

Cecal Volvulus: The CT Whirl Sign

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Abstract. Cecal volvulus is a rare, but potentially fatal, cause of intestinal obstruction. As computed tomographic (CT) scanning is often the initial diagnostic test in patients with acute abdominal pain, we reiterate the importance of the “whirl sign” in diagnosing intestinal volvulus. We report the first description of the CT diagnosis of cecal volvulus.

Key words: Intestinal obstruction, cecal volvulus—Mesentery.

Cecal volvulus is a rare cause of intestinal obstruction accounting for approximately 1% of cases [1]. Once diagnosed, it is a surgical emergency. Classically, the diagnosis of cecal volvulus has relied upon plain film and barium enema studies. The “whirl sign” has previously been described as a finding on CT scan with both midgut volvulus [2–4] and with sigmoid volvulus [5]. We present a case of cecal volvulus which demonstrated this finding. To our knowledge, this has not been previously reported in the literature.

Case Report

A 72-year-old woman presented to the emergency room complaining of increasing abdominal distention, crampy severe abdominal pain, constipation, and a fever of 99°F for the past 2 days. The physical examination showed a firm, massively distended tympanic abdomen with decreased bowel sounds, and diffuse tenderness. Laboratory tests were significant for a white blood cell count of 18.6 K/CUMM. The patient’s past surgical history was significant for an appendectomy, an umbilical hernia repair, and a left radical mastectomy for breast carcinoma.

The abdominal radiograph demonstrated several air-filled dilated loops of bowel, all interpreted as small bowel. Incidentally

noted were several calcified mesenteric lymph nodes in the right mid-abdomen.

A computed tomographic (CT) scan of the abdomen and pelvis, performed later that day, demonstrated multiple dilated loops of small bowel. There was a markedly dilated (12 cm) air- and feces-filled loop of bowel in the anterior left abdominal cavity. This loop could be followed to the right side of the abdomen where it tapered in size and coursed superiorly into a whirl-like structure (Fig. 1). This was interpreted as a massively distended cecum leading to a point of torsion around its mesentery, compatible with volvulus. Incidental note was made of several calcified mesenteric lymph nodes in the region of the twisted mesentery. A water-soluble contrast enema was performed to confirm the diagnosis and ascertain the exact point of obstruction (Fig. 2).

The patient underwent surgery where cecal volvulus was confirmed. A right hemicolectomy with an end-to-end ileocolic anastomosis was performed. The patient had an unremarkable postoperative course and was discharged from the hospital 13 days after admission.

Discussion

Cecal volvulus accounts for 11% of all intestinal volvulus [6]. In most cases, cecal volvulus is truly an ileocolic torsion with only 10% representing a cecal bascule [7]. In recent series, the average patient age ranged from 53.3 [8] to 62.3 years [6]. A slight female predominance was found, with a female to male ratio of 1.4 to 1.0 [8].

It is generally accepted that a freely mobile cecum on a mesentery is a prerequisite for cecal volvulus. Other factors, such as previous abdominal surgery, have been suggested as having a role, with adhesions acting as a fulcrum for the torsion [9]. In our patient, we believe that a combination of these two factors, as well as a third, led to the volvulus. Calcified lymph nodes, indicative of prior granulomatous disease, are present in the torsed cecal mesentery. It is possible that the resultant scarring from this process added to the fulcrum effect leading to the cecal volvulus.

Plain abdominal radiographs have been reported to be diagnostic of cecal volvulus in only 44–46% of cases [6–8]. The classical finding of cecal volvulus on

