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Editorial

Choledocholithiasis and pancreatitis: the difficulties of clinical prediction

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In clinical practice, we have often faced diagnostic uncertainty and the difficulties of indicating (or not) a procedure such as an endoscopic retrograde cholangiopancreatography (ERCP), with its possible complications, in the context of choledocholithiasis.

Amid an unpredictable panorama and knowing that 50% of pancreatitis cases have a biliary origin by choledocholithiasis (1), this new issue of the Revista Colombiana de Gastroenterología aims to explore the possibility of the diagnostic prediction of choledocholithiasis, as reported by Gastelbondo, Toro-Calle, Yurgaky *et al.* However, it also bets on comparing, assessing, and estimating the risk and prognosis scores in relation to the morbidity and mortality in pancreatitis, which is reported by Rodríguez-Varón *et al*.

Choledocholithiasis is a clinical condition that is difficult to diagnose, in which procedural algorithms are required to achieve precision without causing major complications during their performance (2,3). The experience of validating these models has been challenging; in fact, multiple experiences show results that in the end are unsatisfactory (4). The challenge, then, is to find a predictive statistical model that supports adequate clinical decision.

Since there is no universal model of clinical prediction for any disease, it is important to develop separate specific models that can individually assess the role that ethnicity, nationality, sex, or age play in relation to the risk of developing a pathology (5). A large sample size is required, as well as two sets of data: one for the development of the model and another for its validation. Predictive performance will be achieved through multiple validations (5).

Therefore, variables should be managed to obtain the predictors by analyzing multiple regression analyses or logistic regression analyses that reach significant differences. This will allow identifying the set of variables that may predict the outcome (3).

The predictive power of the proposed model should also be evaluated, using an independent —preferably external— data set, whenever available. There are several performance measures, but the two key components are calibration and discrimination (5).

Authors, editors and readers should familiarize with some tools that allow assessing the quality of the works that include the development, validation or updates of clinical prediction models. In fact, there is an independent initiative of statistical experts, epidemiologists, and methodologists, who make up the TRIPOD group (*Transparent Reporting of a multivariable prediction model for Individual Prognosis or Diagnosis*). Said group has issued a consensus and a checklist for the appropriate assessment of the quality of these studies (6).

The study by Gastelbondo *et al.* proposes to compare the predictive criteria of choledocholithiasis developed by the American Society for Gastrointestinal Endoscopy (ASGE) (7) with the parameters of the British Society of Gastroenterology (BSG) (8). This was done using a convenience sample given the intention of comparing these diagnostic tests. This way, choledocholithiasis was confirmed by ERCP or magnetic resonance cholangiography (MRC). Yet, the non-use of endoscopic ultrasound excludes a valid current diagnostic alternative, with pre- and post-test accuracy and probabilities comparable to MRC (9); ERCP was the gold standard. It was found that, in the group of patients with high probability, sensitivity for the BSG and ASGE guidelines was 65 % and 74 %, specificity was 33 % and 28 %, and accuracy was 39 % and 67 %, respectively. On the other hand, in the group of patients with intermediate probability, sensitivity for the BSG and ASGE guidelines was 34% and 35 %, specificity was 66 % and 71 %, and accuracy was 60 % and 32 %, respectively. In turn, Toro-Calle reported an equally modest performance in the same group of patients based on ASGE criteria.

The findings of modest diagnostic predictive performances found in the study by Gastelbondo et al. according to the ASGE (7) and BSG (8) criteria, the difficulties in risk stratification reported by Toro-Calle using the ASGE model, the proposal of an additional variable to predict the risk of choledocholithiasis based on Yurgaky's cases and controls study, and the low concordance among different scales to estimate the risk of morbidity and mortality in patients with pancreatitis are only the reflection of the complexities of clinical prediction. They are inherent to the encounter with biology (which is probabilistic), to information —which is always incomplete—, to biases, and to internal validity in our own works. These difficulties are also inherent to the need for continuous improvement and updating of the models used.

Since the times of Nostradamus —who was a physician but also an astrologist—, prediction has oscillated between the esoteric world and science. Therefore, in order to approach clinical prediction models with scientific rigor in the near future, the development of strategies supported by machine learning is urgently required.

This approach will allow incorporating variables and predictive results or eliminating the variables that do not perform well. Furthermore, the enormous availability of data (big data) contributes to having greater degrees of certainty in the predictability of the models, to improve the stratification of risk, to guarantee the required care routes, and to optimize results (8).

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