The small intestine: no longer "the black box" of the digestive tract

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Up until the end of the 20th century the small intestine was considered to be the "black box" for gastroenterologists. This was due to the impossibility of complete endoscopic visualization by non-surgical means. Its length and anatomically indeterminate position permits elongation of the small intestine by as much as 300%, resulting in the formation of loops. Initial endoscopic studies such as Push Enteroscopy only allowed limited assessments of on average about 90cm of the small intestine (1). The enteroscopy probe was a long, complex and annoying procedure for patients and presented a 3% of perforation risk (2, 3), as a result its use was abandoned. Intraoperative enteroscopy was long considered to be the gold standard for studying the small intestine. However, it is an invasive procedure with high risks since it requires general anesthesia and is a surgical procedure (4, 5). Radiological methods for evaluating the small intestine have been characterized by their low sensitivity and specificity, especially for obscure or hidden gastrointestinal bleeding (6, 7) usually caused by small vascular lesions.

In the 21st Century several techniques have revolutionized study of the small intestine. They include: video capsule endoscopy, double-balloon enteroscopy (9), single-balloon enteroscopy (10), and recently spiral enteroscopy (11). These new technologies have resulted in a huge advance in therapeutic and diagnostic efficacy for diseases of the small intestine.

Studies by Doctors Ospina and Villamizar show the experience in small intestine assessment in a Colombian hospital with single-balloon enteroscopy (12). Even though the number of patients studied is small, the results are important contributions to the knowledge of small intestine pathologies in our population. First of all, 93% of the patients had the presence of a obscure gastrointestinal hemorrhage as an exam indicator (27 patients). In 21 of these cases (72%) the indication was urgent clinically manifested dark bleeding. These data are similar to the ones published in the literature (13, 14). Diagnostic performance for hidden hemorrhages was about 80%. This result agrees with those in European and Asian publications where they have found a diagnostic efficacy of 70-80% with double-balloon enteroscopy (14, 15). It should be noted that the study managed to achieve a complete visualization of the enteric mucosae in two patients using an approach combining single balloon enteroscopy combined with previous tattoo with sterile Indian ink. This confirms that single-balloon enteroscopies can also make a complete small intestine assessment. Even so, it has been shown that a full assessment is more likely with a double-balloon enteroscopy (18). It is probable that the high diagnostic performance found in this study is due to the fact that most of the patients had clinically active bleeding, mentioned by the authors as urgent cases of occult bleeding.

Detection of anomalies with double-balloon enteroscopy in patients with suspected small intestine bleeding has been demonstrated to have a higher probability of success if the hemorrhaging is frequent and/or prolonged (16). This can also be related to transfusion requirements. Similar results in Latin America have shown occult gastrointestinal bleeding as the principal indicator for single-balloon enteroscopy in 52% of the cases with a diagnostic performance of 76% (17).

In Colombia we use both single-balloon and double balloon enteroscopies. Up until now most published studies have been undertaken with double balloon enteroscopy since this technique was developed in 2001 and single-balloon enteroscopy was only developed until 2007. Both procedures have demonstrated diagnostic and therapeutic capacity in small intestine pathology. Both technologies have been compared recently in terms of examination time, diagnostic performance and the possibility of achieving complete intestinal visualization. Different study groups have reported very different results. In a study of 117 patients, a German group led by Dr Andrea May found that achieving total enteroscopy was three times more likely with double balloon than with single-balloon enteroscopy. They also achieved better diagnostic performance with the use of double balloon enteroscopy. Even when the preparation time with the single balloon was significantly lower than with the double balloon, there were no differences in the lengths of exams. They concluded that double balloon enteroscopy remains as the gold standard for exams small intestine endoscopies (18). On the other hand, a Latin American study of 83 patients found that there was a bigger impact with single balloon enteroscopy, in terms of diagnosis and treatment of occult gastrointestinal bleeding, than with double balloon enteroscopy (19). In contrast to these two studies a Japanese group concluded that there were no significant differences in diagnostic efficacy between double balloon enteroscopy and single balloon enteroscopy. Both procedures are very useful for studying occult gastrointestinal hemorrhaging with high diagnostic performance (20).

Studies with capsule endoscopy have not only generated more diagnostic and therapeutic possibilities for occult gastrointestinal bleeding but have also produced important cost reductions. In the past, before capsule endoscopy and double-balloon enteroscopies, the time it took to establish the etiology of a case of occult gastrointestinal bleeding could be as much as 8 years (Average time was 2 years.) with an average cost of $36,360 dollars per patient (21). In their study, Doctors Ospina and Villamizar showed how one can achieve a convenient and exact diagnosis with single-balloon enteroscopy in almost every case, indirectly cutting the cost of handling these patients.

In the present work no severe complications were found. Assisted balloon enteroscopies have been defined as safe procedures with a low risk of severe complication (less than 1%). However, we must remember that there have been severe complications, specifically intestinal perforations, related to the single balloon procedure (22, 23).

New technologies for small intestine research have taken a gigantic step ahead for studying and dealing with enteric pathologies. One of the biggest advantages in enterocospic studies is the possibility of doing extra diagnostic (e.g. histopathological biopsy studies and tattoos) and therapeutic (bleeding control, polypectomies, extracting foreign bodies, dilatations, endoprosthetics, probe advancement for tube feeding) procedures. However, each has its own limitations: capsule endoscopy does not allow intestinal insufflation, checking suspicious areas again, doing biopsies or therapeutic procedures. Double balloon enteroscopy will rarely allow a full antegrade intestinal assessment. Even with a combined approach this is not accomplished in 100% of the cases. Single balloon enteroscopy has similar difficulties. Spiral enteroscopy is a recently developed technique. Up until now there are only a few described cases. Rational use of any of these techniques, or their combined use as in the aforementioned cases, allows for opportune handling of intestinal tract disorders with great benefits not only for the patients' health but also for our institutions' bottom line. The search for quicker, safer and easier diagnostic methods for complete enteric mucosae visualization continues.

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