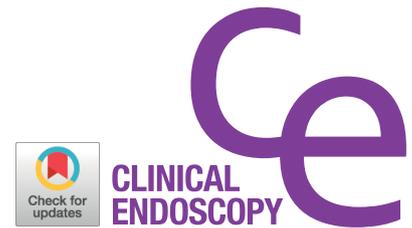


CASE REPORT

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Intussusception after Colonoscopy: A Case Report and Review of Literature

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Intussusception after colonoscopy is an unusual complication. A MEDLINE search revealed only 7 reported cases. We present a report of a 28-year-old man who developed abdominal pain several hours after routine colonoscopy and in whom computed tomography (CT) revealed colocolic intussusception. We postulate that this condition is iatrogenic and induced by suctioning of gas on withdrawal of the colonoscope. A common observation among the reported cases was abdominal pain several hours after colonoscopy and right-sided intussusception. All cases had colonoscopy reaching the right side of the colon. Treatment for adult intussusception remains controversial with regard to reduction versus resection, especially given the high association with a pathological cause and malignancy. Among the 8 reported cases, only the current case did not require surgery. A combination of benign colonoscopy, CT, and the clinical picture should provide sufficient information to initially choose a more conservative treatment approach.

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Key Words: Colonoscopy; Intussusception; Colon; Iatrogenic disease; Adult

INTRODUCTION

Intussusception after colonoscopy is rare. A MEDLINE search revealed only 7 reported cases. We present a report of a 28-year-old man who developed abdominal pain several hours after routine colonoscopy and in whom computed tomography (CT) revealed colocolic intussusception.

CASE REPORT

A 28-year-old man presented with a 2-day history of crampy right iliac fossa pain that began a few hours after

gastroscopy and colonoscopy. The pain was associated with nausea, vomiting, and diarrhea, with a small amount of blood mixed in the stool.

The endoscopy procedure was performed at an external site to investigate iron deficiency anemia. Gastroscopy revealed erosive antral gastritis and duodenal mucosa that appeared atrophic. Colonoscopy was normal to the distal terminal ileum. Biopsies were taken from the stomach, duodenum, terminal ileum, and colon. Histology revealed patchy, mildly active chronic gastritis, which was negative for *Helicobacter pylori*. Other biopsies were normal.

Past medical history included iron deficiency anemia and vitamin D deficiency.

On examination, he had tachycardia at 104 beats/min and fever of 37.7°C. He had right abdominal tenderness with localized guarding.

Laboratory findings showed leukocytosis of $13.2 \times 10^9/L$ (normal range, $4.0\text{--}11.0 \times 10^9/L$) and C-reactive protein level of 252 mg/L (normal range, 0–5 mg/L).

Abdominal CT revealed a 7-cm-long ascending colon to the hepatic flexure colocolic intussusception associated with congestive edema of the proximal large bowel (Fig. 1). There was no evidence of perforation or small bowel obstruction. No ob-

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vious mass lesion acting as an intussusceptum was appreciable on CT.

He was managed with fasting, nasogastric tube decompression, maintenance intravenous fluids, and intravenous ceftriaxone and metronidazole. The symptoms improved without immediate surgery. Thus, colonoscopy was performed with intention to proceed to laparotomy if required. The right colon appeared inflamed and edematous, with a large submucosal nodular swelling at the proximal extent of the inflammation in the proximal transverse colon (Figs. 2, 3). The terminal ileum was entered and appeared normal. Biopsies were taken from the inflamed colon and the suspected intussusceptum site. As intussusception was not present during colonoscopy and the patient was clinically better, laparotomy was deemed unnecessary. Histology showed acute colitis with features not typical of infective or inflammatory colitis but consistent with

the effect of recent intussusception.

The patient continued to improve with normalizing inflammatory markers, and was discharged home 2 days later.

DISCUSSION

Intussusception is an invagination of the bowel, in which a proximal segment (the intussusceptum) telescopes into the lumen of the adjacent distal segment (the intussusciptens).

The occurrence of intussusception is rare in adults, representing approximately 5% of all intussusception cases.¹ In adults, 70%–90% of intussusception is associated with a pathological cause that acts as the lead point in the mechanism of intussusception, such as adhesions, inflammatory lesions, benign tumors, malignant lesions, and Meckel's diverticulum.^{1,3} Malignant causes have been attributed for 24% of adult enteroenteric intussusception. In contrast, there is a far higher association of adult colonic intussusception with malignancy, at approximately 54%–68%.^{1,2} Idiopathic intussusception, the mechanism of which is still poorly understood, accounts for approximately 8%–30% of all intussusception and is more common in small bowel intussusception.^{3,5}

