Title	Cecal volvulus in an elderly patient : A case report
Author(s)	Teruya, Tsuyoshi; Toritsuka, Daisuke; Iha, Kohji; Nishiki, Takehiro; Hanashiro, Kiyotoshi; Azuma, Yasuharu; Takushi, Yasukatsu; Shimabukuro, Nobuhiro; Ota, Morihito; Higa, Junko; Gakiya, Akira; Higa, Kuniki; Nakachi, Atsushi
Citation	琉球医学会誌 = Ryukyu Medical Journal, 35(1-4): 51-56
Issue Date	2016-10-28
URL	http://hdl.handle.net/20.500.12001/22211
Rights	琉球医学会

Cecal volvulus in an elderly patient: A case report

Tsuyoshi Teruya, Daisuke Toritsuka, Takehiro Nishiki, Kohji Iha, Kiyotoshi Hanashiro, Yasuharu Azuma, Nobuhiro Shimabukuro, Yasukatsu Takushi, Morihito Ota, Junko Higa, Kuniki Higa, Akira Gakiya and Atsushi Nakachi

Department of Surgery, Tomishiro Central Hospital

(Received on August 27, 2015, accepted on December 17, 2015)

ABSTRACT

An 85-year-old man who had been bedridden for a long time due to pain in the limbs and paralysis caused by lumbar disc herniation was admitted to our department for severe abdominal pain and vomiting. He was diagnosed with an intestinal obstruction based on the findings of plain abdominal radiography and abdominal computed tomography, which revealed marked dilatation of the colon. An emergency laparotomy was performed subsequent to the diagnosis of ileus secondary to the obstruction by suspected colon volvulus.

Intraoperatively, the moved cecum was found to be located in the left abdomen; it was twisted 270° counterclockwise around the mesentery with the terminal ileum and was necrotic. We diagnosed cecal volvulus and performed ileocecal resection.

In comparison with volvulus of the sigmoid colon, cecal volvulus is a very rare clinical entity and is difficult to diagnose preoperatively.

In treating patients with abdominal symptoms similar to those of our patient, it is advisable to bear the possibility of cecal volvulus in mind. *Ryukyu Med. J., 35 (1~4) 51~56, 2016*

Key words: cecal volvulus, colon obstruction, mobile cecum

INTRODUCTION

In comparison with volvulus of the sigmoid colon, cecal volvulus is very rare and is difficult to diagnose preoperatively. Cecal volvulus primarily involves axial twisting of the cecum, terminal ileum, and ascending colon[1,2].

Here, we report a case of cecal volvulus that required emergency laparotomy for resection of the strangulated ileus and review literature of cases of cecal volvulus.

CASE REPORT

An 85-year-old man was admitted to our hospital with a 2-day history of intermittent severe abdominal pain and vomiting. The patient had been almost completely bedridden due to pain in the limbs and paralysis caused by lumbar disc herniation and had a history of constipation for approximately 20 years. He had no history of abdominal surgery.

Physical examination showed abdominal distention with severe tenderness, without signs of peritoneal irritation. Bowel sound was hypoactive, and no abdominal mass was palpable. Plain abdominal radiography showed a grossly gaseous, distended colon (Fig. 1). Contrast-enhanced abdominal computed tomography (CT) revealed marked dilatation of the air-filled bowel in the left abdomen with slight ascites, no evidence of intraabdominal free air, and presence of the "whirl sign"[3,4] (Fig. 2) and "bird's beak" [3] sign (Fig. 3), indicating volvulus of the colon.

