

When perforation is not the culprit : case report and systematic review of mechanical small-bowel obstruction complicating colonoscopy

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Abstract

Colonoscopy is generally safe, although expansion of colorectal cancer prevention programs is likely to increase the number of post-colonoscopy complications. We report the case of a 42-year-old woman with a prior history of 2 cesarean section deliveries who developed abdominal pain after an otherwise uneventful screening colonoscopy. Urgent exploration revealed closed-loop obstruction involving the terminal ileum, caused by an adhesive band close to the site of her previous Pfannenstiel incision. A systematic review of the literature revealed 11 reports (1985-2008) describing a total of 13 cases of mechanical small bowel obstruction (MSBO) after colonoscopy, 9 of which were confirmed by laparotomy. Colonoscopy-induced MSBO is practically impossible to anticipate, and only a prior history of abdominal/pelvic surgery may be deemed as a predisposing factor. However, it is related to significant morbidity, as it often leads to an ischemic bowel with need for surgical resection. Thus, endoscopists should be aware and maintain a low operative threshold to this rare, but hazardous, complication of colonoscopy. (*Acta gastroenterol. belg.*, 2018, 81, 89-92).

Keywords : small bowel obstruction, colonoscopy, complications, intestinal ischemia

Introduction

Colonoscopy is a widely performed diagnostic-therapeutic procedure and the mainstay of colorectal cancer prevention. Complications of colonoscopy such as bleeding and perforation are mostly reported in patients undergoing polypectomy, while diagnostic colonoscopy has a relatively low rate of serious complications roughly estimated to 2.8 cases/1000 procedures (1).

Herein, we describe a rare case of mechanical small-bowel obstruction (MSBO) complicating an otherwise uneventful screening colonoscopy. Moreover, we systematically review the literature aiming to identify the risk factors and describe the outcomes associated with this unusual, but potentially serious, complication of colonoscopy. For this purpose, MEDLINE/PubMed was searched up to February 2016 for English-language reports using a combination of the following keywords: small bowel, obstruction, colonoscopy, complications. The reference lists of all retrieved articles were also searched.

Case presentation

A 42-year old female underwent screening colonoscopy due to a positive family history of colon cancer. The

patient had been healthy but had a prior history of 2 cesarean section deliveries, both performed via a Pfannenstiel incision 18 and 15 years earlier. A skilled endoscopist (>18.000 colonoscopies ; 15 years of experience) performed the procedure after premedication of the patient with midazolam (3mg). The scope was advanced to the cecum without excessive manipulation and/or an excessive amount of air insufflation, and without need for patient repositioning or external pressure. There were no pathological findings and no biopsy specimen was taken. There was no complaint of pain throughout the procedure and the patient was discharged home uneventfully.

Six hours later the patient developed gradual onset of abdominal pain accompanied by nausea and was admitted to the hospital. On physical examination she was afebrile and there was mild periumbilical tenderness without distension, guarding, or signs of peritoneal irritation. A complete blood count and blood chemistry tests were normal. Erect abdominal x-ray showed a few dilated small-bowel loops, but there were neither air-fluid levels nor free intraperitoneal air. The patient was hospitalized and managed conservatively including bowel rest, nasogastric tube insertion, intravenous fluids and broad-spectrum antibiotics. Over the subsequent hours the abdominal pain worsened and there was diffuse tenderness. A CT scan of the abdomen and pelvis (Figure 1a, 1b) showed a few loops of small bowel in the pelvis forming a narrow transition point ("beak sign") together with mesenteric fat stranding, vascular congestion and a small amount of low density free peritoneal fluid. These findings were suspicious for a closed-loop obstruction with ongoing mesenteric and bowel ischemia. Emergency laparoscopy confirmed a strangulated closed-loop obstruction involving the terminal ileum, about 40 cm proximal to the ileocecal valve. The herniated segment was found to be strangulated within an adhesive band causing a small window close to

