and a prominent granular cell layer, which is why it can also be found in the literature as *esophageal hyperkeratosis*[5]. Its differential diagnoses include glycogenic acanthosis, esophageal papilloma, eosinophilic esophagitis, and candida esophagitis, which can be differentiated using Lugol's staining, as the latter stain positive, whereas epidermoid metaplasia is resistant to it[4].

Although leukoplakia can be an incidental finding in asymptomatic patients, Kamboj et al.[6] showed that two-

thirds of patients had dysphagia at the time of diagnosis and that in up to 25% of patients, it could occur before, concomitantly with, or after the diagnosis of esophageal squamous cell carcinoma—a considerably high risk compared to other entities associated with squamous cell carcinoma, such as esophageal lichen planus and achalasia, with risks of 6.1% and 2.7%, respectively[7,8]. It is a precursor of squamous cell carcinoma, and sometimes high-grade dysplastic areas can be observed within it, making it unreliable to base decisions solely on biopsies, as samples might be taken from unaffected areas within the lesion. Targeted sequencing techniques support this. The detection of mutations, including that of the tumor protein P53 (TP53) in epidermoid metaplasia samples, corroborates the clonal relationship between these entities[9]. Additionally, Sang et al. showed that leukoplakia is an independent risk factor for non-curative resection in patients with high-grade intraepithelial neoplasia, making detection and early resection, when indicated, even more important[10].

CASE REPORT

A 72-year-old male, a heavy smoker, presented with a 6-year clinical history of regurgitation and heartburn. His medical history recorded no other positive findings. Physical examination was normal, including a thorough evaluation of the oral cavity and neck. An esophagogastroduodenoscopy (EGD) revealed a flat lesion (Paris 0-IIb) measuring 30 mm, suggestive of leukoplakia in the distal third of the esophagus (immediately above the gastroesophageal junction) (**Figure 1**). The lesion borders were biopsied, and the histopathological report indicated esophageal mucosa with a focal area of leukoplakia with epithelial hyperplasia, parakeratosis, and inflammation. Stains with methenamine silver and periodic acid-Schiff (PAS) were negative, and no changes suggestive of dysplasia or carcinoma were reported (**Figure 2**). Given the lesion size and the potential risk of malignant transformation, the patient underwent endoscopic submucosal dissection using a tunneled technique (ESTD), achieving negative resection margins. Prophylactically, due to the circumferential resection, a short course of steroids was indicated, and a covered self-expandable metal stent was placed, which was removed at the fourth week.

DISCUSSION

Few cases of this entity have been reported in the literature, so there are no guidelines or consensuses to individualize management. Ezoe et al. reported a high rate of synchro-

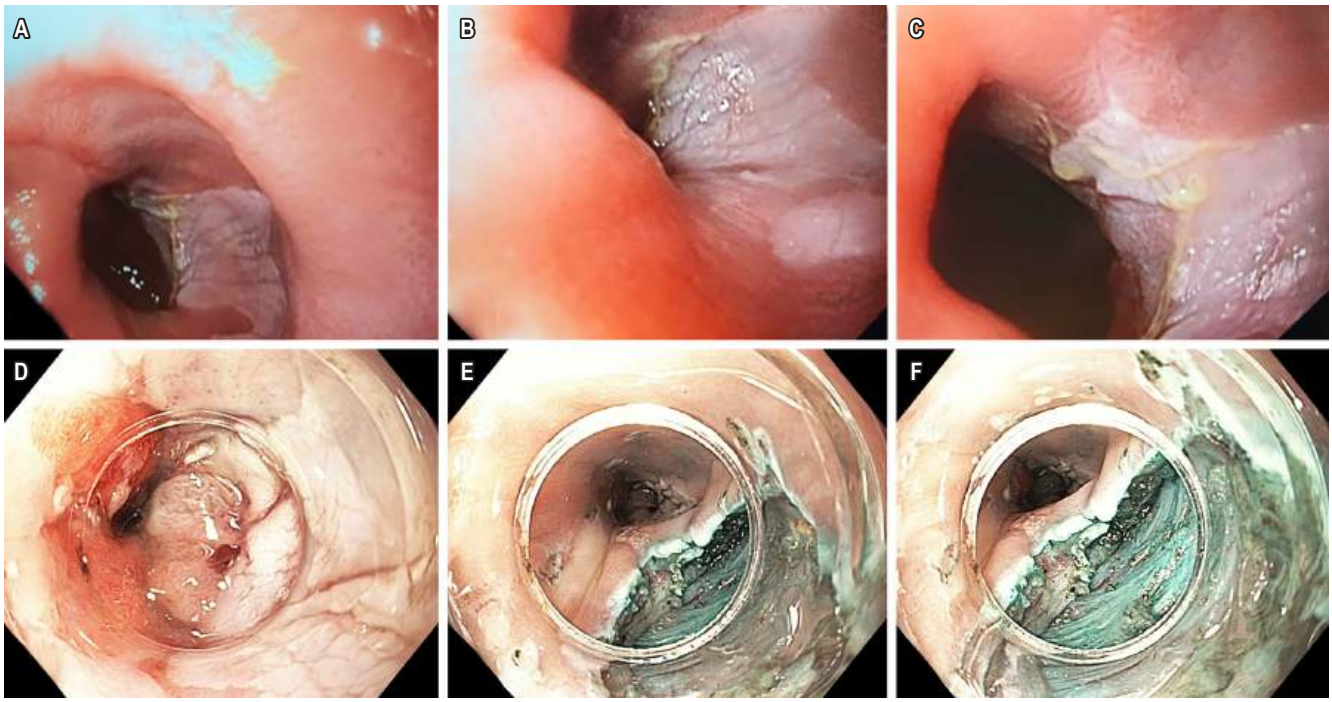


Figure 1. Clinical case examinations. **A, B, and C.** EGD showing a 30 mm lesion in the distal esophagus characterized as a well-defined whitish plaque with surrounding normal mucosa, suggestive of leukoplakia. **D.** Elevated leukoplakia with hyaluronic acid, saline, and methylene blue before dissection viewed through Cap. **E and F.** Endoscopic submucosal dissection of esophageal leukoplakia. Resection bed. Images property of the authors.