Corresponding Author: Tsuyoshi Teruya, Department of Surgery, Tomishiro Central Hospital, 25 Ueda, Tomigusuku, Okinawa 901-0243, Japan. Tel: 098-850-3811, E-mail: tteruya@yuuai.or.jp

Fig. 1 **Plain abdominal radiography shows marked dilatation of the colon in the mid-abdomen.**

Fig. 2 **Axial CT section shows a grossly dilated, air-filled bowel in the left abdomen and presence of the whirl sign (arrows). The whirl sign is considered to be formed by twisting of the mesenteric vessels along with soft tissue and mesenteric fat.**

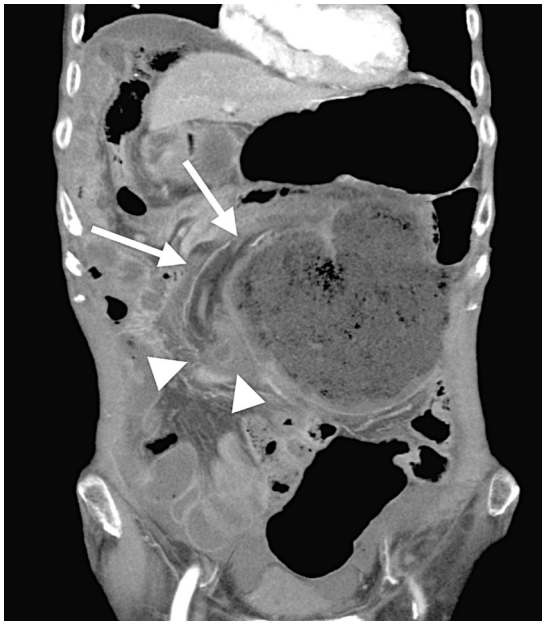

Fig. 3 **Coronal CT section shows a grossly dilated cecum with beaking (arrows) and swirling of mesenteric vessels (arrowheads) at its point of transition to the collapsed colon.**

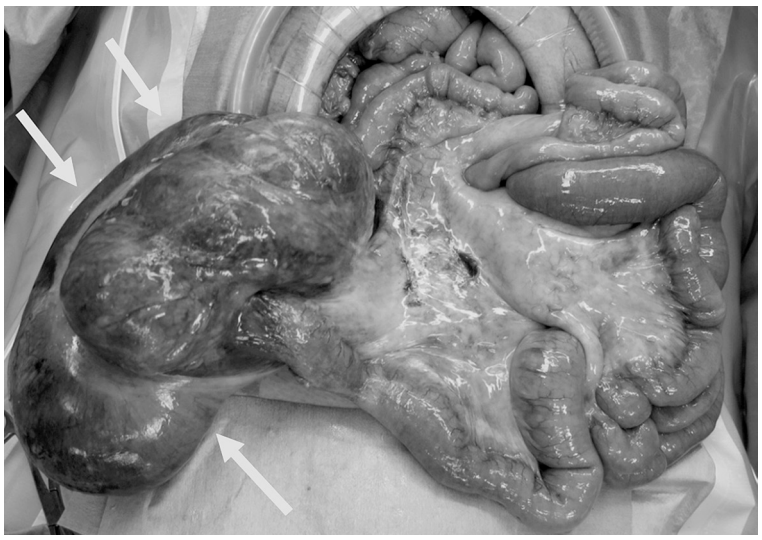

Fig. 4 **Intraoperative photography shows an enlarged cecum that was twisted counterclockwise (arrows) and separated from the retroperitoneum.**

Laboratory examination revealed increased levels of white blood cell counts (17,800/mm^3), C-reactive protein (24.87 mg/dL), lactate dehydrogenase (305 IU/L), and creatinine phosphokinase (321 IU/L); further, deterioration of renal function was noted with elevated blood urea nitrogen (56 mg/dL) and creatinine (2.08 mg/dL) levels.

On the admission day, an emergency laparotomy was performed following a diagnosis of suspected ileus secondary to bowel obstruction by colon volvulus. Perioperatively, a small amount of yellowish and slightly muddy ascites was identified. An enlarged mobile cecum was found to be located in the left abdomen, which was twisted by 270° counterclockwise around the mesentery with a necrotic terminal ileum. Therefore, we diagnosed cecal volvulus. Further, poor fixation of the ascending colon, cecum, and terminal ileum and their loss of fusion to posterior peritoneum were also identified (Fig. 4). However, the fixation and diameter of the transverse and left colon were

considered to be within normal limits. After detorsion, the incarcerated and necrotic cecum was identified, and ileocecal resection with primary anastomosis using automatic suturing device was performed. Subsequent histopathological examination demonstrated no findings of tumor and/or chronic inflammation in the resected lesions.

