

## Endoscopic en bloc removal of appendiceal polyp facilitated by traction

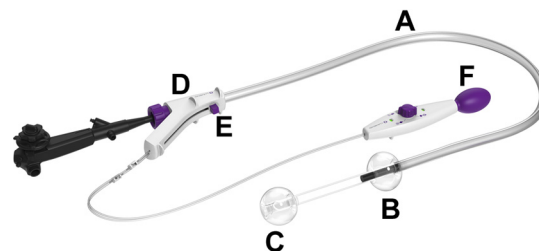
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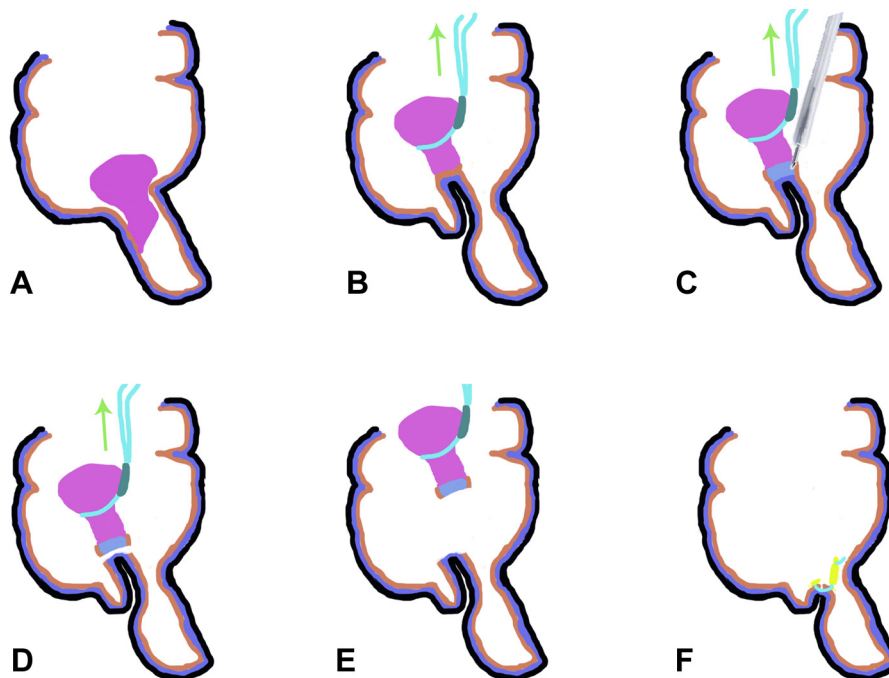
Colonoscopy is widely used for the removal of colonic polyps to prevent the future development of colorectal cancer.<sup>1-3</sup> However, incomplete resection of these precancerous colonic polyps often results in recurrent polyps<sup>4,5</sup> and is also strongly associated (odds ratio, 4.76) with interval development of the colorectal cancer after previous colonoscopy.<sup>6</sup>

Removal of polyps originating from the appendiceal lumen is especially difficult because of the inability to reach the deep margin of the lesion, resulting in a high rate (10%-15.6%) of residual adenoma.<sup>7-9</sup> Several recently published techniques were proposed to facilitate the endoscopic removal of these appendiceal polyps, including underwater EMR, the use of a double-channel gastroscope, and even full-thickness resection.<sup>7,9,10</sup>

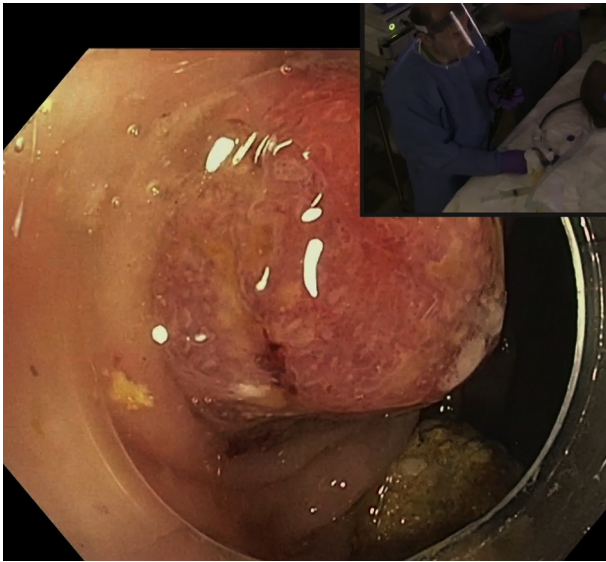
We now report on the use of a recently developed DiLumen (Fig. 1) double-balloon interventional platform (Lumendi LLC, Westport, Conn, USA) to facilitate the