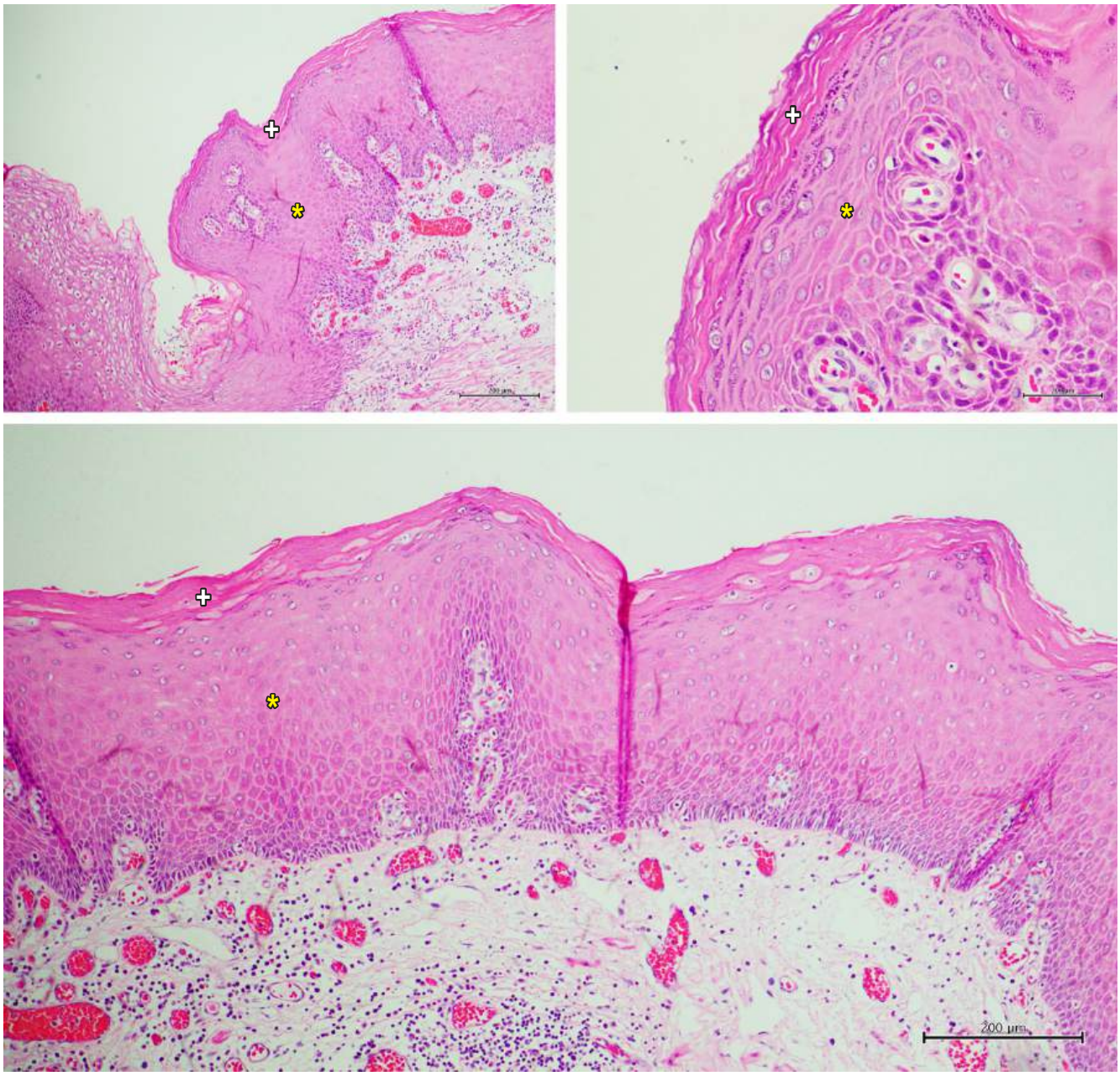


Figure 2. Histological findings. Esophageal mucosa with a focal area of leukoplakia with epithelial hyperplasia (*), parakeratosis (+), and inflammation. No changes suggestive of dysplasia or carcinoma were reported. Hematoxylin and eosin stain. Images property of the authors.

nous or metachronous esophageal and oropharyngeal squamous cell carcinoma in a case series[11]. High-grade squamous dysplasia or squamous cell carcinoma was found in 17% of the patients. Meanwhile, Aida et al. found that epithelial cells within lesions with orthokeratotic dysplasia have greater telomere attrition and a higher number of anaphase bridges, which translates to greater instability and a tendency toward changes with malignant potential[12]. This highlights the importance of recognizing and managing these lesions early.

Most authors recommend strict endoscopic surveillance every 1 to 6 months for cases without demonstrated dysplasia, or ablation with radiofrequency or argon plasma coagulation; however, in the presented case, although we found no foci of dysplasia or carcinoma in situ in the biopsies taken from the lesion, the size and the fact that the entire

lesion had not been explored histologically (possibility of high-grade dysplastic foci not represented in the biopsy) led us to consider endoscopic submucosal dissection as the appropriate management, which also ensures a higher rate of R0 resection compared to other techniques. In the absence of recommendations with sufficient evidence quality, the choice of management strategy is left to the clinician's discretion, based on what is most suitable and adjusted to the availability of local resources.

CONCLUSION

When facing a patient with esophageal leukoplakia, it is essential to conduct a thorough differential diagnosis, as it carries a clear association with high-grade dysplasia and cancer. Management is variable, ranging from strict endoscopic surveillance to endoscopic submucosal dissection, with the goal of achieving en bloc resections with free margins and a higher R0 rate. Until formal consensus recommendations are available, each case must be individualized, and management defined according to the availability of local resources.

Ethical Considerations

This study does not expose information that would allow patient identification; therefore, it does not require informed consent or approval protocol by an institutional ethics committee, in accordance with the Declaration of Helsinki and Resolution 008430 of October 4, 1993.

Funding Source

No sponsorship was received from any of the participating institutions for the preparation of this article.

Conflicts of Interest

The authors declare no conflicts of interest.

REFERENCES

1. Mello FW, Miguel AFP, Dutra KL, Porporatti AL, Warnakulasuriya S, Guerra ENS, et al. Prevalence of oral potentially malignant disorders: A systematic review and meta-analysis. J Oral Pathol Med. 2018;47(7):633-640. https://doi.org/10.1111/jop.12726
2. Park GB, Kim GH. Whitish plaques (leukoplakia) in the esophagus. Gastrointest Endosc. 2021;94(6):1144-1145. https://doi.org/10.1016/j.gie.2021.08.005
3. Singhi AD, Arnold CA, Crowder CD, Lam-Himlin DM, Voltaggio L, Montgomery EA. Esophageal leukoplakia or epidermoid metaplasia: A clinicopathological study of 18 patients. Mod Pathol 2014;27(1):38-43. https://doi.org/10.1038/modpathol.2013.100
4. Ashraf MF, Richter S, Arker SH, Parsa N. A Rare Case of Esophageal Leukoplakia: A Potential Precursor to Esophageal Malignancy. Cureus. 2021;13(8):e17205. https://doi.org/10.7759/cureus.17205
5. Johncilla ME, Srivastava A. Esophagitis unrelated to reflux disease: current status and emerging diagnostic challenges. Virchows Arch. 2018;472(1):29-41. https://doi.org/10.1007/s00428-017-2238-4
6. Kamboj AK, Gibbens YY, Hagen CE, Wang KK, Iyer PG, Katzka DA. Esophageal Epidermoid Metaplasia: Clinical Characteristics and Risk of Esophageal Squamous Neoplasia. Am J Gastroenterol. 2021;116(7):1533-1536. https://doi.org/10.14309/ajg.0000000000001225
7. Ravi K, Codipilly DC, Sunjaya D, Fang H, Arora AS, Katzka DA. Esophageal Lichen Planus Is Associated With a Significant Increase in Risk of Squamous Cell Carcinoma. Clin Gastroenterol Hepatol. 2019;17(9):1902-1903.e1. https://doi.org/10.1016/j.cgh.2018.10.018
8. Leeuwenburgh I, Scholten P, Alderliesten J, Tilanus HW, Looman CW, Steijerberg EW, et al. Long-term esophageal cancer risk in patients with primary achalasia: a prospective study. Am J Gastroenterol. 2010;105(10):2144-9. https://doi.org/10.1038/ajg.2010.263
9. Sang HM, Cao JL, Soyfoo MD, Zhang WM, Jiang JX, Xu SF. Endoscopic and Histopathology Characteristics in Patients with Esophageal High-Grade Intraepithelial Neoplasia. Dig Surg. 2019;36(5):384-393. https://doi.org/10.1159/000490112
10. Singhi AD, Arnold CA, Lam-Himlin DM, Nikiforova MN, Voltaggio L, Canto MI, et al. Targeted next-generation sequencing supports epidermoid metaplasia of the esophagus as a precursor to esophageal squamous neoplasia. Mod Pathol. 2017;30(11):1613-1621. https://doi.org/10.1038/modpathol.2017.73
11. Ezoe Y, Fujii S, Muto M, Ochiai A, Ohtsu A. Epidermoid metaplasia of the esophagus: endoscopic feature and differential diagnosis. Hepatogastroenterology. 2011;58(107-108):809-13.
12. Aida J, Kobayashi T, Saku T, Yamaguchi M, Shimomura N, Nakamura K, et al. Short telomeres in an oral precancerous lesion: Q-FISH analysis of leukoplakia. J Oral Pathol Med. 2012;41(5):372-8. https://doi.org/10.1111/j.1600-0714.2011.01120.x

https://doi.org/10.22516/25007440.1284

Case report

Anorectal Abscess Due to Foreign Body Ingestion: A Case Report

Carlos Mauricio Martínez-Montalvo,[1*] Juan Pablo Pérez-Daza,[2] Johana Andrea Sisa-Rodríguez,[2] Wilmer Orlando Aponte-Barrios,[3] Édgar Germán Junca.[4]

OPEN ACCESS

Citation:
Martínez-Montalvo CM, Pérez-Daza JP, Sisa-Rodríguez JA, Aponte-Barrios WO, Junca EG. Anorectal Abscess Due to Foreign Body Ingestion: A Case Report. Revista. colomb. Gastroenterol. 2025;40(2):372-376. https://doi.org/10.22516/25007440.1284

[1] Internal Medicine Physician, Universidad del Rosario. Gastroenterologist, Universidad Nacional de Colombia, Bogotá, Colombia.
[2] Surgeon, Resident in Radiology and Diagnostic Imaging, Universidad Nacional de Colombia. Bogotá, Colombia.
[3] Head of the Department of Radiology and Diagnostic Imaging, Universidad Nacional de Colombia. Bogotá, Colombia.
[4] Gastrointestinal Surgeon, Universidad Nacional de Colombia, Hospital Universitario Nacional de Colombia. Bogotá, Colombia.

