

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://Elsevier.com/locate/radcr>

Case Report

Small bowel volvulus around caesarian section scar adhesions

Adam Wright MD^{a,*}, Suzanne Chong MD, MS^a, Jonathon Willatt MChB^b

^a Division of Emergency Radiology, Department of Radiology, University of Michigan, Taubman Center F1 B1 Room 140A 1500 E Medical Center Drive, SPC 5302, Ann Arbor, MI 48109, USA

^b Vascular and Interventional Radiology, Department of Radiology, University of Michigan, Ann Arbor, MI 48109, USA

ARTICLE INFO

Article history:

Received 12 January 2017

Received in revised form

20 April 2017

Accepted 29 April 2017

Available online 16 June 2017

Keywords:

Volvulus

Small bowel obstruction

Caesarian section

ABSTRACT

Small bowel obstruction secondary to adhesions is a recognized complication of Caesarian section. However, obstruction due to small bowel volvulus caused by adhesions at the Caesarian-section scar has not been reported. We report such a case identified on computed tomography. We review the literature on small bowel volvulus in pregnant patients and discuss the computed tomography findings.

© 2017 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Small bowel volvulus is well-recognized in infants and children but occurs rarely in adults. Small bowel volvulus secondary to adhesions to a C-section scar has not been reported in the medical literature. We present a case of small bowel volvulus because of adhesions to the C-section scar that led to bowel necrosis and subsequent surgical resection.

Case report

A previously healthy 35-year-old female presented to the Emergency Department with 1 day of crampy periumbilical pain radiating to the back associated with nausea and emesis. Her past surgical history was significant for a

primary low transverse C-section 2 years previously. Computed tomography (CT) of the abdomen and pelvis with oral and intravenous contrast demonstrated small bowel dilatation with wall thickening and enhancement consistent with edema and vascular congestion. A moderate amount of free intraperitoneal fluid was present raising concern for bowel ischemia. Among the dilated bowel loops, a “whirl” of mesenteric fat and mesenteric vessels was noted. The dilated loops of small bowel “beaked” in the low abdomen toward the apex of the mesenteric swirling (Fig. 1). This combination of findings was consistent with a volvulus. The superior mesenteric vein (SMV) twisted around the superior mesenteric artery (SMA), and there was narrowing of the SMV branches (Fig. 2). A small soft-tissue mass extended from the uterine fundus into the apex of the volvulus and continued as a thin, linear band toward the anterior

Competing Interests: The authors have declared that no competing interests exist.

* Corresponding author.

E-mail address: atwright@med.umich.edu (A. Wright).

<http://dx.doi.org/10.1016/j.radcr.2017.04.022>

1930-0433/© 2017 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

abdominal wall at the site of the prior C-section (Figs. 3-5). The uterus was retracted anteriorly and appeared to be tethered by the swirling small bowel. At laparotomy, the small bowel was found to be twisted around a thick band of adhesions at the prior C-section scar. Approximately 85 cm of distal jejunum and most of the ileum was found to be frankly necrotic. This was resected and the adhesions were lysed. Two days later, follow-up exploratory laparotomy demonstrated viable small bowel, and the small bowel anastomosis was completed at that time. The patient recovered fully without complication.

Discussion

Small bowel volvulus occurs when the small bowel twists abnormally around its mesenteric axis causing a mechanical bowel obstruction, resulting in bowel ischemia and necrosis if there is also torsion and occlusion of the mesenteric vasculature. Small bowel volvulus is rare in adults, with an incidence of 1.7-5.7 cases per 100,000 adults [1]. In a large population-based study, small bowel volvulus accounted for 1% of all bowel obstructions [2]. Most patients presented emergently (89%), and 65% were treated surgically. Overall mortality in hospitalized patients was 8%.