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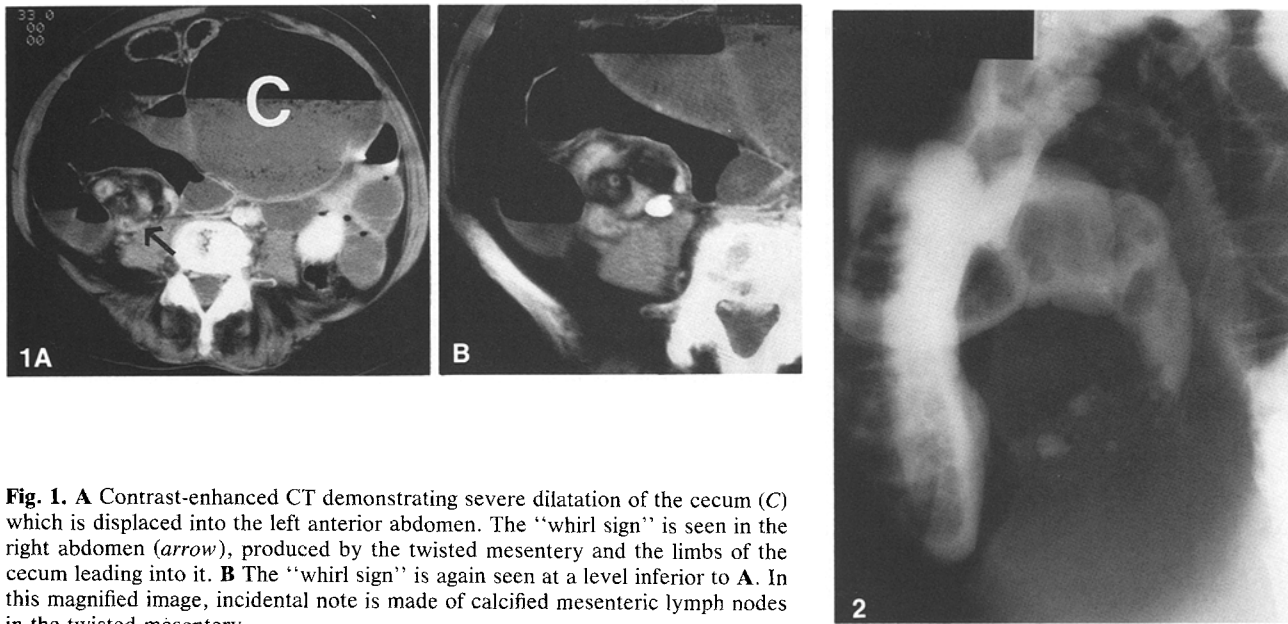


Fig. 1. **A** Contrast-enhanced CT demonstrating severe dilatation of the cecum (C) which is displaced into the left anterior abdomen. The "whirl sign" is seen in the right abdomen (arrow), produced by the twisted mesentery and the limbs of the cecum leading into it. **B** The "whirl sign" is again seen at a level inferior to **A**. In this magnified image, incidental note is made of calcified mesenteric lymph nodes in the twisted mesentery.

Fig. 2. Oblique spot film of the hepatic flexure reveals a tapered cut-off of the column of contrast in the distal ascending colon in the region of several calcified lymph nodes. Contrast is seen in the right ureter from the prior CT scan.

plain film is the "coffee bean" sign. In one study, 30% of plain films were misinterpreted as small bowel obstruction [8]. In our case, multiple air-filled loops were present and interpreted as small bowel. In retrospect, one of these was most likely the abnormal cecum.

Contrast enema has been diagnostic in 83–90% of cases [6–8]. The typical finding is a tapered narrowing or cut off of the column of contrast with a convergence of the mucosal folds. With the increasing use of CT scanning as an initial imaging modality in patients with acute abdominal symptoms and for evaluating bowel abnormalities, we feel that recognition of bowel volvulus by CT scan is worth reiterating. We also demonstrate the first report of the "whirl sign" associated with a cecal volvulus.

The "whirl sign" originally described by Fisher [2] was found on CT in a case of midgut volvulus. The center of the whirl was the superior mesenteric artery and the whirled appearance was created by the encircling loops of bowel. This was again reported by Paul and Dean [3] and more recently by Izes et al. [4]. In 1985, Shaff et al. extended the definition of the "whirl sign" to include the CT appearance of sigmoid volvulus [5]. In this, the whirl was made by the twisted mesentery and the afferent and efferent limbs

of sigmoid colon which led to the point of volvulus. Our case demonstrates this type of whirl in a patient with cecal volvulus. The actual whirl is comprised of the twisted mesentery, as well as collapsed cecal and distal ileal loops. This finding, in conjunction with the abnormal distention and displacement of the cecum led to the correct diagnosis. It may be therefore inferred that the "whirl sign" may be seen in any case of intestinal volvulus.

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