***Correspondence:** Carlos Mauricio Martínez-Montalvo.
carlitos220792@gmail.com

Received: 13/09/2024
Accepted: 18/11/2024

Abstract

Introduction: An anorectal abscess results from the involvement of the anal glands. Its main cause is obstruction of these glands, followed by Crohn's disease, trauma, malignancy, and immunodeficiencies. Ingestion of a foreign body is a rare etiology, with toothpick trauma described in the literature. **Case Presentation:** A 36-year-old man with no relevant medical history presented with a one-week history of sharp abdominal pain, followed by perianal pain accompanied by fever and purulent drainage. Initial evaluation documented an anorectal abscess extending above the levator ani muscle. A subsequent MRI revealed a toothpick as the causative foreign body. The patient underwent surgical management and a 10-day course of targeted antibiotic therapy. **Conclusions:** Anorectal abscess due to foreign body ingestion is rare, often unrecognized, and imaging sensitivity is variable. Computed tomography is recommended as the initial imaging modality. Supra-levator involvement requires early and adequate drainage to prevent fistula formation.

Keywords

Rectal fistula, foreign body reaction, gastrointestinal tract, abscess.

INTRODUCTION

An anorectal abscess is an inflammatory suppurative condition resulting from the involvement of the anal glands in the intersphincteric plane; it is more common in men and can occur at any age, but has a peak incidence between 20 and 40 years of age[(1)]. Its primary cause is obstruction of the anal glands, followed by Crohn's disease, trauma, malignancy, and immunodeficiencies[(2)]. The most common locations are perianal (42.7%), ischiorectal (22.7%), intersphincteric (21.4%), and supralevator (7.3%)[(3)]. A rare cause is the ingestion of foreign bodies, with multiple associated objects having been described, one of which is toothpicks[(4)]. This type of object most frequently causes colon perforation, followed by duodenal perforation. At the anorectal level, an incidence of 7% has been described, with perforation occurring in approximately 70% of cases[(5)]. We present a case of inadvertent toothpick ingestion, with subsequent development of an anorectal abscess involving the supralevator space, documented upon a second review of the initial magnetic resonance imaging.

CASE PRESENTATION

A 36-year-old man with no significant past medical history was admitted with a one-week history of migratory, stabbing

© 2025 Asociación Colombiana de Gastroenterología

abdominal pain initially located in the epigastrium, which later localized to the hypogastrium and left iliac fossa. This was followed by the subsequent appearance of pain in the perianal region, purulent discharge, and febrile peaks (38.7 °C) two days prior to admission. On physical examination, the abdomen was soft, depressible. In the lithotomy position, the perianal physical examination revealed a draining pus orifice at the 9 o'clock position, without inflammatory changes. On digital rectal examination, a mucosal bulge was palpated in the distal rectum at the posterior right quadrant. Admission paraclinical tests revealed leukocytosis with neutrophilia and elevated C-reactive protein (CRP), while the rest of the studies showed no abnormalities. Antibiotic coverage with ceftriaxone 2 g/day and metronidazole 500 mg/12 hours was initiated.

A rectosigmoidoscopy was performed, which found a mucosal bulge in the distal rectum, without mucosal changes or defects in continuity. A contrast-enhanced pelvic magnetic resonance imaging was performed, showing evidence of an anorectal abscess with supralevator involvement, with an approximate volume of 40 mL, reactive mesorectal and internal iliac lymph nodes, as well as puborectalis muscle myositis (**Figure 1**). Upon a second interview, the patient reported consuming a potato with a toothpick one week before the onset of symptoms. Consequently, a second review of the pelvic MRI images was performed, which revealed a linear foreign body perforating the internal anal sphincter and extending into the right ischiorectal fat (**Figure 2**). He was taken for surgical management with abscess drainage and foreign body extraction without complications, and a drain was left in place (**Figures 3** and **4**). Directed antibiotic therapy was administered for 10 days for a susceptible *Escherichia coli* isolate.

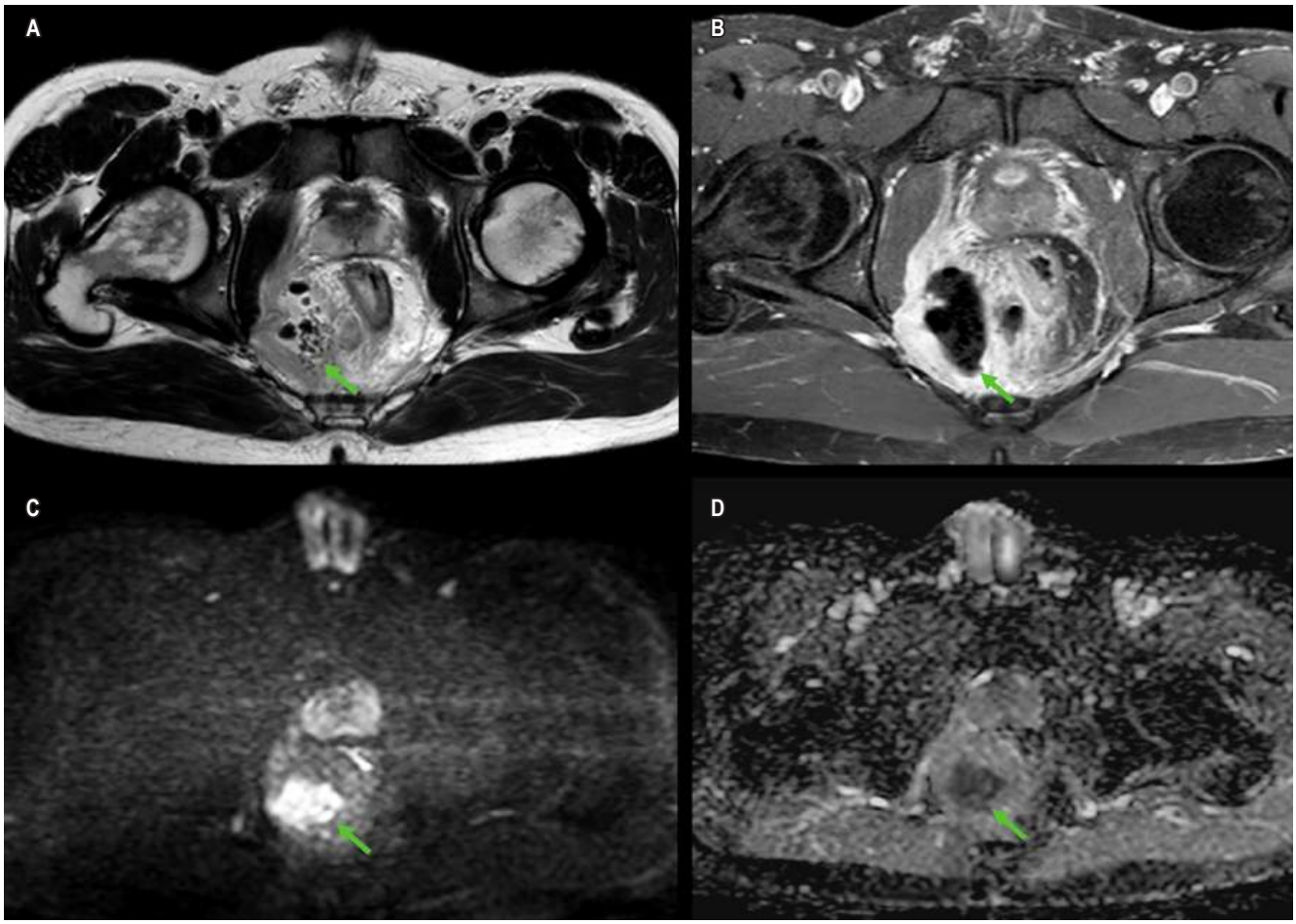


Figure 1. Imaging studies of the clinical case. **A.** Axial T2-weighted image. **B.** Axial T1-weighted fat-suppressed post-contrast image. **C.** DWI B800. **D.** ADC map. Initial findings from the contrast-enhanced pelvic MRI identifying the right supralevator abscess (arrow), demonstrating high signal intensity on T2WI with peripheral enhancement and diffusion restriction (high signal intensity on DWI B800 and low signal intensity on the ADC map) and internal gas bubbles. Images property of the authors.