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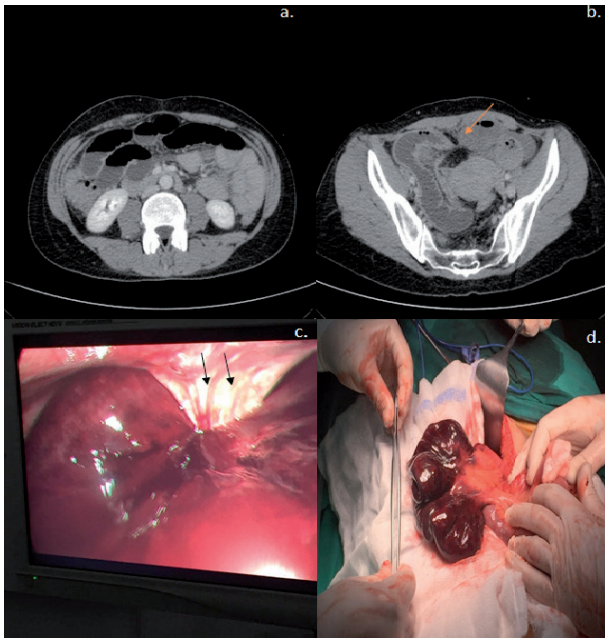


Figure 1.— a. Multi-slice contrast-enhanced CT of the abdomen and pelvis (18 hours from admission) showing dilated small bowel with air-fluid levels and surrounding mild amount of fluid. b. The afferent and efferent loops showing positive beak sign (red arrow) suggesting adhesive band. c. Laparoscopic view showing a strangulated closed-loop obstruction involving the terminal ileum. The herniated segment was found to be strangulated within an anterior abdominal wall adhesive band causing a small window (black arrows) close to the site of previous Pfannenstiel incision scar. d. Laparotomy view of a 20 cm strangulated loop of distal ileum which was not viable and had to be resected.

the site of her previous Pfannenstiel incision scar (Figure 1c). Following conversion to laparotomy, a 20 cm non-viable intestinal segment (Figure 1d) was resected and continuity was restored with a primary anastomosis. The patient was discharged 6 days later after making an unremarkable recovery.

Discussion

Acute abdominal presentation after colonoscopy is relatively rare and is most commonly associated with colonic perforation generally reported at a rate of less than 0.1% (2). Our case suggests that adhesive MSBO leading to intestinal necrosis may be precipitated by an otherwise uneventful colonoscopy. Early identification of this unusual complication is key for prompt surgical management, allowing to decrease MSBO-related morbidity and mortality. We initially managed conservatively our patient considering this to be a case of paralytic bowel, as there were only moderate clinical findings upon presentation. Postcolonoscopy adynamic ileus is indeed likely to occur, triggered by a combination of mechanisms including sympathetic overstimulation, excessive air insufflation, the opioid effect of sedatives and bowel preparation-induced electrolytic imbalances

