



## Endoscopic full-thickness resection of a long intussuscepted appendix by use of a colonoscope

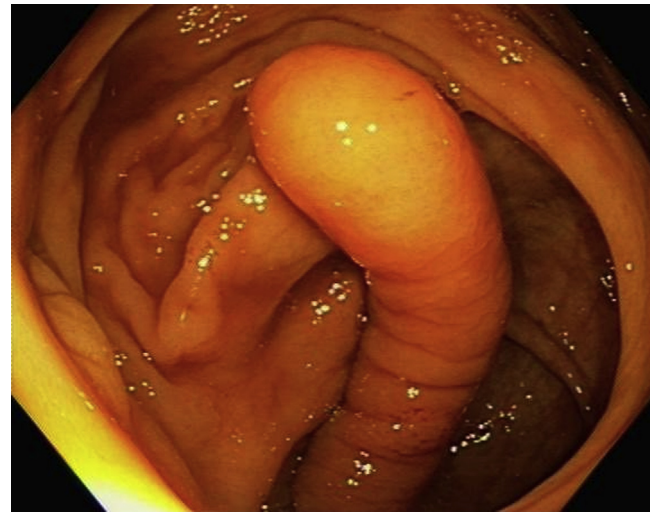
Ghassan M. Hammoud, MD, MPH,<sup>1</sup> Jacob Quick, MD,<sup>2</sup> Sami Samiullah, MD,<sup>3</sup> Deepthi Rao, MD,<sup>4</sup> Jamal A. Ibdah, MD, PhD<sup>5</sup>

A 66-year-old woman with a medical history of nephrolithiasis presented with recurrent intermittent right lower-quadrant pain for 6 months. CT scan of the abdomen and pelvis revealed a long tubular structure in the cecum suggestive of intussuscepted appendix (Fig. 1). Colonoscopy showed an 8-cm tubular structure arising from the appendiceal orifice (Fig. 2). The overlying epithelium was normal, and a diagnosis of large intussuscepted appendix type V was made. After consultation with a surgical team, the patient refused surgery and opted for endoscopic resection (Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)). A repeat colonoscopy in the operating room was performed. The base of the appendix was captured with endoscopic detachable snares (Olympus America, Center Valley,

Pa, USA ) (Fig. 3). Next, with use of the VIO 300D ESU generator, electrocautery snare resection under endocut Q, effect 3, duration 1, interval 6, the base of the appendix



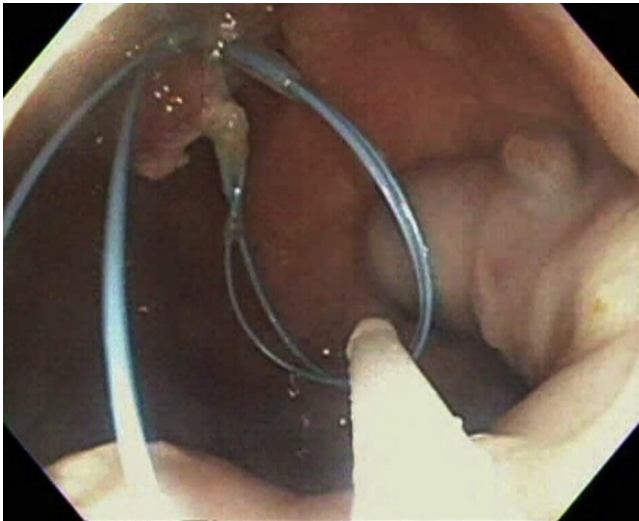
**Figure 1.** CT view of abdomen and pelvis revealing a long tubular structure in the cecum suggestive of intussuscepted appendix.



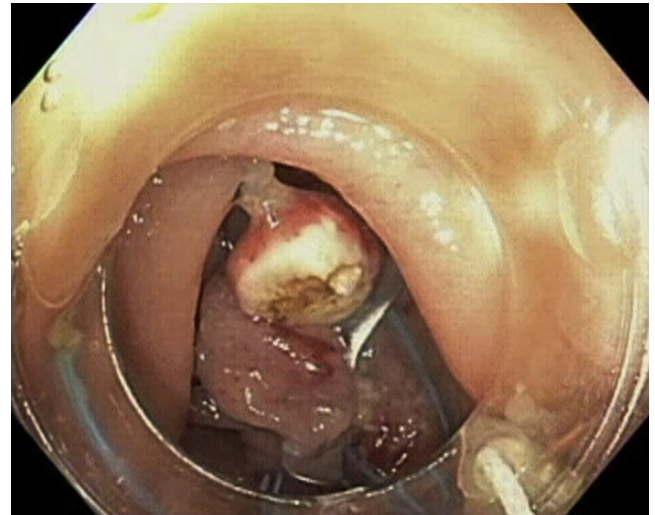
**Figure 2.** Colonoscopic view showing a long inverted intussuscepted appendix.