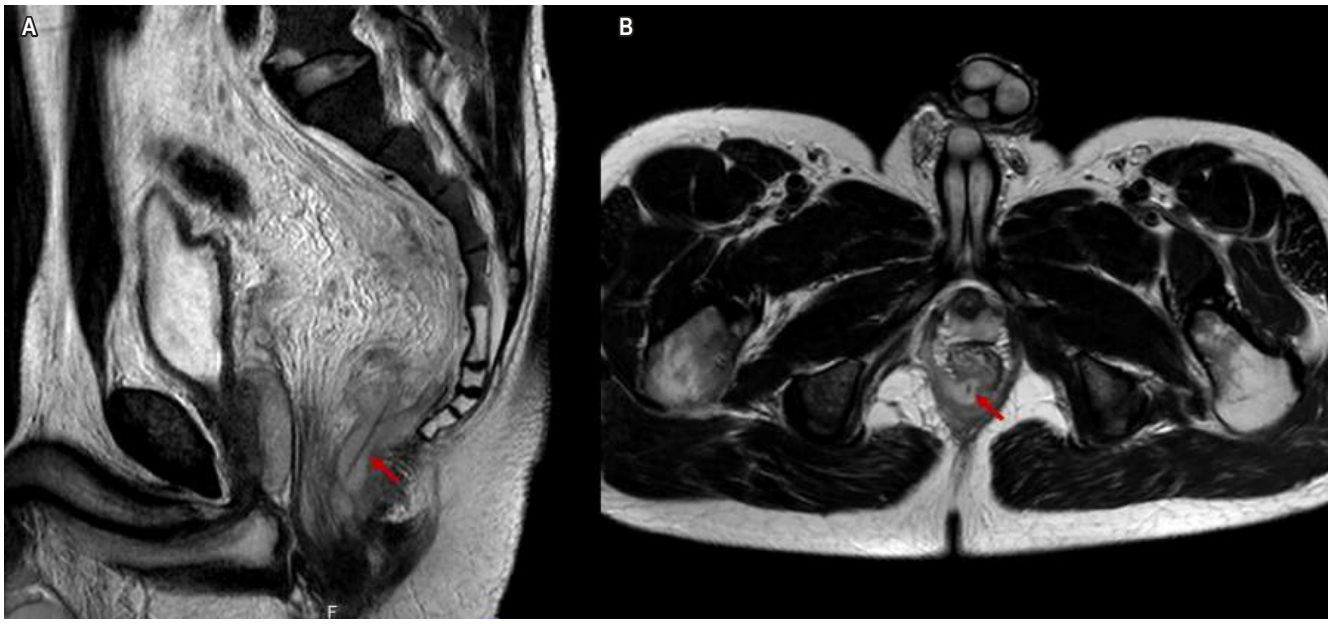


Figure 2. Toothpick (TP) evidenced on contrast-enhanced pelvic MRI. **A.** Sagittal T2-weighted image. **B.** Axial T2-weighted image. A hypointense linear image was identified, causing perforation of the internal anal sphincter at the 7 o'clock position and extending into the right ischiorectal fat. Images property of the authors.



Figure 3. Toothpick (TP) extracted during the surgical procedure. Image property of the authors.

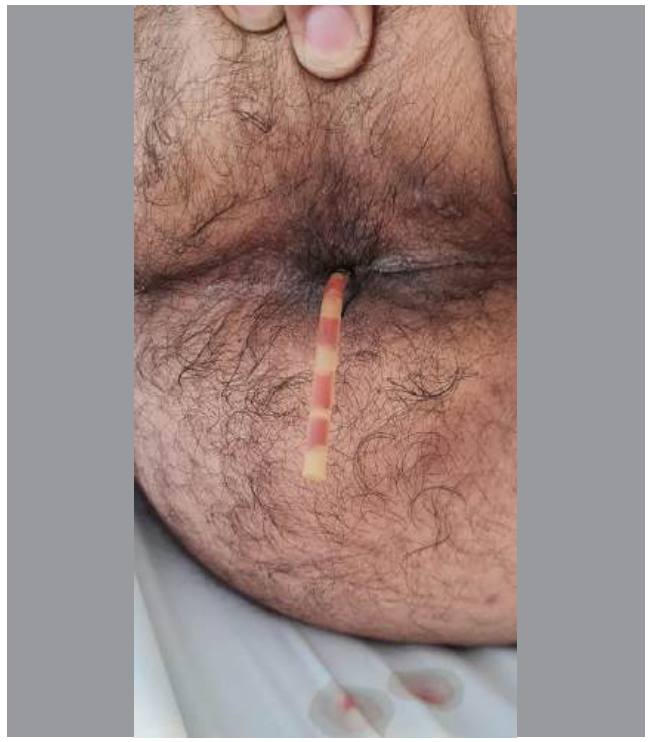


Figure 4. Postoperative abscess drainage with a transanal tube. Image property of the authors.

DISCUSSION

Ingested foreign bodies primarily lodge in the stomach without causing major complications; however, some patients may experience serious complications such as perforation, fistula, obstruction, or bleeding[6]. Toothpick ingestion is a rare event. One study compiling data from 1957 to 2012 reported 136 cases, of which 50% were inadvertent ingestions; the main symptom was abdominal pain (82%) followed by nausea (31%), and 70% had perforations. The most common location was the colon (37%) and the duodenum (23%), while the rectum was affected in only 7% (9 cases). More than half of the patients required surgical management, with a reported mortality rate of 9.6%[5]. Zhang et al. compiled cases from 2013 to 2022 and found 68 patients, identifying risk factors such as alcohol consumption, cognitive impairment, or even being hit while eating; most did not recall the moment of ingestion, and perforation occurred in 66.2%, mostly at the colorectal level. Sixty percent of the patients underwent surgical management, and only one patient died[4]. Complications in adjacent organs have been described in approximately 40% of cases, involving abdominal blood vessels, liver, abdominal muscles, kidneys, ureters, and mesentery[7].

In patients who report ingestion, abdominal pain—which occurs in 82% of them[5]—combined with the timing of ingestion are key points for determining the possible site of perforation, guided by imaging to look for signs of perforation (free gas, wall thickening, fat stranding, abscess, or signs of intestinal obstruction)[4], considering that a toothpick can remain in the abdomen for up to six months[8]. Available imaging modalities have variable performance; indeed, data show that 34% of cases are initially misdiagnosed[5]. The detection rate for toothpicks is 5.5% to 15% for radiography; 22% to 40% for ultrasound; 42.6% to 62.5% for computed tomography (CT); and 22.2% for magnetic resonance imaging (MRI)[4,5,9]. Therefore, CT is the imaging modality of choice for detecting this type of foreign body.

The initial MRI of our patient did not identify the foreign body, requiring a second review. Data exist showing that MRI is not recommended for detecting toothpicks, but if performed, the findings are a linear hypointensity on T1WI and T2WI. The most common local complication is an abscess, which demonstrates high signal intensity on T2WI with peripheral enhancement after contrast administration and diffusion restriction[10].

The patient developed an abscess above the levator ani muscle (supralevator). Involvement at this level is rare, with incidences ranging from 3% to 28% and a recurrence rate of up to 53%. Its importance lies in ensuring adequate drainage to avoid the risk of developing a supralevator fistula[11].

The approach for toothpick removal depends on its location, the presence of wall rupture, the type of abscess, and the involvement of adjacent organs. Endoscopic removal is initially preferred; however, if it traverses the wall, minimally invasive management via laparoscopy is preferred. Laparotomy is reserved for cases involving the small intestine, incomplete laparoscopic removal, or critically ill patients[4].

CONCLUSION

Foreign body ingestion is a common condition that usually resolves without complications, whereas anorectal involvement by a toothpick is rare. The initial approach with the highest diagnostic yield is CT and early drainage, especially in supralevator involvement, as it is a factor in preventing fistulous tracts.

Author Contributions

All authors contributed to the search, execution, writing, and production of the article.