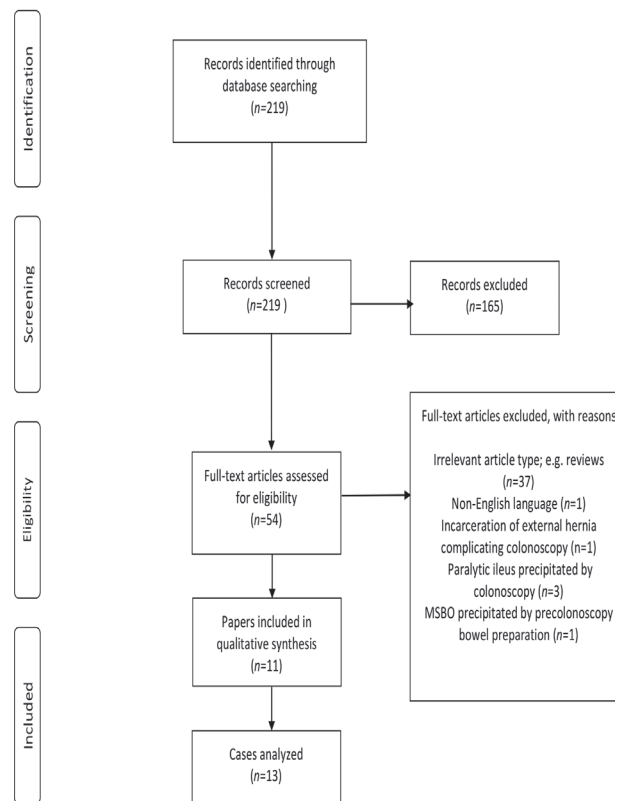


Figure 2.— PRISMA flowchart showing selection of published reports on colonoscopy-induced MSBO.

(3). There have been only 4 previous laparotomy-confirmed cases of colonoscopy-induced MSBO caused by adhesions (4-7). Nevertheless, our case has unique features including: a) laparotomy-confirmed evidence of a closed-looped obstruction; a specific type of mechanical obstruction prone to lead quickly and unpredictably to strangulation (8); b) it is etiologically linked to a prior history of cesarean deliveries; widely performed procedures, with a significant burden of adhesion formation (9).

A systematic review of the literature (Figure 2) permitted identification of 11 publications between 1985 and 2008 (case reports = 10 (4-7,10-15), letter = 1 (16)) reporting on a total of 13 patients with MSBO precipitated by colonoscopy (Table 1). The median age was 56 years (range: 36-75) with a predominance of males (9-13). The direct cause of MSBO was described in 11/13 cases, including 9 cases confirmed by laparotomy. The remaining two cases were managed conservatively, thus a presumptive diagnosis of MSBO was based on clinical grounds and/or imaging findings (14,15). Incarceration of small bowel through postoperative band adhesions was the most common cause of MSBO (n = 4), followed by other type of internal hernias (herniation through a mesenteric defect: 2 (10,12), paracecal hernia: 1 (13), Richter's hernia: 1 (11)). Additionally, a single report of colonoscopy-induced ileal volvulus was published in 1985 (16), whereas a more recent one described a mesenteric root torsion (14). The ileum

Table 1. — Published reports of mechanical small-bowel obstruction (MSBO) precipitated by colonoscopy

Author/Country/ Year [Ref]	Gender, Age (yrs)	Prior surgical history	Procedural details	Onset of symptoms •	Cause of MSBO	Management
Keeffe/USA/1985 (16)	M, 36	Right hemicolectomy 10 yrs earlier, Sigmoidectomy 3 yrs earlier	Colonoscopy, without difficulty	4 days	Ileal volvulus	Laparotomy with resection
Wallner/ Austria/1994 (7)	F, 52	Appendicectomy 30yrs earlier	Colonoscopy, without difficulty	2 hrs	Strangulation of the terminal ileum by adhesive bands	Laparotomy with resection
Patterson/ Canada/2000 (13)	M, 59	Inguinal hernia repair	Colonoscopy; polypectomy, some difficulty	NR	Incarceration of ileum into a paracecal hernia	Laparotomy with reduction
Malki/ Australia/2001 (12)	M, 75	Resection of a jejunal carcinoid 4 yrs earlier	Colonoscopy ; ileoscopy ; poly-pectomy, no immediate complications	2 days	Strangulation through a mesenteric defect	Laparotomy with resection
	M, 73	Colon cancer resection 11 yrs earlier	Colonoscopy, uneventful	3 days	NR	Conservative
	M, 51	Sigmoid cancer resection 1yr earlier	Colonoscopy; polypectomy, uneventful	24 hrs	NR	Conservative
Gonzalez Ramirez/ Spain/2003 (4)	F, 62	Histerectomy, Appendicectomy	Colonoscopy, without difficulty	4 hrs	Strangulation by adhesions at the McBurney incision site	Laparotomy with resection
Raghavendran/ USA/2003 (6)	M, 68	Augmentation cecostytoplasty 4 yrs earlier	Colonoscopy, well-tolerated	24 hrs	Incarceration by a band adhesion	Laparotomy with lysis of a band adhesion
Chung/USA/2003 (10)	F, 65	Hysterectomy	Colonoscopy, without difficulty	NR	Incarceration of a segment of distal jejunum and proximal ileum through a sigmoid mesenteric defect	Laparotomy with resection
Zanati/Canada/2005 (15)	M, 47	Splenectomy 10 yrs earlier	Colonoscopy; biopsies, no immediate complications	Almost immediately	Strangulation by adhesions or internal hernia*	Conservative
Yarze/ USA/2006 (14)	M, 38	None	Cononoscopy; ileoscopy, without difficulty	24 hrs	Torsion of the mesenteric root*	Conservative
Fluri/ Switzerland/2006 (11)	M, 53	None	Colonoscopy	1 day	Richter's hernia involving the terminal ileum	Laparotomy with reduction
Hunter/United Kingdom/2008 (5)	F, 60	Colpopexy via a Pfannenstiel incision 20 yrs earlier	Colonoscopy; polypectomy; biopsies, without immediate complications	8 hrs	Strangulation of mid ileum within a congenital band adhesion	Laparotomy with resection
Present case/ Greece/2016	F, 42	Cesarean section deliveries 18 and 15 yrs earlier	Colonoscopy, without difficulty	4 hrs	Closed-loop strangulation of the terminal ileum by a postoperative adhesive band	Laparotomy with resection