Primary or idiopathic small bowel volvulus is very rare. Secondary causes of small bowel volvulus include adhesion bands, mesenteric or omental defects, stomas, pregnancy, diverticula, midgut malrotation, and prior surgery [3]. The clinical diagnosis of small bowel volvulus in adults can be difficult because the symptoms are often intermittent and vague and can be mistaken for irritable bowel syndrome, peptic ulcer, biliary, pancreatic, or even psychiatric disease [4]. Involvement of the small bowel ranges from short segments to the entire small bowel. Surgical treatment involves detorsion of the bowel, resection of gangrenous segments, and treatment of the underlying cause [5].

Up to 9% of all intestinal obstructions during pregnancy are attributed to small bowel volvulus [6]. The underlying mechanism of small bowel volvulus in pregnancy is thought to be related to the gradual increase in uterine size during



Fig. 2 – The superior mesenteric vein (SMV) branches twist around a small caliber superior mesenteric artery. The SMV branches are markedly diminutive (arrow), narrowed by the volvulus.

pregnancy, causing partial obstruction, proximal distension, and torsion at the point of fixation [6–8]. The reduced intra-abdominal space caused by the gravid uterus may prevent spontaneous detorsion. The sudden decrease in uterine size following delivery may predispose to volvulus due to rapid repositioning of intra-abdominal organs [9]. Caesarian section is a risk factor for developing adhesions and for small bowel obstruction, with an estimated incidence of 0.5-2.2 per 1000 [10,11]. Multiple Caesarian deliveries increase the risk for adhesions and obstruction, with the incidence of bowel obstruction increasing to 9 of 1000 for women with 3 prior Caesarian deliveries [11]. For other gynecologic surgeries, the risk of developing small bowel obstruction secondary to adhesions is much higher, estimated at 16.3 per 1000 cases of hysterectomy [10].

The imaging evaluation of small bowel volvulus often starts with abdomen radiographs, which are often normal or nonspecific. CT is the modality of choice, allowing depiction of anatomic structures in multiplanar detail. Small bowel volvulus should be differentiated from other causes of small bowel obstruction which may respond favorably to conservative management. Several key CT findings are described for small bowel volvulus. The “whirl sign” describes bowel loops, mesenteric fat, and surrounding soft tissue encircling twisting mesenteric vessels and was first described by Fisher in 1981 [12]. If the whirl sign demonstrates twisting of at least 90 degrees or more, the reported sensitivity for detecting small bowel volvulus is 64% [13]. In most cases of small bowel volvulus, the whirl sign rotates at least 180 degrees [13]. The “beak sign” refers to fusiform tapering of compressed bowel loops at the site of twisting. The tip or apex of the beak indicates the point of rotation [12]. The abnormal positioning of the SMA and SMV can be a clue to small bowel volvulus, reflecting the twisting of the mesenteric vessels during volvulus. The courses of the SMA and SMV and their larger, proximal branches are typically straight, fanning out distally with the mesenteric leaves, with the SMA located to the left of and slightly posterior to the SMV. Rotation of the vessels and/or reversed

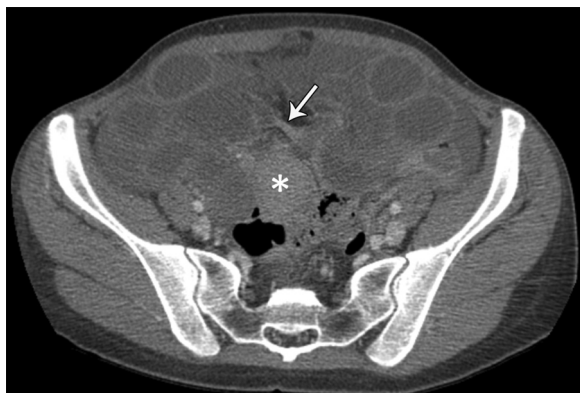


Fig. 1 – Beaking of the small bowel loops toward the apex of the volvulus (arrow) near the uterine fundus (*).