**Figure 3.** Endoscopic view showing detachable snares applied at base of appendix.



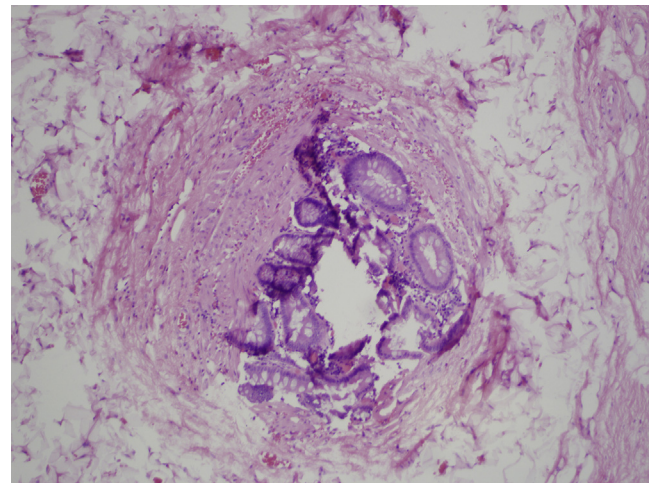
**Figure 4.** Endoscopic view showing full-thickness resection of appendix using a stiff snare.



**Figure 6.** Application of over-the-scope clip at the tip of the resected appendix.



**Figure 5.** Endoscopic view showing full-thickness resection of the retrieved appendix.



**Figure 7.** Histopathologic view of specimen from the appendix showing minute focus of embedded luminal epithelium within the muscularis; additionally, a focus of mesothelial lining is internalized, suggestive of intussuscepted appendix (H & E, orig. mag.  $\times 2$ ).

underwent endoscopic full-thickness resection (Figs. 4 and 5). To prevent delayed bleeding, dehiscence of the lumen, or both, an over-the-scope clip (OVESCO Endoscopy, Los Gatos, Calif, USA) was applied at the tip of the resection site (Fig. 6). Pathologic examination confirmed the findings of intussuscepted appendix (Fig. 7). The patient did well after the procedure and was discharged from the hospital the following day. Follow-up in clinic showed improvement in her intermittent right lower-quadrant pain.

The appendix is inverted into the cecum in 0.01% of cases.<sup>1</sup> Intussusception of the appendix can occur at any age but is more common in boys.<sup>2</sup> The signs and symptoms of intussuscepted appendix are vague and can include recurrent intermittent abdominal pain and bleeding from the rectum.<sup>2</sup> Appendiceal intussusception can be mistaken for a polyp at colonoscopy and can occur in the setting of endometriosis.<sup>3-6</sup> The diagnosis of

intussuscepted appendix can be made by radiologic studies, which are not diagnostic. The intussuscepted appendix can appear as a “coiled-spring” or a “spiral shell” on abdominal US or contrast enema.<sup>7,8</sup> Colonoscopic examination reveals a long protruded invaginated appendix from the appendiceal orifice. McSwain<sup>9</sup> proposed 5 types of appendiceal intussusception in which type V is complete invagination of the appendix into the lumen of the colon (Fig. 2). The definitive treatment for symptomatic intussuscepted appendix is surgical resection. However, endoscopic management can be feasible and safe with the use of appropriate devices to prevent delayed leakage, dehiscence, and bleeding.

Endoscopic full-thickness resection of a symptomatic inverted appendix is feasible and safe. The use of

endoscopic detachable snares and an over-the-scope clip is recommended to ensure no dehiscence of the appendiceal lumen or peritonitis and to prevent bleeding. Preprocedure awareness of the inverted appendix is crucial before simple snare polypectomy or biopsies are performed.

## DISCLOSURE

*All authors disclosed no financial relationships relevant to this publication.*

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Division of Gastroenterology and Hepatology (1), Division of Acute Care Surgery (2), Division of Gastroenterology and Hepatology (3), Department of Pathology and Anatomical Sciences (4), Division of Gastroenterology and Hepatology (5), University of Missouri School of Medicine, Columbia, Missouri, USA.

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