REFERENCES

1. Thompson DT, Hrabe JE. Intra-abdominal and Anorectal Abscesses. Gastroenterol Clin North Am. 2021;50(2):475-88. https://doi.org/10.1016/j.gtc.2021.02.014
2. Gaertner WB, Burgess PL, Davids JS, Lightner AL, Shogan BD, Sun MY, et al. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Management of Anorectal Abscess, Fistula-in-Ano, and Rectovaginal Fistula. Dis Colon Rectum. 2022;65(8):964-85. https://doi.org/10.1097/DCR.0000000000002473
3. Ortiz H, Marzo M, de Miguel M, Ciga MA, Oteiza F, Armendariz P. Length of follow-up after fistulotomy and fistulectomy associated with endorectal advancement flap repair for fistula in ano. Br J Surg. 2008;95(4):484-7. https://doi.org/10.1002/bjs.6023
4. Zhang X, Xing M, Lei S, Li W, Li Z, Xie Y, et al. Case report and literature review: Orally ingested toothpick perforating the lower rectum. Front Surg. 2024;11:1368762. https://doi.org/10.3389/fsurg.2024.1368762
5. Steinbach C, Stockmann M, Jara M, Bednarsch J, Lock JF. Accidentally ingested toothpicks causing severe gastrointestinal injury: a practical guideline for diagnosis and therapy based on 136 case reports. World J Surg. 2014;38(2):371-7. https://doi.org/10.1007/s00268-013-2307-z

6. Wang X, Zhao J, Jiao Y, Wang X, Jiang D. Upper gastrointestinal foreign bodies in adults: A systematic review. Am J Emerg Med. 2021;50:136-41. https://doi.org/10.1016/j.ajem.2021.07.048
7. Yang Z, Wu D, Xiong D, Li Y. Gastrointestinal perforation secondary to accidental ingestion of toothpicks: A series case report. Medicine (Baltimore). 2017;96(50):e9066. https://doi.org/10.1097/MD.0000000000009066
8. Zakościelny A, Zgodziński W, Wallner G, Zinkiewicz K. Endoscopic removal of an impacted wooden toothpick in the wall of the sigmoid colon. Wideochir Inne Tech Maloinwazyjne. 2018;13(3):417-419. https://doi.org/10.5114/wiitm.2018.75863
9. Mark D, Ferris K, Martel G, Mulholland K. Radiological diagnosis of a small bowel perforation secondary to toothpick ingestion. BMJ Case Rep. 2013;2013:bcr2013009869. https://doi.org/10.1136/bcr-2013-009869
10. Xavier J, Stewart P. Laparoscopic removal of a toothpick perforating the upper rectum. ANZ J Surg. 2020;90(6):1184-6. https://doi.org/10.1111/ans.15489
11. Zinicola R, Cracco N, Rossi G, Giuffrida M, Giacometti M, Nicholls RJ. Acute supralevator abscess: the little we know. Ann R Coll Surg Engl. 2022;104(9):645-9. https://doi.org/10.1308/rcsann.2021.0257

https://doi.org/10.22516/25007440.1280

Case report

Cholestatic Acute Hepatitis as an Unusual Manifestation of Syphilis in an Immunocompetent Patient: A Case Report

Carlos Andrés Marín-Hoyos,[1] Karen Juliana Moreno,[2*] Jhonattan Fabian Morales-Giraldo,[3] Raúl Vallejo-Serna,[4] Diego Mauricio Gómez-Ramírez.[5]

OPEN ACCESS

Citation:
Marín-Hoyos CA, Moreno KJ, Morales-Giraldo JF, Vallejo-Serna R, Gómez-Ramírez DM. Cholestatic Acute Hepatitis as an Unusual Manifestation of Syphilis in an Immunocompetent Patient: A Case Report. Revista. colomb. Gastroenterol. 2025;40(3):377-379. https://doi.org/10.22516/25007440.1280

[1] Medical Student, Universidad Libre. Cali, Colombia.
[2] Resident Physician, Universidad del Valle. Cali, Colombia.
[3] Internal Medicine Physician, Universidad del Valle, Hospital Universitario del Valle. Cali, Colombia.
[4] Internal Medicine Physician, Universidad del Valle. Cali, Colombia.
[5] Gastroenterologist and Hepatologist, Clínica Farallones, Clínica Nuestra Cali, and Clínica Imbanaco. Cali, Colombia.

***Correspondence:** Karen Juliana Moreno.
karenjulianamorenosoto@gmail.com

Received: 29/08/2024
Accepted: 06/12/2024

Abstract

Acute hepatitis is among the most underdiagnosed clinical presentations of syphilis. Its incidence is higher in individuals living with human immunodeficiency virus (HIV) and less frequently reported in immunocompetent patients. Diagnosis should be suspected in the presence of risk factors and typical clinical manifestations of the infection. Timely treatment is crucial for disease control and the prevention of complications. We report the case of a young immunocompetent adult who developed cholestatic acute hepatitis as a manifestation of secondary syphilis.

Keywords

Hepatitis, syphilis.

INTRODUCTION

Hepatitis is a condition characterized by an inflammatory process that can be caused by infections, drug toxicity, autoimmune and metabolic diseases, and various genetic defects. The most common etiologies of acute hepatitis are alcohol and hepatotropic viruses; however, other, much less common infections, such as syphilis, can cause acute hepatitis due to their capacity for multi-organ involvement[1]. Syphilitic hepatitis is a rarely diagnosed entity with an incidence ranging from 0.25% to 3%[2,3]; however, it can reach up to 41% in patients coinfected with the human immunodeficiency virus (HIV)[4]. It is characterized by a cholestatic pattern with a predominant elevation of alkaline phosphatase and a mild increase in bilirubin and transaminases[5].

CASE PRESENTATION

A 23-year-old male patient presented to the emergency department with a one-month history of generalized, intermittent, colicky abdominal pain, associated with the appearance of a non-pruritic maculopapular rash on the upper limbs, thorax, and palmoplantar areas. His medical history revealed no relevant pathologies or previous transfusions; he denied the use of inhaled, injectable, or oral psychoactive substances; no use of hepatotoxic substances or travel

in the last three months was found; however, he reported risky sexual activity (unprotected sexual intercourse with more than two partners in the last year). Physical examination revealed a generalized maculopapular rash on the upper limbs, thorax, and palmoplantar areas, associated with conjunctival and mucocutaneous jaundice.

Diagnostic tests showed altered liver function tests, with the R factor demonstrating a predominant cholestatic pattern, along with aspartate aminotransferase (AST): 207 UI/L, alanine aminotransferase (ALT): 358 UI/L, γ-glutamyl transferase (GGT): 540 UI/L, alkaline phosphatase (ALP): 1328 UI/L, total bilirubin: 2.3 mg/dL and direct bilirubin: 2.06. The complete blood count, coagulation tests, and the rest of the basic biochemistry were normal. Imaging tests were ordered to rule out causes of biliary obstruction. An abdominal ultrasound showed mild hepatomegaly without other findings, and a magnetic resonance cholangiopancreatography corroborated the ultrasound findings, showing no evidence of intra- or extrahepatic bile duct dilation or stones, with lymph nodes near the porta hepatis at the retroperitoneal level. Serology for hepatotropic viruses (immunoglobulin M [IgM] antibodies for hepatitis A virus, surface antigen for hepatitis B, antibodies for hepatitis C, antibodies against the surface antigen of the hepatitis B virus) and other possible viral etiologies (IgM antibodies against cytomegalovirus, IgM against Epstein-Barr virus, and fourth-generation human immunodeficiency virus [HIV] enzyme-linked immunosorbent assay [ELISA]), an autoimmunity panel (antinuclear antibodies, antimitochondrial antibodies, and anti-smooth muscle antibodies), iron profile, and ceruloplasmin were all negative. Additionally, a rapid plasma reagin (RPR) test was reactive at 1:64 dilutions, and serum total antibodies for treponema (FTA-ABS) were positive.

The diagnosis of acute syphilitic hepatitis was made based on positive syphilitic serology and elevated liver enzymes, after ruling out other causes, including viral, autoimmune, deposition, toxic, or pharmacological etiologies. Treatment was initiated with benzathine penicillin G 2,400,000 units intramuscularly in a single dose, which led to subsequent normalization of liver function tests and a decrease in non-treponemal syphilis serology (RPR) titers at the three-month follow-up.