Intussusception after colonoscopy, however, is extremely uncommon. The literature review revealed that only 8 cases, including the present case, have been reported to date. The first case was reported in 2000 by Yamazaki et al.; other cases are mentioned in Table 1.^{6–12} The age of presentation ranged from 19 to 73 years, with a male predominance of 5:2. All patients had onset of abdominal pain within hours of colonoscopy and presented early to the hospital. Remarkably, all

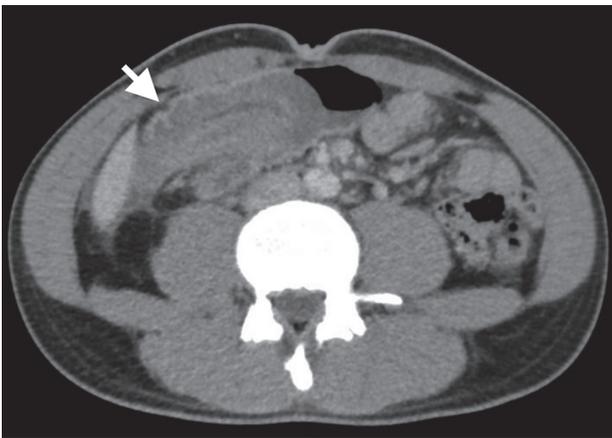


Fig. 1. Computed tomography demonstrating a right-sided colocolic intussusception.



Fig. 2. Colonoscopy—inflamed and edematous colonic mucosa with a large submucosal nodular swelling.



Fig. 3. Colonoscopy—inflamed and edematous colonic mucosa.

sites of intussusception after colonoscopy were on the right side of the colon. Only 1 case was an ileocolic intussusception, while the rest were colocolic intussusceptions. All patients had undergone colonoscopy reaching the right colon. Three cases achieved terminal ileum intubation but terminal ileum biopsy was only reported in 1 case. Of those 3 cases, 1 had an unresectable large polyp in the terminal ileum.

Four cases were managed with laparotomy, 3 of which proceeded with right hemicolectomy, and 1 had an ileocolic resection. The other 3 cases were managed with laparoscopy. Of those, 2 had laparoscopic reduction, and 1 proceeded with colonoscopy to confirm the viability of the colonic mucosa. One laparoscopic case concluded with an endoscopic ileocolic resection. Only our case did not require operative management. Only 1 case had a potential cause for intussusception: a large pedunculated polyp in the terminal ileum. None of the cases had malignant pathology.

A mechanism of intussusception after colonoscopy has been postulated by several authors. Yamazaki et al. suggested that intussusception was induced by hyperperistalsis, which would vent gas and empty the insufflated colon after colonoscopy.⁶

Ho et al. added that post polypectomy edema could be acting as the lead point; however, 2 of the cases (Theodoropoulou et al. and Lasithiotakis et al.) did not allude to any biopsy being performed. In the sole case of ileocolic intussusception, the ileal polyp was the potential lead point.^{7,8,10} Lasithiotakis et al. speculated that aspiration of insufflated air while withdrawing the colonoscope, coupled with ongoing propulsive small intestinal peristalsis and relaxation of the ileocecal valve, led to invagination of the ileal polyp through the ileocecal valve, and development of ileocolic intussusception.¹⁰

We hypothesize that aspiration of gas during withdrawal of the colonoscope would have created a vacuum effect to draw in the proximal colon, causing it to collapse and invaginate into the distal colon as the colonoscope was retrieved. We postulate that this is a phenomenon seen in the right colon because the cecum is mobile and free to move within the abdomen. A similar phenomenon was observed in vivo in a case reported by Santos-Antunes et al., in which colonoscopy was performed for a patient with a colonic volvulus.¹³ The authors observed intussusception occurring during colon decompression and retrieval of the scope.¹³