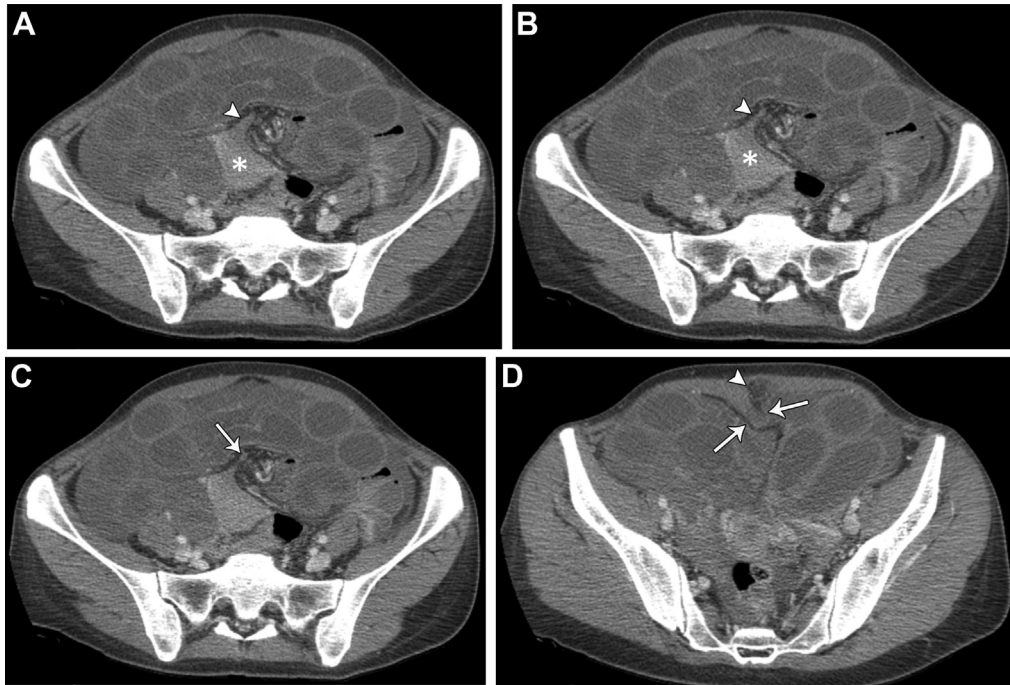


Fig. 3 – The uterus (*) is situated high in the pelvis nearly at the iliac crests due to retraction by the twisting small bowel loops. A small mass of tissue is closely associated with the uterine fundus and extends into the apex of the volvulus (Figs. 3A and B and Fig. 4, arrowheads) and then becomes a thin band of tissue (Fig. 3C, arrow, and Fig. 5, arrowheads). The tissue connects to the C-section scar on the anterior abdominal wall (Fig. 3D and Fig. 5, arrows). Note the irregularity of the abdominal wall due to C-section, with a small amount of fat interposed between the rectus abdominis muscles (Fig. 3D, arrowhead).

positioning of the vessels with respect to each other are suggestive of volvulus. Dilation of the SMV due to obstruction of venous return may be a sensitive sign, identified in 8 of 9 cases in a small case series [14]. Since volvulus results

in closed loop obstruction, proximal bowel dilatation is often present, as well as hyperemia. Bowel wall thickening due to edema and ischemia can be observed when blood flow is obstructed. Additional findings of ascites and

