



Use of a rigidizing overtube to complete an incomplete colonoscopy

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The successful completion of colonoscopy can be limited by endoscopist skill, bowel preparation, and looping.¹ A variety of different techniques are available to manage looping, such as abdominal splinting, use of variable-stiffness colonoscopes, and reduction maneuvers.¹⁻³ If cecal intubation remains difficult despite these maneuvers, overtube-assisted colonoscopy may help achieve this goal. This may include the use of single-balloon or double-balloon enteroscopy, spiral enteroscopy, or colonic overtubes.⁴

In August 2019, the Pathfinder Endoscope Overtube (Neptune Medical, Burlingame, Calif, USA) was approved by the U.S. Food and Drug Administration.⁵ The Pathfinder Endoscope Overtube is an 85-cm-long, single-use overtube that operates in 2 states, flexible or stiffened (Fig. 1). When the overtube is advanced to the desired location in the colon and is as reduced as possible, a vacuum can be applied to the overtube, leading to up to 15-fold stiffening of the overtube. This may allow the colonoscope to advance while limiting loop formation. To date, the application of this rigidizing overtube has yet to be reported.

A 64-year-old man with a history of C5 spinal cord injury due to a diving accident presented for screening colonoscopy. After providing written informed consent, the patient was put under moderate sedation. The patient had a Boston bowel prep score of 6 (right colon segment 2, mid colon 2, left colon segment 2) despite a 3-day inpatient admission for bowel preparation (Video 1, available online at www.VideoGIE.org). A pediatric colonoscope was used initially, but given significant looping, the colonoscope could only reach the transverse. This was confirmed by review of the magnetic images, which demonstrated looping in the sigmoid. The colonoscope was withdrawn, and the Pathfinder overtube was used. With assistance from the overtube, the colonoscope reached the cecum easily in 8 minutes (Fig. 2). A 1-cm sessile polyp was found in the ascending colon and was removed by cold snare. Of note, a portion of a dental implant with a screw was found in the ascending colon. This was removed with a snare through the overtube (Fig. 3). An additional 3 polyps measuring <1 cm were identified and removed by cold snare, and the procedure was terminated. Three of the polyps (including the 1-cm polyp) were determined to be tubular adenoma. The fourth polyp was identified as a hyperplastic polyp.

Our case illustrates the utility of the rigidizing overtube in helping to accomplish procedures that cannot be performed with a standard colonoscope. The American Society for Gastrointestinal Endoscopy and American College of Gastroenterology jointly have recommended cecal intubation of $\geq 90\%$ in all colonoscopies and $\geq 95\%$ for screening colonoscopies. Cecal intubation is important, especially because several studies have demonstrated that colonoscopies are less effective in preventing proximal colorectal cancer and cancer deaths in comparison to



Figure 1. The Pathfinder Endoscope Overtube is an 85-cm single-use flexible overtube that can stiffen 15-fold with application of vacuum at the stopcock.