NR : Not reported ; M : Male ; F : Female. • Interval between colonoscopy and the onset of intestinal obstructive symptoms. * Presumptive cause of MSBO lacking laparotomy confirmation in patients with conservative management.

was the intestinal segment involved in all 6 reports addressing the exact site of intestinal obstruction (5,7, 10,11,13,16). The vast majority of patients (10-13) had a prior history of intraabdominal or pelvic surgery, including gynecologic procedures, colonic resection and appendicectomy. Colonoscopy-induced MSBO caused by adhesions occurred within a few years to decades after the index operation, ranging from 4 years in a patient with prior cecostytoplasty (6) to 30 years in a patient with appendicectomy (7). Most cases of MSBO resulted from elective diagnostic/screening examinations with or without biopsies, whereas resection of diminutive/

small polyps was performed in 4 cases. Conventional air insufflation was used in all cases, likely to account for increased intraluminal pressures. In contrast, no case of post-colonoscopy MSBO has been reported using carbon dioxide (CO₂), an insufflating agent causing less luminal distention. The intestinal obstructive symptoms usually occurred within 24 hours from colonoscopy, although there are reports of presentation as late as 3-4 days (12,16). Interestingly, a significant degree of technical difficulty on carrying out the procedure was only noted in one case (13). Including our case, management of colonoscopy-induced MSBO required

laparotomy in 10/14 cases, and only 4 cases resolved without incident under conservative treatment. As in our case, the majority of previously published cases (7-13) led to strangulation with bowel necrosis, thus exposing the patient to the additive risks of surgical intervention.

In conclusion, MSBO is an unpredictable complication of colonoscopy resulting in significant morbidity, as it often leads to bowel necrosis requiring surgical resection. Contributing factors may be given by the increased sympathetic tone, excessive inflation of the intestine through an incompetent ileocecal valve and increased abdominal pressure during colonoscopy, accounting for the forceful encapsulation and strangulation of the small bowel by adhesions or other potential internal herniation orifices. Patients with a history of abdominal/pelvic surgery, even performed several decades ago, should be considered as the population at risk for developing colonoscopy-induced MSBO. Timely operative management is crucial to the outcome; however, there are few or no surrogates of early diagnosis and prompt recognition of colonoscopy-induced MSBO is often challenging on clinical grounds. Thus, in patients with postcolonoscopy abdominal pain, clinicians should be aware and maintain a low threshold for intervention regarding this rare, but hazardous, complication.

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