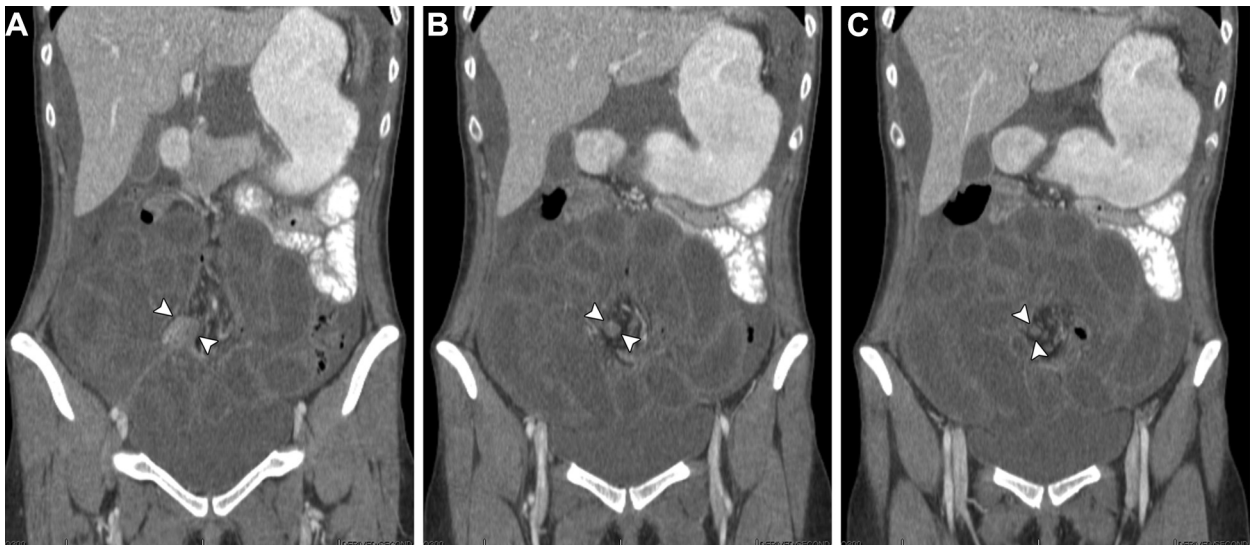


Fig. 4 – A small mass of tissue is closely associated with the uterine fundus and extends into the apex of the volvulus (Figs 3A and B and Fig. 4, arrowheads).

