



# Clinical Case Study

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## IS COLONOSCOPY A DANGEROUS ROUTINE PRACTICE THAT INDUCES APPENDICITIS?: A CASE REPORT OF POSTCOLONOSCOPY APPENDICITIS

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Colonoscopy is useful in colon surveillance and endoscopic treatment such as polypectomy and endoscopic submucosa dissection. Regular colonoscopic examination has a low rate of complications (Reumkens et al., 2016; Waye, Lewis, & Yessayan, 1992) which result mainly from bleeding and perforation. I report a case of appendicitis that occurred after colonoscopy in a healthy patient without any chronic colon disease such as ulcerative colitis or colonic lesions at the appendix orifice.

### Case Presentation

The patient was a 50-year-old man without systemic diseases such as diabetes mellitus or hypertension. He underwent a health examination which included colonoscopy. Colonoscopy revealed two small polyps at the cecum and the sigmoid colon. The polyp at the cecum, far from the appendix orifice, was approximately 2 cm in diameter (Figure 1) and was resected using biopsy forceps. The procedure lasted approximately 16 minutes (intubation time was approximately 5 minutes), and no obvious complication such as bleeding or perforation was noted immediately after the procedure.

Approximately 6 hours after colonoscopy, however, he began experiencing epigastria with diaphoresis. No signs of gastrointestinal bleeding such as hematochezia or melena were noted. He came to our emergency department, and the following vital signs were recorded: body temperature, 36.2°C; blood pressure, 122/59 mmHg; and heart rate, 56/minute. He described the abdominal pain as dull and continuous. Laboratory tests revealed a normal white blood cell count, a normal C-reactive protein level

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*The author declares no conflicts of interest.*

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**FIGURE 1.** Polyp found at the cecum and removed during colonoscopy with a normal appendix orifice.

(0.03 mg/dl), and a normal lipase level (15 U/L). Because the symptoms persisted, he underwent abdominal computed tomography (CT), which revealed an increased diameter of the appendix (>7 mm) and mixed fluid and air inside the appendix; in addition, two appendicoliths were noted (Figures 2 and 3). Appendicitis was suspected, and the patient underwent an appendectomy (Figure 4). The patient recovered well from surgery and was discharged.

## Discussion

Colonoscopy is useful for diagnosing colonic lesions, such as tumors and polyps. Major complications after colonoscopy include bleeding and perforation, but these are unusual (Rutter et al., 2012). Other complications include spleen laceration and appendicitis. The incidence of postcolonoscopy appendicitis is extremely low (0.038%–0.049%) (Vender, Larson, Garcia, Topazian,

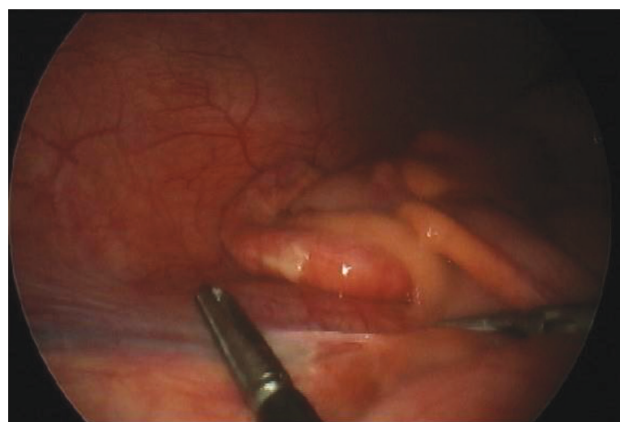


**FIGURE 3.** Computed tomography revealed mixed fluid and air inside the appendix, as well as two appendicoliths.

& Ephraim, 1995). In contrast to average cases of acute appendicitis, postcolonoscopy appendicitis occurs at a median age of 55 years and men are almost twice as likely to be affected as women (Hamid, Ahmed, & Simmons, 2019). The major mechanism for the development of postcolonoscopy appendicitis is barotrauma through intraluminal obstruction such as fecal impaction, which can occur even without obvious evidence of a pre-existing inflammatory condition (Vender et al.,



**FIGURE 2.** Computed tomography revealed increased diameter of the appendix (>7 mm).



**FIGURE 4.** Appearance of the appendix during surgery.

1995). Other mechanisms associated with postcolonoscopy appendicitis include direct intubation into the appendix orifice and a lesion, such as a polyp or tumor, close to the appendix orifice (Al Hillan, Mohamed, Chien, Alshami, & Arif, 2020). The onset of appendicitis can be diagnosed 0–14 days after colonoscopy (Al Hillan et al., 2020; Hamid et al., 2019). The symptoms and signs of postcolonoscopy appendicitis include abdominal pain, nausea and vomiting, and fever, but these manifestations are similar to those that occur after colonoscopy without an inflammation process (Chae et al., 2007). However, the early stage of postcolonoscopy appendicitis may be misinterpreted as gas pain caused by air insufflation during colonoscopy. Because the severity of appendicitis varies among individuals, the incidence of postcolonoscopy appendicitis may be underestimated.

Abdominal CT is the “gold standard” tool for diagnosing postcolonoscopy appendicitis and for revealing other complications, including perforation and peri-appendix abscess. Abdominal CT is also useful for ruling out other causes of postcolonoscopy abdominal pain. Appendectomy is the recommended intervention, especially when appendicitis is accompanied by rupture or abscess formation. However, less severe appendicitis can be treated conservatively without imaging. The incidence of appendicitis after colonoscopy may thus be underestimated.

Barotrauma is the main mechanism underlying postcolonoscopy appendicitis. However, the duration of colonoscopy may play a role in the occurrence of postcolonoscopy appendicitis because the longer the procedure, the larger the degree of air insufflation, which may increase the pressure on the appendix orifice. However, measures can be taken to prevent postcolonoscopy appendicitis. Good colon preparation helps prevent the development of intracolonic fecaliths (Hamid et al., 2019). Reduction of the residual intraluminal pressure in the appendix is also important. Insufflation with carbon dioxide may keep the pressure lower because carbon dioxide is resorbable (Zhang et al., 2018). In addition, interventions for cecum lesions, such as polypectomy, may increase the rate of postcolonoscopy appendicitis because of direct injury to the appendix orifice or, in the case of hot snare polypectomy, thermal injury (Kato et al., 2017; Nemoto, Tokuhisa, Shimada, Gomi, & Maetani, 2015). However, no large database or reviews of these issues are available.

Pre-existing fecaliths in the appendix lumen may also play a role in postcolonoscopy appendicitis. As in diverticulitis, fecal impaction may induce further inflammation. Therefore, precolonoscopy abdominal

CT may be helpful for detecting intraluminal fecaliths. However, pre-existing fecaliths in the appendix lumen do not always induce appendicitis after colonoscopy. Radiation damage by CT can also occur; hence, routine abdominal CT before colonoscopy may be more harmful than helpful.

## Conclusion

Although appendicitis is a rare complication after colonoscopy, the diagnosis may be difficult in less severe cases; hence, the incidence may be underestimated. Other factors that induce postcolonoscopy appendicitis, such as cecum lesion intervention, should be considered. Discomfort after colonoscopy should be monitored, even though the procedure is associated with few complications.

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