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## Successful use of a novel dynamic rigidizing overtube in a patient with looping during colonoscopy



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### INTRODUCTION

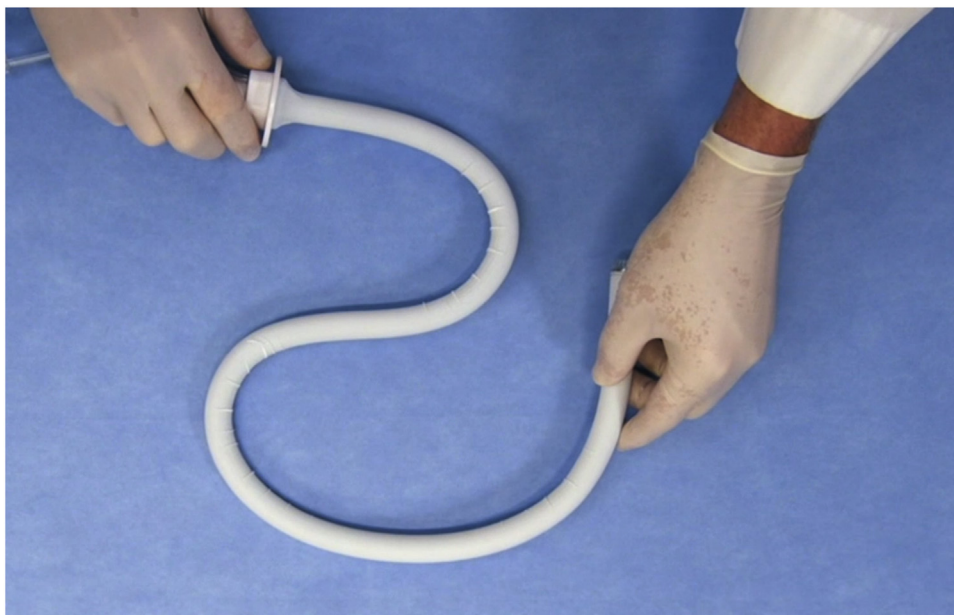
Colonoscopy is an essential procedure for colorectal cancer screening and colon pathology diagnosis and therapy. It is well known that looping may preclude successful advancement of the colonoscope for the practicing endoscopist. This can add significantly to the time of the procedure and demands on the endoscopist and the procedural team. Typically, when looping is encountered during a colonoscopy, abdominal counter-pressure and position changes are applied, at times to no avail.<sup>1</sup>

Special instrument maneuvers and equipment have been used during challenging colonoscopies to facilitate completion of the procedure. External straighteners, pediatric colonoscopes after guidewire exchange, and ShapeLock are examples of devices endoscopists resort to during difficult colonoscopies.<sup>2</sup> ShapeLock was an overtube device with controllable stiffness that was presented in 2004 to facilitate safe and effective colonoscopy by preventing looping; however, it is no longer available on the market.<sup>3-5</sup>

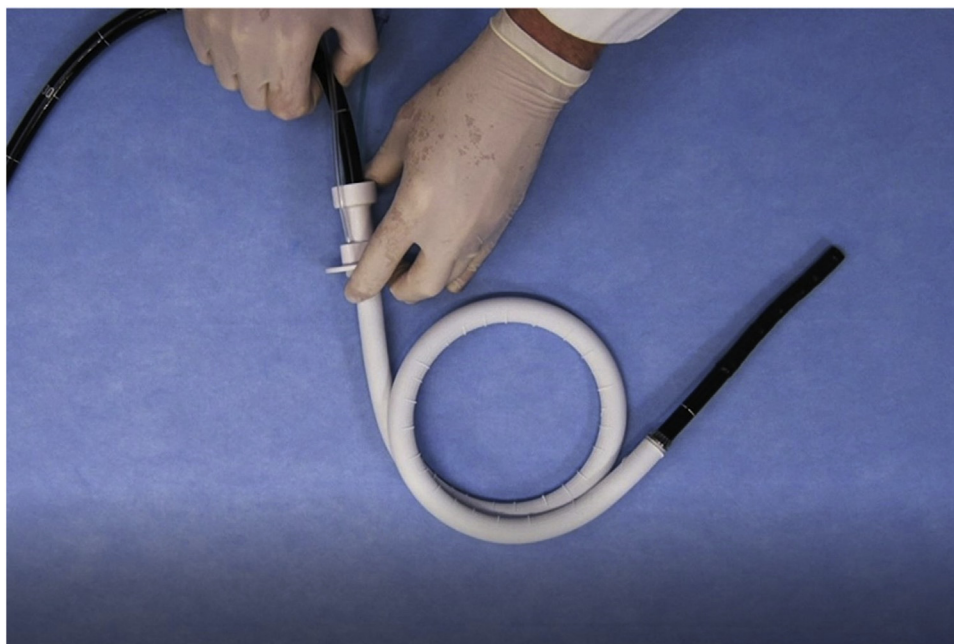
A novel dynamic rigidizing overtube (Pathfinder, Neptune Medical, Burlingame, Calif, USA) is now available to reduce risks associated with looping and to facilitate colonoscopy completion (Fig. 1). In its flexible state, the overtube material is soft and pliable, but in its rigid state it becomes 15 times stiffer when a vacuum is applied (Fig. 2). This aids in stability and helps maintain a 1-to-1 relationship between force exerted on the shaft and motion at the colonoscope tip by minimizing loop formation.