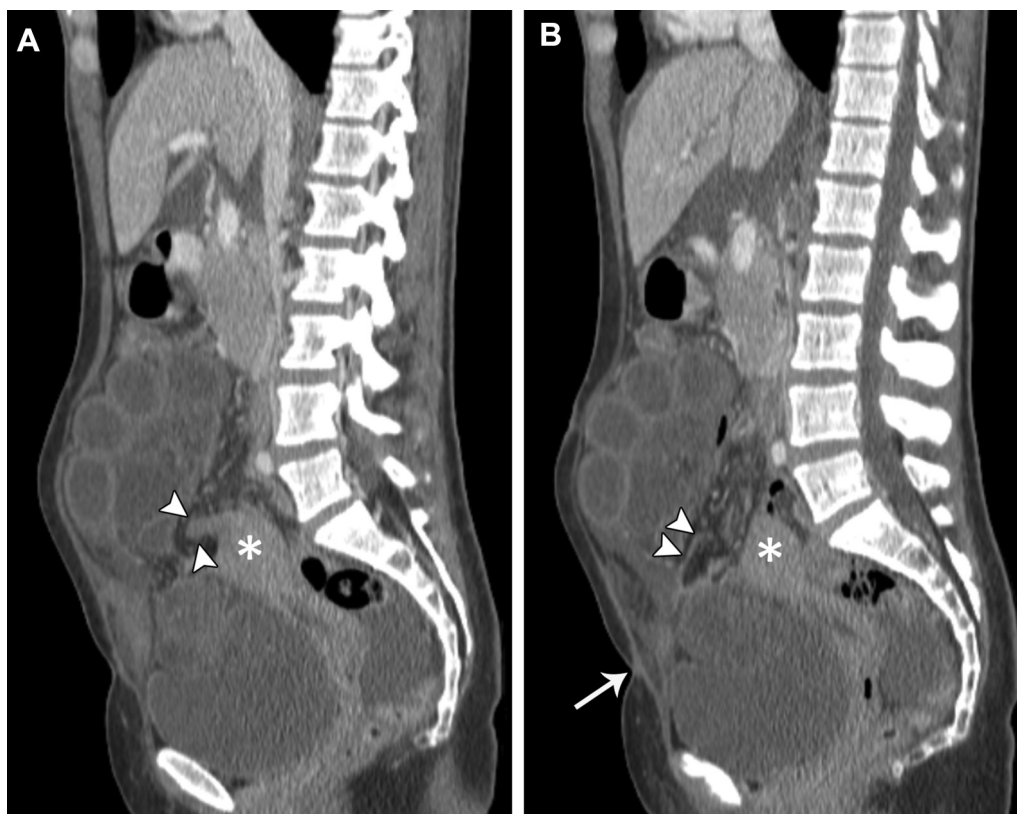


Fig. 5 – The uterus (*) is situated high in the pelvis nearly at the iliac crests due to retraction by the twisting small bowel loops. The small bowel loops beak around a thin band of tissue that extends from the point of the volvulus (Fig. 5, arrowheads) and connects to the C-section scar on the anterior abdominal wall (Fig. 3D and Fig. 5, arrows).

pneumatosis suggest bowel ischemia. Perforation and free intra-abdominal air may be seen as late complications.

REFERENCES

- [1] Katis P, Dias S. Volvulus: a rare twist on small bowel obstruction. *Can Med Assoc J* 2004;171(7):728.
- [2] Coe T, Chang D, Sicklick J. Small bowel volvulus in the adult populace of the United States: results from a population-based study. *Am J Surg* 2015;210(2):201–10.
- [3] Huang JC, Shin JS, Huang YT, Chao CJ, Ho SC, Wu MJ, et al. Small bowel volvulus among adults. *J Gastroenterol Hepatol* 2005;20(12):1906–12.
- [4] Fukuka T, Brown B, Lu C. Midgut volvulus as a complication of intestinal malrotation in adults. *Dig Dis Sci* 1993;38(3):438–44.
- [5] Kapadia M. Volvulus of the small bowel and colon. *Clin Colon Rectal Surg* 2017;30(1):40–5.
- [6] Dilbaz S, Gelisen O, Caliskan E, Caliskan S, Gokcin H, Haberal A. Small bowel volvulus in pregnancy. *Eur J Obstet Gynecol Reprod Biol* 2003;111(2):204–6.
- [7] Harer Jr W, Harer Sr W. Volvulus complicating pregnancy and puerperium: report of three cases and review of the literature. *Obstet Gynecol* 1958;12(4):399–406.
- [8] Kantor H. Midgut volvulus in pregnancy. *J Reprod* 1990;35(5):577–80.
- [9] Sherer D, Abulafia O. Postcesarean small bowel volvulus: case report and review of the literature. *Gynecol Obstet Invest* 2001;51(1):69–72.
- [10] Al-Took S, Platt R, Tulandi T. Adhesion-related small-bowel obstruction after gynecologic operations. *Am J Obstet Gynecol* 1999;180(2pt1):313–5.
- [11] Andolf E, Thorsell M, Kallen K. Cesarean delivery and risk for postoperative adhesions and intestinal obstruction: a nested case-control study of the Swedish medical birth registry. *Am J Obstet Gynecol* 2010;203(4):401–6.
- [12] Fisher J. Computed tomographic diagnosis of volvulus in intestinal malrotation. *Radiology* 1981;140:145–6.
- [13] Gollub M, Yoon S, Smith L, Moskowitz C. Does the CT whirl sign really predict small bowel volvulus?: experience in an oncologic population. *J Comput Assist Tomogr* 2006;30(1):25–32.
- [14] Feng S-T, Chan T, Sun CH, Li ZP, Guo HY, Yang GQ, et al. Multiphasic MDCT in small bowel volvulus. *European journal of radiology* 2010;76(2):13–8.