

Macroscopic characteristics of the duodenal papilla in patients undergoing ERCP and its relationship with the degree of difficulty in cannulation

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ABSTRACT: The effective and safe cannulation of the bile duct during Endoscopic Retrograde Cholangiography (ERCP) continues to be a debate, there are technical factors and factors associated with the patient that have been previously investigated, however there is no evidence on the effect that the major duodenal papilla may have on cannulation.

KEYWORDS: ERCP, Cannulation, Duodenal papilla.

Introduction

Although more than 500,000 endoscopic retrograde cholangiopancreatographies are performed in the United States each year, there are 6 basic components for successful cannulation described by Hawes¹ in 2017, as follows:

1. Taking the time to study the conformation of the papilla.
2. Take the time to position the duodenoscope before touching the papilla.
3. Start the cannulation perpendicular to the ampulla orifice.
4. Obtain a "hint" of the papilla.
5. Guidance technique promoting a limited injection of contrast material (or both) as the first approach to deep cannulation.
6. Decrease contact with the papilla so that trauma to the papilla is avoided.

It is currently known that a majority of endoscopies performing ERCP recognize obvious differences in the macroscopic appearance of the major duodenal papilla, which has led to a widespread conception among endoscopists that certain characteristics in the major duodenal papilla predispose to more difficult cannulation and therefore condition the patient to a greater likelihood of adverse effects such as bleeding, perforation and pancreatitis.²

According to Haraldsson it is necessary to determine the association between the macroscopic appearance of the major duodenal papilla and the difficulties in its cannulation, and the following requirements should be present.³

1. There must be a clear definition of what is considered a difficult cannulation in order to make it reproducible and relevant.

Due to the above, in 2016 the European Endoscopic Association (ESGE) widely recommended the use of the definition proposed by the Scandinavian Association of Endoscopy. This definition clearly shows an increase in adverse effects when any of the following criteria are present; more than 5 minutes, 5 attempts or the passage of the guide twice to the pancreas.

2. In order to be sure of the results of different endoscopists was necessary to create a classification.^{2,3} (Figure 1).

Methods

We made the selection of patients that deserved ERCP all with native duodenal papilla being classified from 1 to 4 prior to their cannulation and according to their macroscopic characteristics.

Results

The assessment of a single endoscopist in 82 patients to perform ERCP was performed, having an intraobserver agreement of 100% to identify and

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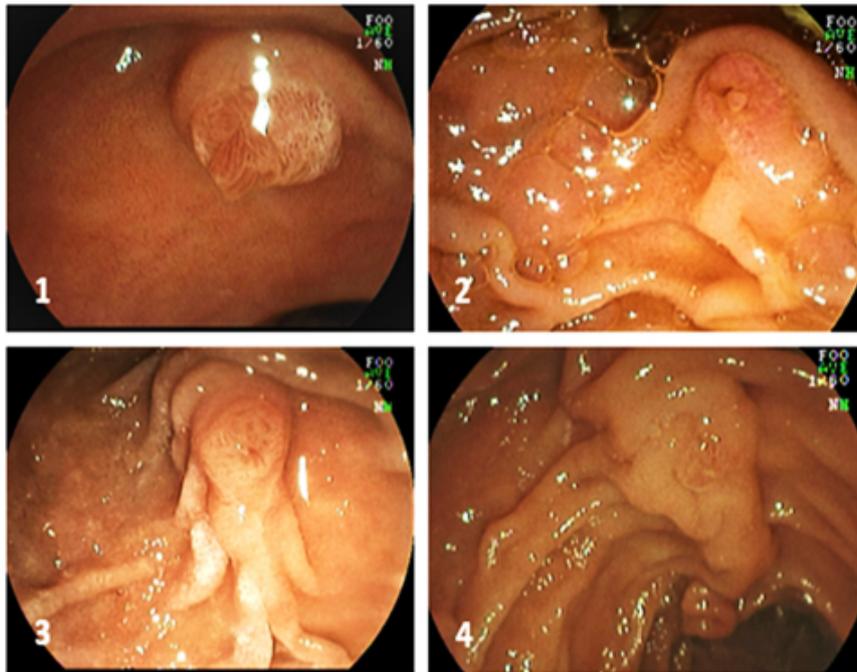


Figure 1. Classification of the endoscopic appearance of the papilla of Vater. **Type 1** “Regular papilla”, most common type with no distinctive features, “classic appearance”, **Type 2** “small papilla”, small, often flat with a diameter not bigger than 3 mm. **Type 3** “protruding or pendulous papilla”, papilla that is protruding or bulging into the duodenal lumen, sometimes hanging down, pendulous with the orifice oriented caudally. **Type 4** “creased or ridged papilla”, the ductal mucosa seems to extend distally out of the orifice either on a ridge or a crease.

