

EDITORIAL

Capsule endoscopy: the revolution of small-bowel endoscopy

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En el presente artículo, el profesor Marco Pennazio, experto mundial en videocápsula endoscópica, hace un interesante análisis editorial sobre el trabajo original de la doctora María Teresa Galiano y su grupo, publicado en el número anterior de nuestra revista (4).

Article: Galiano de Sánchez MT, Sánchez Arciniegas F, Pineda Ovalle LF. Revisión de la experiencia clínica de la utilización de la videocápsula endoscópica (VCE) como método diagnóstico en la patología del intestino delgado. *Rev Col Gastroenterol* 2009; 1: 17-25.

Throughout the history of medicine the small bowel has been a difficult organ to study. For many centuries, diagnosis of diseases involving the small bowel was based on the medical history of subjective and objective symptoms. The information was then compared with that provided, as time passed, first by autopsy, then by radiology and surgical findings, and finally by in vivo biopsies, which could often only be performed with relatively complex and contrived techniques. Compared to other diagnostic tools, small-bowel endoscopy has the advantage of visualizing the mucosa directly, and especially of showing subtle mucosal changes such as vascular abnormalities that do not alter the mucosal surface and are thus undetectable on contrast visualization. Until the end of the 20th century, however, most of the small intestine was relatively inaccessible to endoscopic imaging and therapy without surgery. Mucosal visualization of the small bowel was limited to the reach of the push enteroscope (with the

exception of invasive and expensive intra-operative enteroscopy). The push enteroscopy technique did not enable distal portions of the small intestine to be visualized but permitted tissue sampling, polypectomy and treatment of bleeding lesions. The advent of capsule endoscopy (CE) has revolutionized the field of small-bowel imaging (1), not only opening up a sort of "Pandora's box" but also stimulating the development of other imaging techniques aimed at studying the small bowel such as balloon-assisted enteroscopy (BAE), which is, however, invasive and labour intensive (2, 3). The fact that the entire small bowel can be imaged endoscopically with minimal discomfort for the patient in a non-invasive way is a key advantage of CE.

In the current issue of the *journal*, Galiano de Sánchez et al. report one of the largest South American experience of CE for small-bowel disease to date (4). Overall, in this retrospective and descriptive study most patients (97%) presented with obscure gastrointestinal bleeding which nowadays represents the primary and best validated indication to CE. In these patients, when used as first-line exploration, CE is the most efficient strategy as regards diagnosis; the technique is also helpful for effective decision-making concerning subsequent treatments (5, 6). Some data of this study deserve a special comment:

1. 24.7% of the CE findings were discovered outside of the small bowel. As the Authors correctly

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pointed out, endoscopic studies of the upper and lower gastrointestinal tract should be repeated before evaluation of the small bowel, because of the significant miss rate on initial endoscopy. The skill and experience of the initial endoscopist, as well as the quality and completeness of the initial evaluation, are factors that should be taken into consideration when deciding whether to repeat upper endoscopy and/or colonoscopy in patients with suspected small-bowel bleeding, although the diagnostic yield of repeat endoscopy may be enough to warrant a second-look in any case (7).

2. Figures for positive findings (91.7%) were somewhat higher than those reported in other studies. This fact might be explained by the inclusion of many patients taking NSAIDs. Also, certain conditions like parasite infestation are more likely to be detected in this environment than in the western population. It must also be emphasized that, in order to clearly explain the clinical situation, findings at CE should always be classified according to their bleeding potential: highly relevant lesions include angioectasias, large ulcerations, tumors or varices; those of uncertain relevance include red spots, and small isolated erosions; low relevance lesions include visible submucosal veins, non-bleeding diverticula, and nodules without mucosal break (8).
3. Although not specifically addressed in the study of Galiano de Sánchez et al., patient selection and timing of the procedure are crucial factors in optimizing the yield of CE. The presence of active bleeding at the time of examination or of a short interval between the last episode of acute bleeding and CE (9), and low hemoglobin levels and high transfusion requirement (10) have been found to be associated with a high diagnostic yield.
4. Similarly to that reported in other studies, CE showed active bleeding in 21.6% of patients. In a recent multicenter study we found that in this challenging situation BAE may both clarify the true origin of bleeding in over 2/3 of patients and provide the most appropriate treatment (11). CE

is helpful in selecting the preferential endoscope insertion route for BAE. It has been suggested that, when the ratio of time to reach the lesion at CE to time to reach the caecum is <0.75 , the oral route should be considered first to reach the lesion with BAE, the positive predictive value of CE in indicating the BAE route being 95%, with a negative predictive value as high as 98% (12). A CE-directed approach may thus avoid unnecessary combined BAE procedures.

5. Tumours or mass lesions were discovered in 12.3% of patients, despite prior negative diagnostic work-up. Although small-bowel tumors are rare entities it has been suggested that the early use of CE can shorten the diagnostic work-up and influence the subsequent management of these patients (13). Interestingly, more than half (58.3%) of the tumours were submucosal. It is well known that it may sometimes be difficult differentiating true masses from bulges at CE. A mass at CE with low probability of being a tumour may need to be confirmed with BAE or with computed tomography (CT) or magnetic resonance imaging (MRI) with or without enteroclysis, according to local availability and expertise (14).

Despite the indisputable progress that the introduction of CE has brought to visualizing lesions of the small bowel a few issues remain to be solved. Some of the intrinsic technical characteristics of the system may hamper diagnosis. Firstly, the lack of remote control and of the capability to take biopsies may significantly decrease the specificity of CE findings, since the diagnosis can be based only on the endoscopic appearance. Secondly, it is difficult to localize and size small-bowel lesions precisely with the current technology. This problem may have important clinical consequences, especially in patients with inherited polyposis syndromes, because the size and location of the lesions are key points to define, ultimately, the clinical significance of CE findings and to direct further management. In the study of Galiano de Sánchez, et al, incomplete small-bowel

examination occurred in 11% of cases. These figures are in agreement with the literature where incomplete small-bowel visualization without any anatomic abnormality may occur in 10% to 20% of examinations (15). This factor, together with suboptimal small-bowel cleanliness in some exams, may decrease the negative predictive value of the test. The eventuality of false negative testing with CE must not be underestimated, since this may delay diagnosis and potentially worsen the outcome (16). Lastly, capsule retention is a rare but serious complication of CE because it can significantly modify the subsequent management of the patient. It is now clear that the rate of indefinite retention depends on the indication to the examination (17). The risk of retention is high in patients with prolonged NSAID use, abdominal radiation injury, extensive Crohn's enteritis, and prior major abdominal surgery or small-bowel resection. The careful selection of patients included in this study may possibly explain the absence of such complication. As a rule, before indicating a capsule examination, the patient's medical history should be carefully assessed and screening methods, such as the patency capsule (18) or CT or MRI, should always be taken into consideration when small-bowel strictures are suspected.

As the future of micro-devices in medicine unfolds, CE has established itself as a valuable diagnostic tool for doctors and their patients. Although some technological and logistic issues still need to be overcome, CE has become the gold standard for endoscopic examination of the small bowel in several challenging clinical situations. Doctor Galiano de Sánchez et al are to be congratulated for their effort to arrive at the correct diagnosis for elusive specific gastrointestinal conditions. Further studies are needed to better define the impact of CE on health-care use and clinical outcome of patients with small-bowel disorders.

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