

# Single-Balloon Enteroscopy



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## KEYWORDS

- Small-bowel endoscopy • Single-balloon enteroscopy
- Balloon-assisted enteroscopy • Device-assisted enteroscopy • Carbon dioxide
- Diagnostic yield • Complete enteroscopy rate

## KEY POINTS

- Single-balloon enteroscopy and double-balloon enteroscopy are equally suitable for small bowel exploration.
- The individual learning curve should be comprised of about 30 examinations for experienced endoscopists.
- Carbon dioxide should be used as insufflation gas for single-balloon endoscopy procedures.

## INTRODUCTION

With the beginning of the millennium, wireless video capsule endoscope (VCE) and double-balloon enteroscopy (DBE) were introduced.<sup>1,2</sup> Both devices allowed the investigation of the small bowel for the first time, the latter one not only as diagnostic modality, but also with the option to perform therapeutic interventions (EN-450T5, Fujinon Incorporated, Saitama, Japan).

Several years later, the single-balloon endoscope (SBE) appeared on the market.<sup>3,4</sup> This newly introduced balloon-assisted enteroscopy device (SIF-Q180, Olympus Optical, Tokyo, Japan) has only 1 balloon, located on the tip of the overtube. By this means, the set-up of the system is facilitated, which shortens preparation time. A recent Pubmed search demonstrated approximately 1071 published studies using DBE, and 321 with an SBE. An ongoing debate includes the different pan-enteroscopy rates of both systems and the diagnostic impact of complete visualization of the small bowel.<sup>5-9</sup>

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The next new kid on the block, the spiral enteroscope (SE, Endo-Ease Discovery SB, Spirus Medical, Stoughton, Massachusetts), promised to offer the most stable position in the small bowel, and, therefore, to be especially suitable for therapeutic interventions.<sup>10</sup> To date, approximately 82 citations in Pubmed using SE are available. Currently, a new motorized version of the spiral enteroscope is being tested and may change the importance of this enteroscopy device.

In a line with all the other authors and experts of enteroscopy within this journal, this article will aim to describe the possibilities and limitations of single-balloon enteroscopy. Additionally, the article will compare the performance of the SBE with DBE and SE, not on a personal, eminence-based judgment, but on the basis of randomized controlled trials (RCTs).

### SINGLE-BALLOON ENDOSCOPY FOR EVALUATION OF THE SMALL BOWEL

As balloon-assisted enteroscopy system, the SBE (SIF-Q180, Olympus Optical, Tokyo, Japan) consists of a standard endoscope back-loaded with an overtube equipped with a balloon at its distal end (Fig. 1). The rigid overtube is supposed to avoid looping of the bowel and to direct the pushing forces directly to the tip of the endoscope to advance the enteroscope into the deep small bowel. The inflated balloon is supposed to fix the intestine to the endoscope system. In contrast to the DBE system, the SBE uses the angulated tip of the endoscope (hooked-tip) to fix the intestine to the scope.<sup>3,4</sup> Technically, there are 2 options to push the endoscope deeper into the small bowel<sup>3</sup>:

1. Conventional push-and-pull-technique: the enteroscope and the overtube are pulled back in order to shrink and straighten the bowel; the tip of the endoscope is further threaded into the small bowel
2. Simultaneous push-and-pull technique: the inflated overtube is pulled back, whereas the enteroscope is pushed forward simultaneously

Usually complete small bowel visualization may be accomplished by a combined oral and anal approach.<sup>11</sup>

#### *Insertion Depth*

With respect to the literature and to the authors' own experience, most endoscopists seem to estimate intubation depth during enteroscopy according to the method



**Fig. 1.** The single-balloon enteroscope (SIF-Q180, Olympus Medical Systems Corp, Tokyo, Japan) consists of a standard endoscope back-loaded with an overtube equipped with a balloon at its distal end.

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