DISCUSSION

Acute hepatitis is one of the possible clinical manifestations of syphilis and can often be underdiagnosed and underreported[6]. It has been described more frequently in patients coinfected with HIV, and is less frequent and unusual in immunocompetent patients, like the one in our case[4,7]. It occurs more often in the early stages of infection and is detected mainly in the primary and secondary phases (88%), followed by the latent phase (7%) and the tertiary phase (6%)[7]. Its development occurs after the hematogenous dissemination of the spirochete, which allows it to reach different organs, including the liver, generating an inflammatory response in the hepatocytes and bile ducts[6-8]. In the secondary syphilis phase, the involvement is predominantly cholestatic and often coincides with fever, a typical palmoplantar rash, and even nephrotic syndrome[9,10].

Diagnostic criteria were proposed in 2004 and consist of altered liver enzymes, positive serological tests for *Treponema pallidum*, exclusion of other causes of liver disease, and normalization of liver enzymes after appropriate antibiotic treatment[8]. Relevant entities for the differential diagnosis of the cholestatic pattern include choledocholithiasis, malignant biliary duct obstruction, hepatotoxicity, primary biliary cholangitis, sclerosing cholangitis, infiltrative diseases, and infections that can lead to cholestasis. Liver biopsy is not essential for diagnosis, but if performed, the described histological findings include inflammatory infiltration of the bile duct, hepatic granulomas, periportal necrosis, and endotheliitis, which are non-pathognomonic findings, except for the detection of *T. pallidum* with dark-field microscopy in the liver parenchyma[11,12].

Although our case illustrates a typical presentation and clinical response, fulminant liver failure has been described[13]. The treatment for acute secondary syphilitic hepatitis is benzathine penicillin G 2,400,000 units intramuscularly in a single dose, and the outcome is excellent in most patients, who show improvement in clinical symptoms and liver biochemistry within weeks[14].

CONCLUSIONS

Syphilitic hepatitis is an underdiagnosed entity that can affect both immunocompromised and immunocompetent patients. It usually presents with mild and non-specific clinical manifestations, and altered liver profile and syphilis serology are key for diagnosis. Treatment with penicillin is effective and can prevent serious complications such as acute liver failure.

REFERENCES

1. Al Dallal HA, Narayanan S, Alley HF, Eiswerth MJ, Arnold FW, Martin BA, et al. Case Report: Syphilitic Hepatitis-A Rare and Underrecognized Etiology of Liver Disease With Potential for Misdiagnosis. Front Med (Lausanne). 2021;8:789250. https://doi.org/10.3389/fmed.2021.789250
2. Pizzarossa AC, Rebella M. Hepatitis in patients with syphilis: an overlooked association. BMJ Case Rep. 2019;12(1):bcr-2018-226918. https://doi.org/10.1136/bcr-2018-226918
3. Adachi E, Koibuchi T, Okame M, Sato H, Kikuchi T, Koga M, et al. Liver dysfunction in patients with early syphilis: a retrospective study. J Infect Chemother. 2013;19(1):180-2. https://doi.org/10.1007/s10156-012-0440-5
4. Salado-Rasmussen K, Wessman M, Cowan SA, Gerstoft J, Katzenstein TL. Syphilitic hepatitis and neurosyphilis: an observational study of Danish HIV-infected individuals during a 13-year period. Sex Transm Infect. 2019;95(6):416-418. https://doi.org/10.1136/sextrans-2018-053921
5. Ridruejo E, Mordoh A, Herrera F, Vizzotti G, Vila M, Marciano S, et al. Severe cholestatic hepatitis as the first symptom of secondary syphilis. Dig Dis Sci. 2004;49(9):1401-4. https://doi.org/10.1023/B:DDAS.0000042237.40205.c6
6. Pereira FG, Leal MS, Meireles D, Cavadas S. Syphilitic hepatitis; a rare manifestation of a common disease. Gastroenterol Hepatol Bed Bench. 2021;14(1):77-80.
7. Huang J, Lin S, Wan B, Zhu Y. A Systematic Literature Review of Syphilitic Hepatitis in Adults. J Clin Transl Hepatol. 2018;6(3):306-309. https://doi.org/10.14218/JCTH.2018.00003
8. Mullick CJ, Liappis AP, Benator DA, Roberts AD, Parenti DM. Syphilitic hepatitis in HIV-infected patients: a report of 7 cases and review of the literature. Clin Infect Dis. 2004;39(1):100-5. https://doi.org/10.1086/425501
9. Lee M, Wang C, Dorer R, Taylor D. A great masquerader: acute syphilitic hepatitis. Dig Dis Sci. 2013;58(4):923-5. https://doi.org/10.1007/s10620-012-2322-1
10. Ibáñez M, Varela M, Rodríguez-Peláez M, Gómez-Durán MS, Sánchez-Pobre P, Álvarez-Sala R. Luetic hepatitis. An emerging entity. Gastroenterol Hepatol. 2009;32(8):610-3. https://doi.org/10.1016/j.gastrohep.2009.05.001
11. Huang J, Lin S, Wan B, Wang C, Li J, Zhao D. A systematic literature review of syphilitic hepatitis in adults. J Clin Transl Hepatol. 2018;6(3):306-9. https://doi.org/10.1080/07853890.2023.2239828
12. Marcos P, Eliseu L, Henrique M, Fernandes I, Martins A. Syphilitic hepatitis: Case report of an overlooked condition. Clin Case Rep. 2019;8(1):123-6. https://doi.org/10.24875/PJDV.M22000032
13. Affonso da Costa AB, Fornazari B, da Silva FPM, Lima LV, Zubaran PE, Sperandio FF. Fulminant hepatitis in a patient with secondary syphilis. Int J STD AIDS. 2018;29(13):1348-50. https://doi.org/10.1177/0956462418785257
14. Ferreira-González L, Rubín de Celis EP, Sesma P. Neurosyphilis after treatment of syphilitic hepatitis in an immunocompetent patient. Enferm Infecc Microbiol Clin. 2012;30(5):274-5. https://doi.org/10.1016/j.eimc.2012.01.015

https://doi.org/10.22516/25007440.1285

Case report

Distal Esophageal Fibrovascular Polyp: A Case Presentation

Mariana Varela-Alzate,[1*] Luisa Fernanda Serna-Vanegas,[1] Laura María Velásquez-Castro,[1] Juan Camilo Rivas-Domínguez,[1] Manuela Ramírez-Hurtado,[1] Robin Germán Prieto-Ortiz.[2]

OPEN ACCESS

Citation:
Varela-Alzate M, Serna-Vanegas LF, Velásquez-Castro LM, Rivas-Domínguez JC, Ramírez-Hurtado M, Prieto-Ortiz RG. Distal Esophageal Fibrovascular Polyp: A Case Presentation. Revista. colomb. Gastroenterol. 2025;40(3):380-384.
https://doi.org/10.22516/25007440.1285

[1] Medical Student, Surgical Sciences Research Group, Universidad Tecnológica de Pereira. Pereira, Colombia.
[2] Physician, Specialist in General Surgery, Specialist in Gastroenterology and Digestive Endoscopy, Centro de Enfermedades Hepáticas y Digestivas (CEHYD). Bogotá, Colombia.

***Correspondence:** Mariana Varela-Alzate.
mariana.varela@utp.edu.co

Received: 18/09/2024
Accepted: 28/10/2024

Abstract

Introduction: Fibrovascular polyps are rare benign tumors of the esophageal submucosa, typically located in the proximal third. They can reach significant sizes and produce a variety of symptoms, including dysphagia and weight loss. These lesions account for less than 2% of all benign esophageal tumors. **Clinical Case:** We report the case of a 54-year-old male who presented with progressive dysphagia and weight loss. Upper gastrointestinal endoscopy revealed a polyp at 38 cm from the dental arch. Endoscopic ultrasound confirmed a 25-mm fibrovascular polyp in the distal third of the esophagus. The patient underwent successful endoscopic polypectomy using a hot snare technique. **Conclusions:** This case highlights an atypical presentation of a fibrovascular polyp in the distal esophagus, contrasting with its usual proximal location. Successful management through endoscopic polypectomy demonstrates the efficacy of this approach for moderately sized polyps in this location. This report underscores the importance of considering fibrovascular polyps in the differential diagnosis of dysphagia, even when located distally, and contributes to the clinical knowledge regarding their diagnosis and management.

Keywords

Esophagus, polyps, dysphagia, endoscopic mucosal resection, histology.