### CASE DESCRIPTION/METHODS

A 72-year-old man presented for surveillance colonoscopy. A pediatric colonoscope was successfully advanced to the ascending colon but could not be advanced farther because of loop formation. Making the situation worse, every time the colonoscope was advanced through the loop, the patient became bradycardic to a



**Figure 1.** This image shows the flexibility of the dynamic rigidizing overtube. In its flexible state, it allows smooth movement of the overtube over the colonoscope.



**Figure 2.** This image shows the overtube when it is in its rigidized state. While becoming 15 times more rigid, the overtube allows for 1-to-1 tip control during advancement of the colonoscope.

heart rate of 40 to 49 beats/min, presumably from a vasovagal reflex.

Repeated attempts at advancing the colonoscope were unsuccessful because of looping and bradycardia, despite abdominal counterpressure and position changes. The colonoscope was removed, and the rigidizing overtube device was introduced onto the colonoscope. This was performed by applying approximately 50 mL of water into the tube lumen and lubricated by mixing for 30 seconds, after which the colonoscope easily slid into the overtube.

The colonoscope with the overtube was advanced to the ascending colon in its flexible state. Once in the ascending colon, the overtube was rigidized, and the colonoscope was then advanced easily past the prior point of looping. However, when approaching the cecum, another loop was encountered. At this point, the overtube was made flexible, and the colonoscope and overtube were reduced by approximately 25 cm. The overtube was then advanced further up the colonoscope and rigidized. The colonoscope was then advanced through the overtube, allowing for easy cecal intubation and successful completion of colonoscopy without any further loop formation ([Video 1](#), available online at [www.VideoGIE.org](http://www.VideoGIE.org)).

## DISCUSSION

In this case, we demonstrate a colonoscopy procedure salvaged through the use of a novel rigidizing overtube device. The attachment of the colon to a mobile

mesentery can hinder advancement of the colonoscope, increasing the risk of paradoxical movement, perforation, and pain. This can lead to prolonged sedation times, limited cecal intubation, and hindrance of therapeutic interventions, resulting in suboptimal colorectal cancer screening and care for the patient. In addition, the mental and physical fatigue that often accompany difficult colonoscopies may cause undue stress in the practitioner.

Vasovagal reactions and bradycardia are well-documented, albeit uncommon, occurrences during colonoscopies.<sup>6</sup> Currently, no reported adverse events have been associated with the overtube, but its contribution to perforation or mucosal tearing risk remains to be determined. However, the overtube may be adequately lubricated with water both internally and externally, reducing the risk of mucosal traction and injury. The dynamic rigidizing overtube has the potential to reduce discomfort for patients, increase colonoscopy completion rates, and reduce mental and physical demands on endoscopists associated with challenging colonoscopy procedures.

## DISCLOSURE

*Dr Samarasena has ownership in Docbot; is a consultant for Medtronic, Olympus, Conmed, Neptune Medical, Steris, and Microtech; is a lecturer for Medtronic, Olympus, Conmed, and Mauna Kea Technologies; and has an educational grant from Cook Medical. All other authors disclosed no financial relationships.*

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