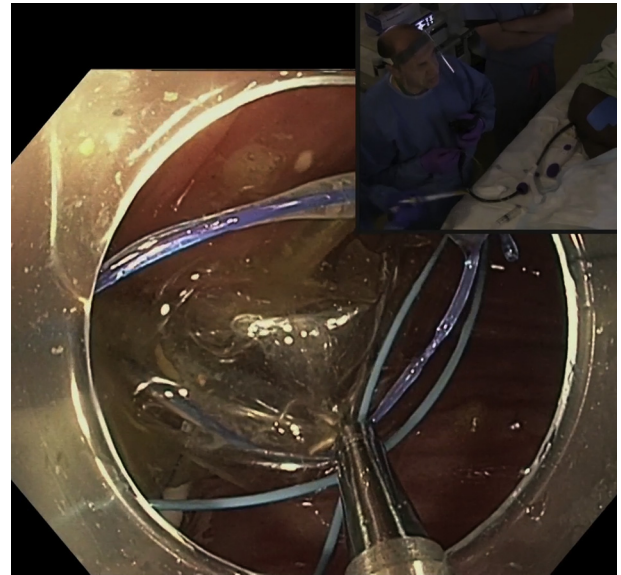
**Figure 1.** DiLumen double-balloon interventional platform consists of the following elements: **A**, Plastic sleeve serves as an overtube around the endoscope. **B**, Aft-balloon is attached to the oral (proximal) end of the sleeve. **C**, Fore-balloon is attached to the oral end of the sleeve by 2 pushrods. **D**, Base is attached to the anal (distal) end of the sleeve. **E**, Slider knob for the fore-balloon. Sliding this knob forward moves the fore-balloon in the oral direction (away from the sleeve). Pulling the knob backward pulls the fore-balloon in the anal direction (toward the sleeve). **F**, Inflation handle is used to selectively inflate or deflate each balloon.



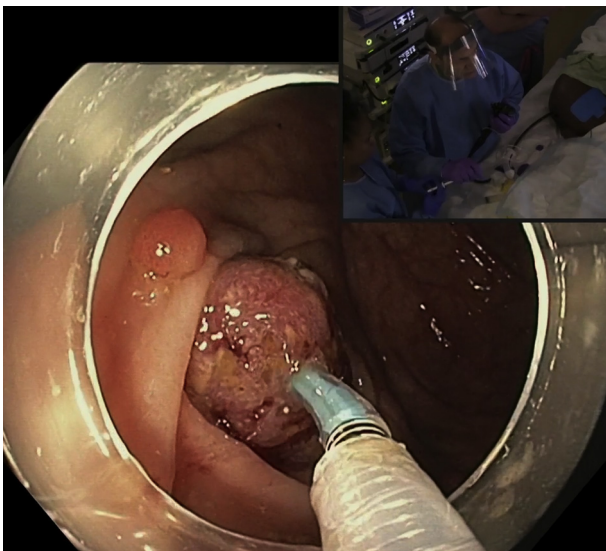
**Figure 2.** Schematic diagram demonstrating consecutive procedural steps: **A**, Polyp originating inside the appendix. **B**, A PolyLoop is tightened around the polyp and connected to the fore-balloon of the DiLumen. The fore-balloon is retracted in the anal direction, pulling the polyp into the cecum and exposing the attachment of the polyp to the appendiceal mucosa. **C**, Submucosal injection of normal saline solution under the polyp with endoscopic injection needle. **D**, The polyp is cut off from the site of its attachment. **E**, The polyp is removed. **F**, Mucosal defect after lesion removal is closed with 1 continuous endoscopic suture with the Overstitch endoscopic suturing device.