INTRODUCTION

Fibrovascular polyps are benign submucosal and intraluminal tumors composed of fibrous tissue, adipocytes, and vascular structures, and are covered by normal squamous epithelium. They are extremely rare tumors, accounting for less than 2% of all benign esophageal tumors, and their most common symptoms include dysphagia, weight loss, odynophagia, gastrointestinal bleeding, and respiratory symptoms. They are most frequently located in the proximal third of the esophagus, are usually slow-growing, and are characterized by reaching large dimensions: polyps up to 25 cm in length have been described in the literature[(1)].

We present the case of a patient with a large fibrovascular polyp located in the distal third of the esophagus.

CASE REPORT

A 54-year-old male patient presented to the outpatient clinic with symptoms of progressive dysphagia and weight loss. He denied a history of gastroesophageal reflux, hematemesis, or melena, a family history of neoplasms, or other relevant pathologies. The physical examination revealed no abnormalities, with documented absence of lymphadenopathy and positive abdominal findings. Given the diagnosis of dysphagia, an upper gastrointestinal endoscopy was

© 2025 Asociación Colombiana de Gastroenterología

requested, which revealed a polyp at 38 centimeters from the dental arches (**Figure 1**).

A thoracoabdominal computed tomography (CT) scan was requested (**Figure 2**), which ruled out probable neoplastic pathology or lesions suggestive of metastasis. Consequently, an esophagogram was ordered, which reported a 25 mm esophageal polyp in the distal esophagus, with normal esophageal transit, no evidence of stenosis, dysmotility, or other significant alterations (**Figure 3**).

Given the endoscopic finding, an endoscopic ultrasonography was performed, which reported findings consistent with a fibrovascular polyp of the same size. No other masses or lymphadenopathy were observed in the upper digestive tract. The patient underwent endoscopic polypectomy with a hot snare, and the diagnosis was confirmed histologically; the outcome was adequate, with no recurrence of the mass.

DISCUSSION

Fibrovascular polyps are rare submucosal tumors that originate predominantly in the cervical part of the esophagus at the pharyngoesophageal junction. Although their true incidence is unknown, they are estimated to account for less than 2% of benign esophageal tumors[2]. They are observed more frequently in middle-aged and elderly men[3]. Due to an initial lack of symptoms, they can reach a considerable size, with the largest reported size being 25 cm[4].

Fibrovascular polyps are often completely asymptomatic and only become clinically significant when they have rea-

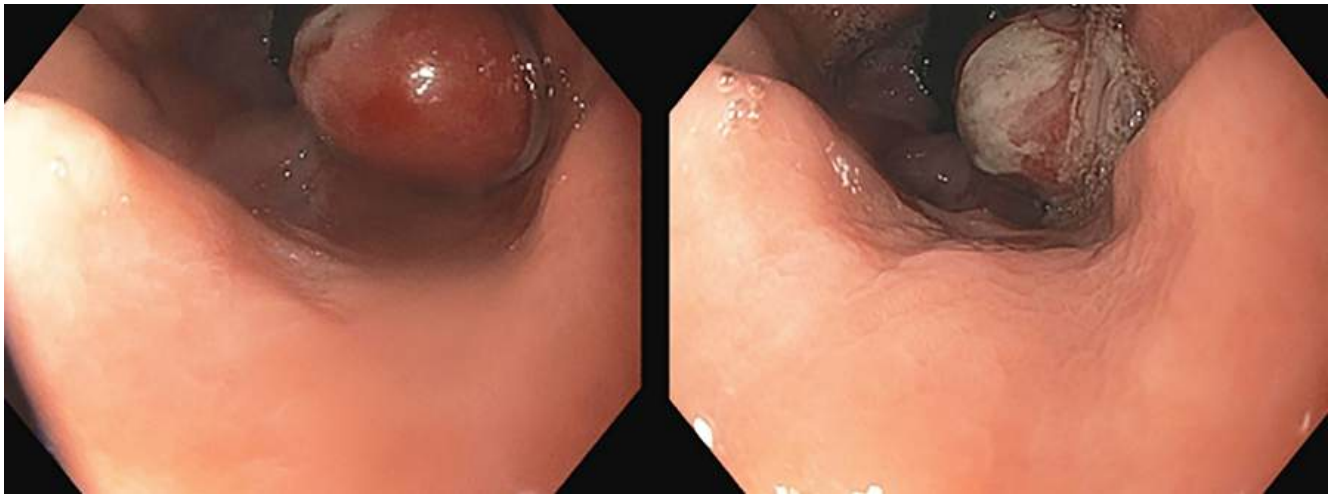


Figure 1. Polyp located 38 cm from the dental arches, adjacent to the Z-line. Images property of the authors.

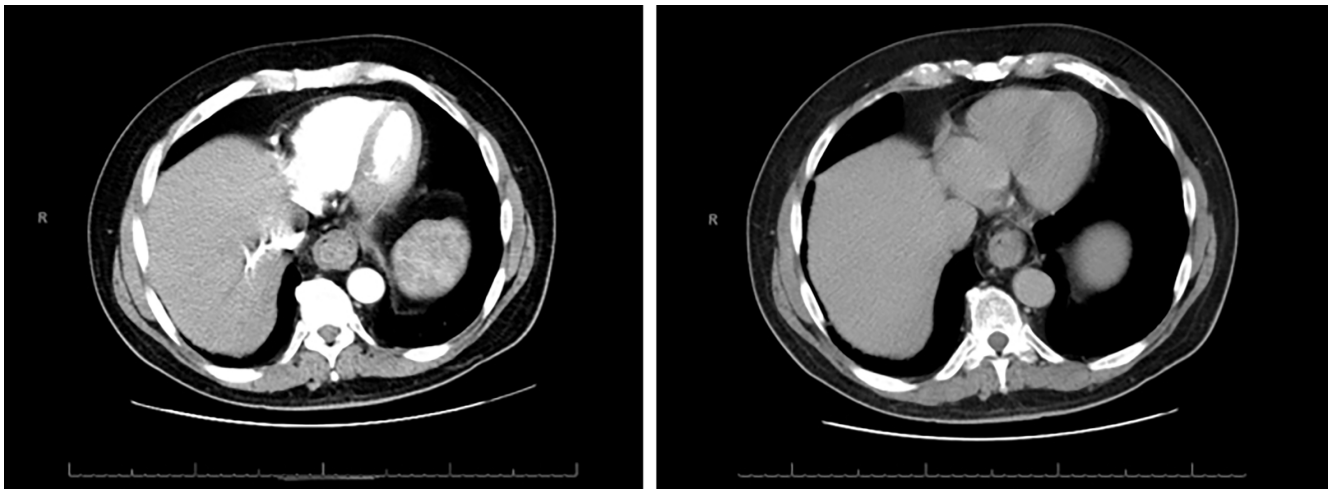


Figure 2. Computed tomography scan describing the esophageal lesion as a polyp and ruling out lesions suggestive of metastasis. Images property of the authors.

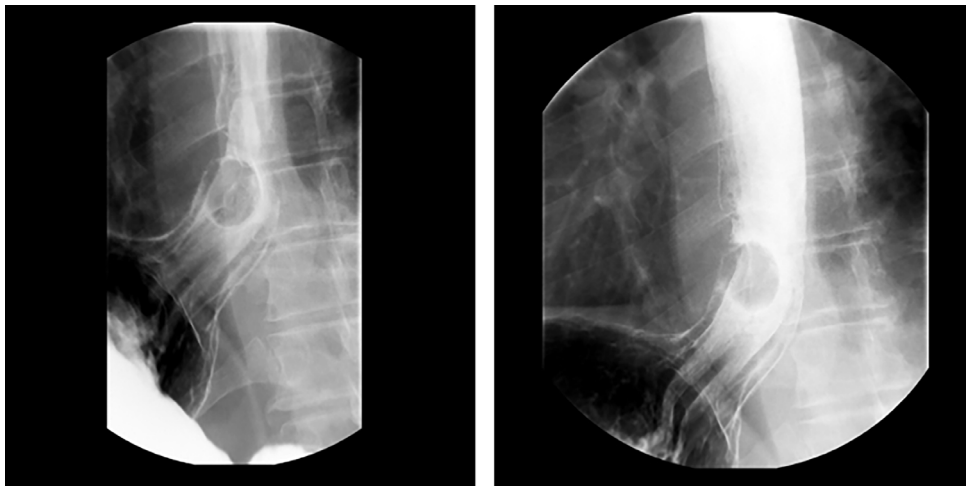


Figure 3. The polyp is observed in the distal third of the esophagus. Images property of the authors.

ched a considerable size; 62% of patients may present with dysphagia, 38% with regurgitation of the mass, and 25% with a persistent lump sensation in the throat[5]. Other less frequent symptoms include retrosternal discomfort, odynophagia, dyspnea, cough, and weight loss. It is important to mention that serious complications have been reported, such as gastrointestinal bleeding from ulceration of the polyp and even death from asphyxiation[6,7]. The presence of dysphagia and weight loss in the presented patient is consistent with the typical clinical presentation of a fibrovascular polyp described in the literature, despite the absence of other common symptoms.