Table 1. Review of Reported Post Colonoscopic Intussusception Cases

Study	Age/ Gender	Pre-morbid colonoscopy report	Presenting complaints ^{a)}	Site of intus- susception	Type of intus- susception	Operative strategy
Yamazaki et al. (2000) ⁶	48/M	Two 5 mm polyp in the caecum and hepatic flexure, biopsied	1/7 abdominal pain	Right colon	Colo-colic	Laparotomy+Ileocolic resection
Theodoropoulou et al. (2009) ⁷	19/M	Ileo-colonoscopy	1/7 abdominal pain	Right colon	N/A	Laparotomy+Right hemicolectomy
Ho et al. (2010) ⁸	32/M	Small polyp mid ascending colon removed with snare cautery	1/7 RLQ pain V	Ascending colon	Colo-colic	Laparoscopic reduction +intraoperative colonoscopy
Nachnani et al. (2012) ⁹	73/F	Normal to caecum+random colonic biopsy	1/7 RLQ pain	Hepatic flexure	Colo-colic	Laparoscopic reduction
Lasithiotakis et al. (2012) ¹⁰	58/ M?F ^{b)}	4-cm diameter pedunculated polyp in the terminal ileum approximately 10 cm from the ileocecal valve	1/7 abdominal pain NVD	Terminal ileum	Ileocolic	Laparotomy+Right hemicolectomy
Lee et al. (2013) ¹¹	47/M	15-mm non-polypoid lesion (0-IIa type) located at the caecal base, polypectomy	1/7 abdominal pain	Caecum	Colo-colic	Colonoscopy+laparotomy +Right hemicolectomy
Min et al. (2017) ¹²	31/F	No significant abnormality, mild congestion throughout the colon. Patent colorectal anastomosis in mid rectum	1/7 abdominal pain	Right colon	Colo-colic	Laparoscopic exploration +ileocolic resection
Current (2017)	28/M	Normal to ileum. Random colon biopsies	2/7 abdominal pain NV fever	Right colon	Colo-colic	Colonoscopy

RLQ, right lower quadrant; NVD, nausea, vomiting, diarrhea; N/A, not available.

^{a)}1/7=1 day, 2/7=2 day, whereby the denominator 7 indicates 7 days in one week.

^{b)}It was initially written as 58 year old man in the abstract but changed to 58 year old women in the case report.

Clinical presentation of adult intussusception can be non-specific but generally involves abdominal pain and signs of bowel obstruction.¹⁴ Symptoms of intussusception after colonoscopy may be common to those of other complications after colonoscopy. Hence, CT was the preferred diagnostic tool for all reported cases of intussusception after colonoscopy.

The radiologic finding in CT is described as a “target sign”, with the intussusceptum in the center and the edematous intussusciptens forming the external ring.⁵ While some studies have shown that a lead point is identifiable in up to 32% of cases (28 of 88 scans reviewed) it may not always be distinguishable in prolonged intussusception.³ Impaired circulation of the mesenteric vessels may lead to bowel edema and thickened bowel loops make it difficult to discern a lead mass from inflammation because of the amorphous appearance.^{5,15} However, additional valuable information, such as metastasis or lymphadenopathy, is readily obtained with CT and may indicate an underlying pathology.¹⁶ Ultrasound tends to be less accurate for diagnosis in adults than in children but may still reveal a target or doughnut-ring sign.¹⁴

Treatment for adult intussusception remains controversial, mainly with regard to reduction versus primary resection. Because there is a high association with a pathological cause in adult intussusception and malignancy, especially in colonic cases, most authors agree on surgical exploration. Prior to the mid-1950s, manual reduction before resection was advocated. This would, in theory, permit a more limited resection.⁴ However, with the increased awareness of the association with malignancy, the concepts of seeding and venous dissemination upon operative manipulation have led to recommendations for primary resection without initial reduction as the treatment of choice, except in unusual circumstances. Nevertheless, there have been no significant data to support this concern.^{1,2,4,17} In recent years, the widespread use of CT has increased the detection of intussusception, particularly in individuals without a lead point.^{3,15} More recent studies have started to re-evaluate the operative mandate of managing adult intussusception. Rea et al. conducted a retrospective study of 170 adult intussusception cases.¹⁸ Excluding those that were terminally ill and explorative trauma cases, 84% were managed nonoperatively, including those that were symptomatic (63.6%). Fifteen of the explored patients did not have intussusception on the table. However, it is important to note that 93% of this nonoperated study group were enteroenteric adult intussusceptions.¹⁸ In another study, asymptomatic patients without a lead point on CT were regarded safe to manage without an operation, assuming a transient phenomenon. Operative exploration in asymptomatic patients was also routinely negative. Similarly, the majority of patients had enteroenteric intussusception.³

As the current general consensus that surgical resection should be performed for colonic adult intussusception due to the high association with neoplastic etiology, excluding the single case with the large polyp, it is not surprising that 4 of the 7 reported cases were managed with bowel resection despite benign colonoscopy.

Considering that patients with an intussusception after colonoscopy would already have undergone a recent colonoscopy, such cases are unique compared to the usual demographic of adult intussusception that mandates operative management. The combination of normal pre-morbid colonoscopy, CT without signs of bowel compromise, and a clinically stable patient, there should be enough information for clinician to opt for a more conservative initial approach with a colonoscopy.

Conflicts of Interest

The authors have no financial conflicts of interest.

Author contributions

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 Formal analysis: WAWH
 Funding acquisition: WAWH
 Investigation: WAWH
 Methodology: WAWH
 Resources: WAWH
 Supervision: WT
 Validation: WAWH
 Visualization: WAWH
 Writing-original draft: WAWH
 Writing-review & editing: WAWH, WT

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