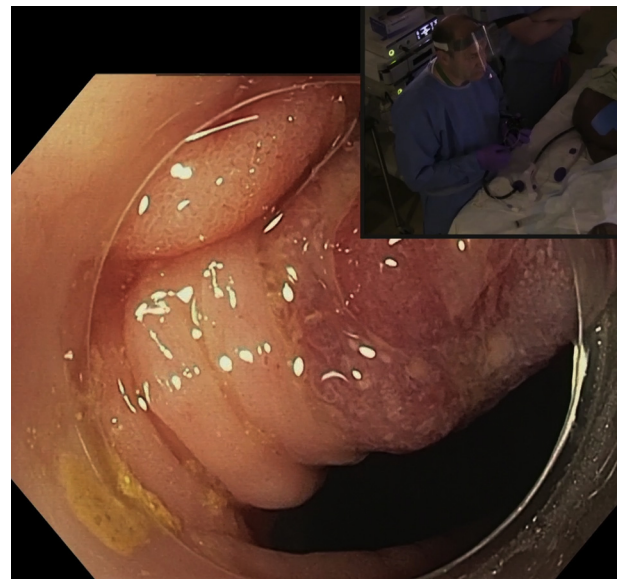
**Figure 3.** Adenomatous polyp growing from appendix into cecum.



**Figure 5.** The PolyLoop is attached to the fore-balloon of the DiLumen with endoscopic clip.



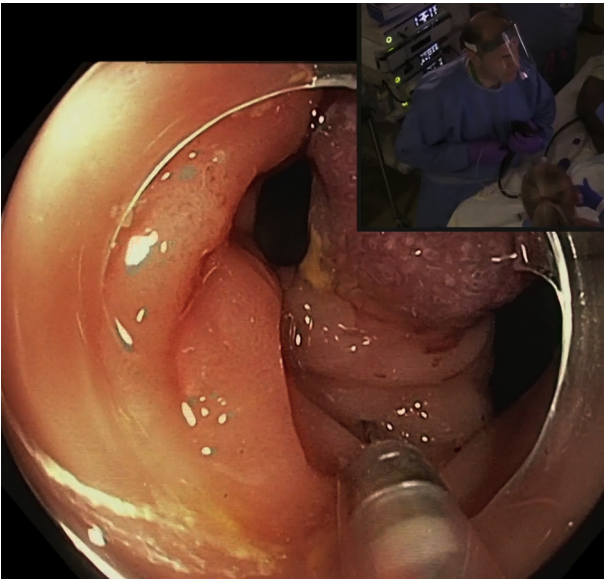
**Figure 4.** The Polyloop is tightened around the appendiceal polyp.



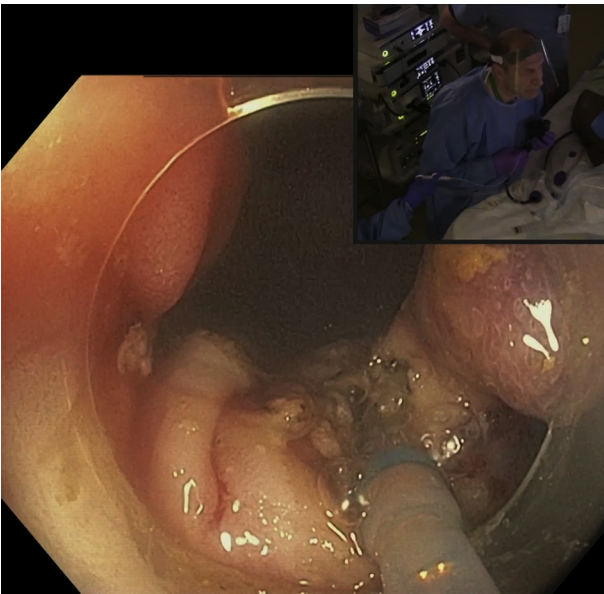
**Figure 6.** The fore-balloon is retracted in the anal direction, pulling the polyp into the cecum and exposing the attachment of the polyp to the appendiceal mucosa.

removal of a large (15-mm) polyp originating from the appendiceal lumen (Figs. 2 and 3; Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)). A PolyLoop (Olympus America, Center Valley, Pa, USA) was placed and tightened around the middle portion of the polyp (Fig. 4) to avoid catching the deep layers of the appendiceal wall. The PolyLoop was attached to the DiLumen's dynamically adjustable foreballoon (Fig. 5) with the use of an endoscopic clip (QuickClip Pro; Olympus America). The aft-balloon was distended, stabilizing the DiLumen inside the ascending colon. Then the fore-balloon was retracted in the anal direction, pulling the polyp into the cecum and exposing the attachment of the polyp to the appendiceal mucosa (Fig. 6).