classify each papilla according to the table mentioned by Haraldsson previously in form and possibility of cannulation of the same. The classification of the papilla was done during the first 2 minutes of the procedure and being reported in each paper after the ERCP. The average age of the operated patients was 50 years old being 70% female and 30% male with an average BMI of 28 kg/m² regardless of sex. The most frequent pathology found was choledocholithiasis in 43% and the least, pancreatic carcinomas resolved by the application of a single plastic biliary prosthesis. It is necessary to emphasize that many of them and in spite of the alterations of samples of hepatic synthesis by laboratory and indications of very strong criteria, showed in the cholangiography after cannulation biliary ways without filling defects, occupying 34%. The most frequent ASGE criteria to perform ERCP and to consider it therapeutic,⁴ were very strong in 56% of the indications occupying total bilirubin's higher than 4 mg/dl, choledocholithiasis observed by ultrasonography and to a lesser extent ascending cholangitis. Only 4 events could not be cannulated in spite of the preliminary cut measures, the most common of them being a dorsal cut and one with a double guide technique without success. These were excluded from this study. The most common type of papilla was type three, in 28 patients occupying 34% of the sample, managing to cannulate the three attempts on average, which as mentioned in the world

literature contributes to complex searches found in this review, that up to 40% of them required up to 5 attempts, entering the classification of difficult cannulation according to ASGE criteria. The next most frequent type of papilla was type 1, in 23 patients. Likewise, cannulation was performed at the first episode. The type 2, with a frequency of 23% with an average of three attempts to achieve its cannulation, papilla type 4, the least frequent, observed almost immediate cannulation in 63.6% of them. The average time of cannulation was 6 minutes and 39 seconds, and the type of papilla that occupied more attempts was the type 2 with up to 7 attempts, and the type 3 as the most difficult was to cannulate in frequency with up to 5 attempts in 40% of them. In 100% of the cases of the use of guiding technique for cannulation of the bile duct, when noting difficulty of cannulation, the technique of approach for difficult cannulation was preliminary cut in the papillary dorsum in up to 23% of the cases followed by pancreatic sphincterotomy in 6%, and double guiding in 1%. As for the complications found Anderson et al.⁵ pancreatitis was observed up to 11%, and of this more frequent in papilla type 1, registering 5 cases. In only three cases there were severe complications, one of them severe cholangitis with septic shock resolved by medical management, another case hemorrhagic shock due to ample bleeding, after wide sphincterotomy of 2 cm in case of choledocoele with replacement of blood

products and discharge at 72 hours. And finally a duodenal perforation of free wall Stapfer 1, resolved by surgical management. Of the non-cannulated events that were 4, most occurred in type 4 papillae in up to 50% of the events. Without being significant between type of papilla.

Discussion

The first impression of the endoscopist who performs therapeutics towards the duodenal papilla is the basis for the development of the procedure, since if the bile duct is not cannulated, it will be difficult to generate an advance unless other elements of access to the bile duct are found.

Five years ago, Haraldsson's Scandinavian digestive endoscopy team ventured to ask the question, if the duodenal papilla and its external morphology contribute to its cannulation? And much more importantly, to consider it necessary that every endoscopist who does therapeutics should be prepared to think of a more complex plan of not achieving it. As has been described in a few reviews on this topic and no system of international validation has been established, most of the elements are based on expert experience.³ One strength about this evaluation is the possibility that it has been extended by a single endoscopist, without observing variability of expertise, or inter-observer variation. It was possible to evaluate the capacity for complications, in which papillae showed the greatest number of pancreatitis, and which type of papilla could be established as the most frequent specifically in the Mexican population, requiring more events to generate a large sample, but leaving a basis for the study of this question. The "participation of the resident in training" did not intervene, forcing the endoscopist to perform 100% of the procedure, avoiding the generation of statistical errors. The weakness is integrated in 3 important points,⁶ the low number of patients, the endoscopist with 350 procedures, and the absence of an international definition of each papilla and its possible needs of angulation and technique. The first one with a great variation in racial characteristics in spite of being a Mexican population, the anatomical alterations between men and women, and of course the pathology.^{2,8} The doctor who performed the procedures considered himself moderately experienced that perhaps he intervenes in the amount of pancreatitis of up to 10% that the American guidelines consider a strict factor for that pathology after the procedure, being very high this percentage in spite of the

measures of prevention of the same one. And finally, the lack of definition of each papilla and its needs requires more bibliographic support to support the ideal technique and to classify each ampullar morphology.

Just as at international level type 2 and type 3 papilla have been mentioned as the most complex to cannulate,³ the present one identified type 3 as the most complex requiring up to 7 attempts and more time for its entry, and type 1 as the most complicated with pancreatitis; this probably because it is considered the most frequent in the studied population. Perhaps one of the most common situations was the referral of patients even with strong criteria with greater possibility of complications since cannulation is ultimately considered a trauma to the duodenal papilla.

A new classification to deal with any clinical scenario must compromise utility and precision in order to be efficient; with this work we try to support the application of endoscopic imaging in the mental abstraction of the endoscopist and later generate a multicenter and older population work that solidifies and makes the right decision in endoscopic retrograde cholangiopancreatography.

Conclusion

Cannulation of the main bile duct is the base event for endoscopic retrograde cholangiopancreatography. Multiple elements come into play when the experienced or inexperienced endoscopist must deal with a different type of papilla and the underlying disease may be as diverse as the patient himself.

The present study has demonstrated that the endoscopic appearance of the papilla in Mexican population as well as in European population affects the cannulation of the bile duct, in contrast with European studies which showed the final result of greater difficulty in those patients who present duodenal papilla type 2 or 3, in Mexico we found a greater difficulty to cannulate those that were catalogued as type 1 and type 2 having an average of 0.6 and 2.4 attempts respectively.

The importance of this division lies in the fact that, for the endoscopist with little experience and for the experienced, safety guidelines must be taken into account in the procedure, which continues to be the jewel in the crown of digestive endoscopy. The possibility of complications increases according to the

intentions of cannulation if this is not achieved immediately

Conflicts of interest

The authors declare no conflicts of interests.

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