The diagnosis of an esophageal fibrovascular polyp is a complex process that requires a combination of techniques and a multidisciplinary approach, as these polyps can be confused with other conditions, such as achalasia or mediastinal tumors causing extrinsic esophageal compression, underscoring the importance of an accurate diagnosis[8].

The diagnostic process should begin with a detailed medical history and a thorough physical examination. These initial steps are crucial for identifying the aforementioned characteristic symptoms, which may point towards the presence of an esophageal polyp. More specific studies should then be performed, with the barium swallow or esophagogram being the diagnostic technique of choice[9]. This test typically reveals an intraluminal filling defect in the cervical esophagus, which may extend distally. The characteristic image is that of a "sausage-shaped" mass originating in the upper esophagus and potentially reaching the lower esophagus.

Upper gastrointestinal endoscopy plays a fundamental role in diagnosis, allowing visualization of a mobile intraluminal mass covered by normal mucosa, and a careful examination of the upper esophageal sphincter may reveal the stalk of the mass. This technique allows for biopsy sampling, identification of ulcerated areas, and, in some cases, polyp resection. However, endoscopic diagnosis can be challenging because the squamous epithelium covering the polyp may be indistinguishable from the normal esophageal mucosa[10].

Endoscopic ultrasound complements conventional endoscopy by providing valuable information about the internal structure of the polyp. This technique is especially useful for delineating the polyp's stalk, assessing its histological composition and vascularization, and reporting on possible tumor infiltration and the presence of lymphadenopathy. Endoscopic ultrasound also allows determination of the submucosal origin of the polyp, which is crucial for the differential diagnosis, as was performed in our patient[11].

CT and magnetic resonance imaging (MRI) are valuable complementary tools in the diagnostic process. These advanced imaging techniques provide detailed information about the extent and composition of the polyp. Neck and chest MRI, in particular, can be decisive for treatment planning, as it accurately demonstrates the origin of the stalk and the composition of the polyp[11]. Furthermore, these techniques are useful for ruling out the possibility of mediastinal involvement and for preoperative evaluation.

It is important to note that endoscopic biopsies may be inconclusive due to the submucosal nature of the lesion. Therefore, the definitive diagnosis is established by histopathological examination of the resected specimen. This analysis reveals the presence of fibrovascular tissue covered by normal squamous epithelium, confirming the benign nature of the polyp[11], as occurred in our patient.

The treatment for fibrovascular polyps is surgical or endoscopic resection, depending fundamentally on the site

of stalk insertion, the size of the lesion, its mobility, and the number of feeding vessels. Those with predominant fatty composition are good candidates for endoscopic resection, whereas if they are highly vascularized, the risk of bleeding increases, and surgical excision may be preferable, since hemostasis is achieved more safely with open surgical techniques[12]. Surgical resection is preferred due to the potential risk of respiratory compromise and hemorrhage, in addition to serving to exclude cancer and avoid the small risk of malignant degeneration[13].

For polyps larger than 8 cm in length or those with a thick stalk, rich vascularization, and originating in the upper third of the esophagus, surgical resection via cervical esophagotomy is preferred as the primary intervention. Total esophagectomy is reserved for more severe cases. Thoracotomy is considered for more caudal or larger lesions. Generally, polyps less than 2 cm in diameter with thin stalks can be removed by endoscopic ligation of the stalk and electrocautery, as was performed in the patient in this case report[13,14].

The procedure allowed for complete excision of the esophageal fibrovascular polyp. Following the intervention, the patient showed a favorable recovery. During postoperative follow-up, no recurrence of the tumor mass was detected, and the patient did not present complications such as bleeding, perforation, or surgical site infection.

CONCLUSIONS

Fibrovascular polyps are an unusual pathology that should be considered as a differential diagnosis in adult patients presenting with dysphagia. Diagnosis is made by upper gastrointestinal endoscopy and confirmed histologically. Complementary examinations such as computed tomography and endoscopic ultrasonography should be performed. Endoscopic resection is the best therapeutic option.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

The authors express their sincere gratitude to the Surgical Sciences Research Group of Universidad Tecnológica de Pereira for their contribution to the preparation of this case report.

REFERENCES

1. Drenth J, Wobbes T, Bonenkamp JJ, Nagengast FM. Recurrent esophageal fibrovascular polyps: case history and review of the literature. Dig Dis Sci. 2002;47(11):2598-604. https://doi.org/10.1023/A:1020592900552
2. Borges A, Bikhazi H, Wensel JP. Giant fibrovascular polyp of the oropharynx. AJNR Am J Neuroradiol. 1999;20(10):1979-82.
3. Fries MR, Galindo RL, Flint PW, Abraham SC. Giant fibrovascular polyp of the esophagus. A lesion causing upper airway obstruction and syncope. Arch Pathol Lab Med. 2003;127(4):485-7. https://doi.org/10.5858/2003-127-0485-GFPOTE
4. Blacha MM, Sloots CE, Van Munster IP, Wobbes T. Dysphagia caused by a fibrovascular polyp: a case report. Cases J. 2008;1(1):334. https://doi.org/10.1186/1757-1626-1-334
5. Caceres M, Steeb G, Wilks SM, Garrett HE Jr. Large pedunculated polyps originating in the esophagus and hypopharynx. Ann Thorac Surg. 2006;81(1):393-6. https://doi.org/10.1016/j.athoracsur.2005.05.106
6. Ramalho LN, Martin CC, Zerbini T. Sudden death caused by fibrovascular esophageal polyp: case report and study review. Am J Forensic Med Pathol. 2010;31(1):103-5. https://doi.org/10.1097/PAF.0b013e3181c6bec2
7. Lee SY, Chan WH, Sivanandan R, Lim DT, Wong WK. Recurrent giant fibrovascular polyp of the esophagus. World J Gastroenterol. 2009;15(29):3697-700. https://doi.org/10.3748/wjg.15.3697
8. Weiand G, Knipping L, Mangold G. Der fibrovasculäre Oesophaguspolyp--Diagnostik und Therapie [Fibrovascular esophageal polyp--diagnosis and therapy]. Chirurg. 2001;72(7):847-52. https://doi.org/10.1007/s001040170116
9. Ozcelik C, Onat S, Dursun M, Arslan A. Fibrovascular polyp of the esophagus: diagnostic dilemma. Interact Cardiovasc Thorac Surg. 2004;3(2):260-2. https://doi.org/10.1016/j.icvts.2003.11.013
10. Palacios F, Contardo C, Guevara J, Verá A, Aguilar L, Huamán M, et al. Pólipo fibrovascular gigante de esófago. Rev Gastroenterol. Perú. 2003;23(3):213-216. https://doi.org/10.47892/rgp.2003.233.783
11. Ćuk V, Knežević-Ušaj S, Ignjatović M, Kostić Z, Tarabar D, Kovačević B, et al. Giant esophageal fibrovascular polyp with clinical behaviour of inflammatory pseudotumor: a case report and the literature review. Vojnosanit Pregl 2014;71:784-91. https://doi.org/10.2298/VSP130219058C
12. Benedicto-Hernández E, Serrano-Puche F, Martos-Fornieles JA, López-Espejo J, González-Almendros I. Pólipo fibrovascular esofágico. Rev Argent Radiol. 2024;88(2):85-88. https://doi.org/10.24875/RAR.22000096

13. Madeira FP, Justo JW, Wietzycoski CR, Burttet LM, Kruel CD, da Rosa AP. Giant fibrovascular polyp of the esophagus: a diagnostic challenge. Arq Bras Cir Dig. 2013;26(1):71-3. https://doi.org/10.1590/S0102-67202013000100017

14. Chourmouzi D, Drevelegas A. Giant fibrovascular polyp of the oesophagus: a case report and review of the literature. J Med Case Rep. 2008;2:337. https://doi.org/10.1186/1752-1947-2-337