After the submucosal injection of normal saline solution underneath the polyp with an endoscopic injection needle (InjectorForce Max; Olympus America) (Fig. 7), the polyp was resected (Fig. 8) with use of the DualKnife (Olympus America) and removed en bloc (Fig. 9). The mucosal defect after removal of the lesion was closed with 1 continuous endoscopic suture (Fig. 10) by use of the Overstitch (Apollo Endosurgery, Austin, Tex, USA) endoscopic suturing device inserted through the conduit from the rectum to the ascending colon created by the DiLumen double-balloon platform. A postprocedural



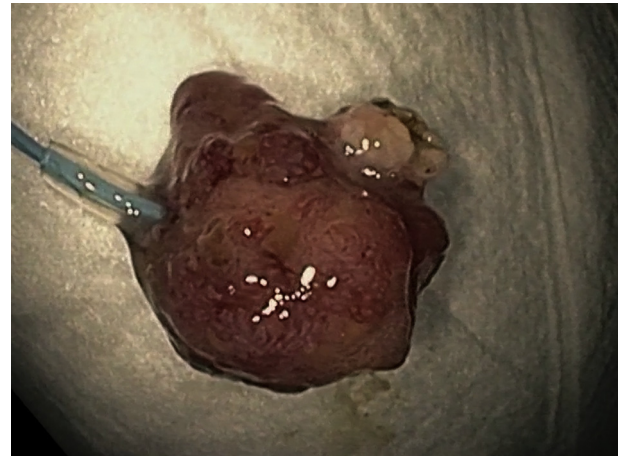
**Figure 7.** Submucosal injection of normal saline solution under the polyp.



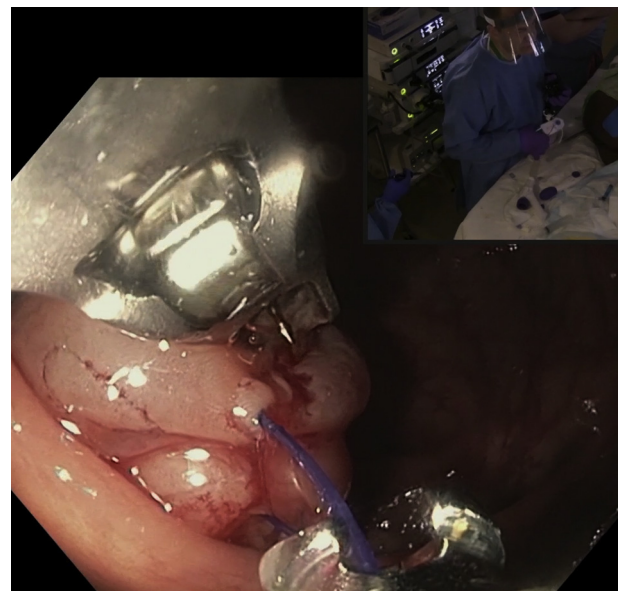
**Figure 8.** The polyp is cut off with the DualKnife.

abdominal radiograph did not reveal any intraperitoneal air. After the procedure, the patient was discharged home in stable condition with no complaints. Pathologic examination of the specimen reported it as a tubular adenoma and confirmed R0 resection with negative margins.

In conclusion, endoscopic removal of a polyp originating inside the appendix can be difficult, resulting in incomplete resection with residual polypoid tissue left inside the appendix. The use of a traction device exposed the attachment of the polyp to the appendiceal mucosa and facilitated en bloc endoscopic removal of a difficult polyp with negative (R0) resection margins.



**Figure 9.** Specimen demonstrating 15-mm polyp after en bloc removal, with clearly visible normal mucosal resection margin.



**Figure 10.** Mucosal defect after lesion removal is closed with 1 continuous endoscopic suture using Overstitch endoscopic suturing device.

## DISCLOSURE

*Dr Kantsevov is a consultant for Apollo Endosurgery, Aries, Endocages, LumenDi, Medtronic, Olympus, and Vizballoons; is a co-founder of Apollo Endosurgery and Endocages; is a shareholder in Apollo Endosurgery; holds equity in Endocages, LumenDi, and Vizballoons; is on the advisory board of LumenDi; and is in active litigation with LumenR. All other authors disclosed no financial relationships relevant to this publication.*

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