



REVIEW ARTICLE

Contrast-Enhanced Cross Sectional Imaging and Capsule Endoscopy: New Perspectives for a Whole Picture of the Small Bowel



Pedro Boal Carvalho^{a,*}, José Cotter^{a,b,c}

^a Gastroenterology Department, Centro Hospitalar do Alto Ave, Guimarães, Portugal

^b Life and Health Sciences Research Institute (ICVS), School of Health Sciences, University of Minho, Braga, Portugal

^c ICVS/3B's, PT Government Associate Laboratory, Guimarães, Portugal

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Abstract Small bowel evaluation is a challenging task and has been revolutionized by high-quality contrasted sectional imaging (CT enterography - CTE) and magnetic resonance enterography (MRE) as well as by small bowel capsule endoscopy (SBCE).

The decision of which technique to employ during the investigation of small bowel diseases is not always simple or straightforward. Moreover, contraindications may preclude the use of these techniques in some patients, and although they are noninvasive procedures, may present with various complications.

SBCE plays a crucial role in the investigation of both obscure gastrointestinal bleeding and Crohn's disease, but it is also useful for surveillance of patients with Peutz-Jeghers syndrome, while CTE is very accurate in small bowel tumours and in established Crohn's Disease, and its use in patients presenting with gastrointestinal bleeding is increasing. MRE, an expensive and not widely available technique, is essential for the study of patients with Crohn's Disease, and presents an attractive alternative to SBCE in Peutz-Jeghers syndrome surveillance.

These diagnostic modalities are often not competitive but synergistic techniques. Knowing their characteristics, strengths and limitations, indications, contraindications and potential complications, as well as the adaptation to local availability and expertise, is essential to better select which procedures to perform in each patient, both safely and effectively, in order to optimize management and improve patient outcomes.

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* Corresponding author.

E-mail addresses: pedroboalcarvalho@gmail.com, pedroboalcarvalho@cha.min-saude.pt (P. Boal Carvalho).

PALAVRAS-CHAVE

Doença de Crohn;
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Cápsula Endoscópica e Estudos Imagiológicos Contrastados: Diferentes Perspectivas para uma Imagem Mais Completa do Intestino Delgado

Resumo A investigação do intestino delgado, previamente difícil e limitada, sofreu uma revolução com o aparecimento de técnicas imagiológicas contrastadas de elevada qualidade, como a enterografia por tomografia axial computadorizada (enteroTC) e a enterografia por ressonância magnética (enteroRM), assim como pela enteroscopia por cápsula (EC).

A decisão na escolha da técnica a utilizar nas diferentes patologias do intestino delgado não é na maioria das vezes simples ou óbvia. Adicionalmente, a presença de contra-indicações pode restringir o uso destas técnicas em alguns doentes, e apesar de não serem consideradas técnicas invasivas, não são isentas de riscos e complicações.

A EC tem um papel crucial na investigação da hemorragia digestiva de causa obscura e da doença de Crohn, mas tem-se revestido também de utilidade na vigilância de doentes com síndrome de Peutz-Jeghers; a enteroTC revelou uma elevada capacidade diagnóstica para neoplasias do intestino delgado e na doença de Crohn estabelecida, e a sua utilização na hemorragia digestiva de causa obscura tem vindo a expandir. A enteroRM, apesar de dispendiosa e de disponibilidade limitada, tem uma elevada eficácia no estudo da doença de Crohn, e é uma alternativa válida à EC no síndrome de Peutz-Jeghers.

Estas técnicas diagnósticas são frequentemente singergísticas e complementares, ao invés de competitivas. O reconhecimento das suas características, das suas capacidades e limitações, assim como das indicações, contra-indicações e potenciais complicações, e aliado à adaptação à disponibilidade e competências locais, é essencial na correcta escolha de procedimentos seguros e eficazes para cada doente, de forma a otimizar a abordagem e o prognóstico.

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1. Introduction

The study of the small bowel has been traditionally limited to low yield techniques, such as push enteroscopy and small bowel follow-through, or invasive techniques such as intra-operative enteroscopy.

By the end of the past century, cross-sectional imaging techniques with excellent resolution, namely CT enterography (CTE) and magnetic resonance enterography (MRE), were developed to better observe and characterize small bowel pathology, while a new contender, small bowel capsule endoscopy (SBCE) has been shown to provide excellent diagnostic yield in a myriad of small bowel diseases.

The choice of what technique or even which combination to use for small bowel study in the different clinical settings encountered daily is often challenging, and depends on technical characteristics but also on local expertise and availability.

2. Technical characteristics

CTE was developed in 1997 to better assess small bowel Crohn's Disease (CD).¹ The preparation for CTE includes a clear liquid diet for the 4–6 h previous to the examination, as well as the administration of 1000–2000 cc of an oral contrasting agent, usually over 45–60 min, followed by intravenous contrast during image acquisition.² Oral contrast is used in order to accomplish bowel distension and maximize the contrast between the lumen and the bowel wall.² CT enteroclysis, where oral contrast is administered

through a nasojejunal tube, allows for superior jejunal distension,³ but poor patient tolerance and low efficiency limits its use.² A number of oral neutral contrasting agents are available, including methylcellulose, polyethylene glycol, manitol, low-density barium solution and water alone – the latter is rapidly absorbed, resulting in poor distension, particularly in the distal ileum, and may contribute to fluid overload.² For the intravenous contrast, 100–150 cc of an iodine-based contrasting agent is used, and as in regular CT, caution should be employed in the prevention of iodine nephropathy, particularly in diabetic and elderly patients.^{2,4} A prokinetic, such as metoclopramide (10–20 mg po), is often administered at the start of the oral contrasting agent ingestion, and hyoscine butylbromide (20 mg iv) at the start of the intravenous contrasting agent in order to reduce peristalsis imaging artefacts.²

MRE was more recently made available to clinicians, but the same core principles apply in regards to CTE. After a 4–6 h fast, 1000–2000 cc of a biphasic water-based oral contrast similar to the ones used during CTE is administered, often with metoclopramide (10–20 mg po), followed by a gadolinium-based intravenous contrast (0.65 mg/kg) together with either hyoscine butylbromide (20 mg iv) or glucagon (0.5 mg iv).^{5,6}

Small bowel capsule endoscopy (SBCE) was first unveiled in 2001.⁷ For the procedure, ESGE guidelines support the indication for a clear liquid diet on the day preceding the exam, as well as a 12 h fast.⁷ A purgative bowel preparation (commonly using 1000–3000 cc polyethylene glycol-based solutions) is often administered before capsule ingestion as

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