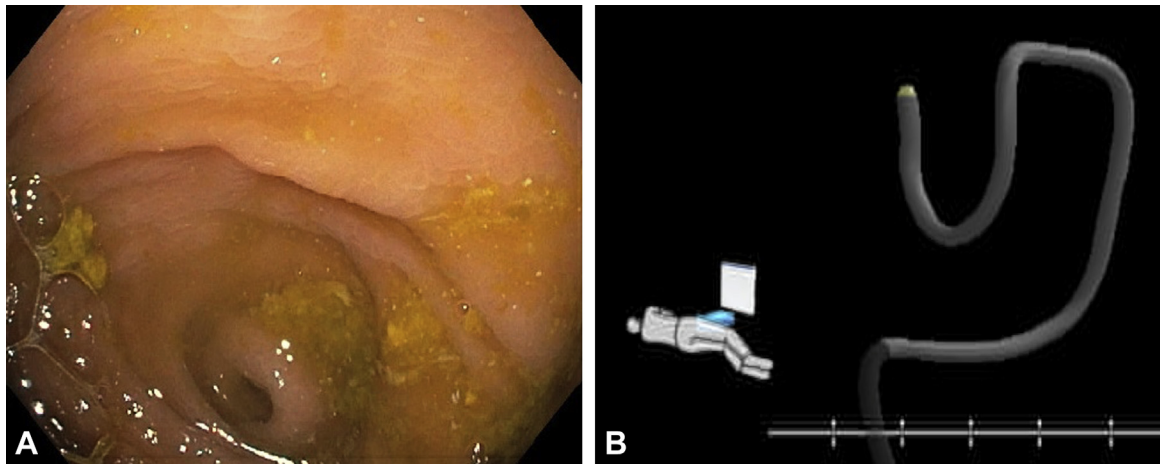


Figure 2. **A**, Cecum reached with assistance from rigidizing overtube. **B**, The magnetic imager demonstrates effective advancement with decreased looping.

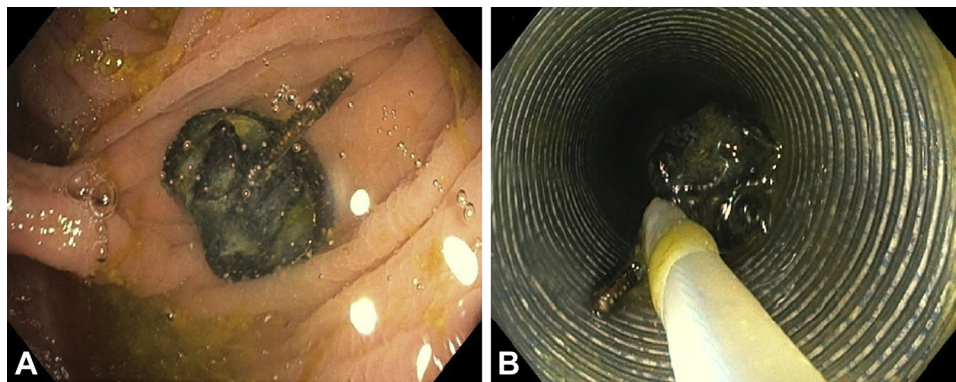


Figure 3. **A**, Dental implement identified in the ascending colon. **B**, Removal of the dental implement via overtube.

disease in the distal colon.^{6,7} Use of standard techniques such as abdominal splinting, variable-stiffness endoscopes, and reduction maneuvers may aid in limiting looping but may still be insufficient to achieve cecal intubation. Although techniques such as single-balloon enteroscopy and double-balloon enteroscopy can be used, these procedures tend to be more time intensive and are not performed by most gastroenterologists.

In contrast, the rigidizing overtube is a tool we believe can be used by general gastroenterologists. The rigidizing overtube is useful in managing various types of loops, including alpha, reversed alpha, and N loops.¹ Beyond the ability to help reach the cecum in cases of incomplete colonoscopy, the overtube is useful in stabilizing the endoscope tip, thus facilitating therapeutic maneuvers such as polyp resection. The specimen can be removed through the overtube without fragmentation, and the endoscope easily can be reinserted as needed to return to the prior location. Furthermore, the overtube can accommodate a pediatric colonoscope, an upper

endoscope, and an enteroscope. Once the overtube is advanced to the desired location, if necessary, the pediatric colonoscope can be exchanged for a smaller-diameter colonoscope, such as an upper endoscope or enteroscope. If the endoscopist prefers to use a cap on the end of the pediatric colonoscope, the overtube should be loaded on the colonoscope before the cap is placed. Although further studies are needed to demonstrate the utility of the rigidizing overtube, here we have demonstrated its use in assisting in a difficult colonoscopy.

DISCLOSURE

Dr Hwang is a consultant for Olympus, Medtronic, Boston Scientific, Micro-Tech, and Lumendi. Dr Watson is a consultant for Apollo Endosurgery, Boston Scientific, and Neptune Medical and a speaker for Apollo Endosurgery. Dr Friedland is a consultant for Capsovision. All other authors disclosed no financial relationships.

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<https://doi.org/10.1016/j.vgje.2020.06.014>

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