Postoperatively, the patient suffered aspiration pneumonia and infection of the surgical site in the abdominal wall; however, these complications were successfully treated by the administration of antibiotics and wound irrigation. He was discharged with no sequelae on postoperative day 35.

DISCUSSION

Cecal volvulus was first reported by Rokitansky in 1837 as a cause of intestinal strangulation[5]. Cecal volvulus is a very rare condition, with the reported incidence ranging from 2.8 to 7.1 per million people per year; it accounts for approximately 1.0–1.5% of all cases of adult intestinal obstruction and 25–40% of volvulus of the colon[6]. Although rare, this is the second most common form of volvulus after sigmoid volvulus, which has an incidence of 20–56%[7,8].

A mobile cecum rarely results in cecal volvulus, and intestinal obstruction caused by cecal volvulus occurs in about 1% of cases[9]. Based on necropsy reviews, Wolfer et al. reported that almost 11% of the population had a mobile cecum with fixation failure of the retroperitoneum[10]. The nearly 40-fold difference between the incidence of the mobile cecum and occurrence of cecal volvulus suggests that predisposing factors other than anatomical susceptibility are involved in the development of volvulus[6]. In additional to the presence of the mobile cecum, several factors have been proposed to affect the formation of cecal volvulus, including chronic constipation, overeating, pregnancy, long-term bed rest, a history of abdominal surgery, and psychotropic drugs[4,7,11]. In our patient, chronic constipation, long-term bed rest, and defect of the fixation of the ascending colon and ileocecal portion observed perioperatively, are considered to have played an important role in the development of cecal volvulus.

The most common signs associated with cecal volvulus are abdominal distention, abdominal pain, and vomiting, but these are not highly specific[6]. The clinical symptoms depend on the amount of bowel involved and on the degree and duration of the twisting[12].

A Japanese study evaluating cecal volvulus was recently reported by Katoh et al. [13], and the incidence of cecal volvulus in Japan appeared to peak at 70-79 years of age, similar to the age of our patient.

Routine plain abdominal radiography is occasionally helpful for the diagnosis of cecal volvulus[14]. The radiographic features are as follows: (a) a greatly distended cecum in an ectopic position, (b) a distended small intestine often located to the right of the cecum, (c) the ileocecal valve located to the right of the distended cecum, (d) spiral distortion of the mucus membrane folds seen at the site of twisting, and (e) a distended small intestine with air-fluid levels seen in the upright position.

However, the preoperative diagnosis of cecal volvulus and the differentiation of cecal volvulus from other sites of colon volvulus may be difficult in an abdominal plain radiography. Rabinovici et al.[1] reported that the incidence of cecal volvulus diagnosed by plain abdominal radiography alone was indicated in only 17% of cases.

A contrast enema (using barium or diatrizoic acid) is also a useful modality for diagnosing colon volvulus. It usually demonstrates "bird's beak" deformity at the point of torsion[14]. The characteristic finding of the "bird's beak" sign indicates progressive tapering of the afferent and efferent bowel loops ending at the site of torsion in the colon. The accuracy of a barium enema in diagnosing colon volvulus has been shown to be up to 88%[8]. However, administration of a contrast enema is restricted to select patients since the mortality associated with cecal volvulus is high due to secondary to ischemia, infarction, and perforation[1,2].

Swenson et al. reported that plain abdominal radiograph was unlikely to yield significant diagnostic value for cecal volvulus and highly recommended CT as the examination of choice, with high diagnostic utility for cecal volvulus[15].

CT is non-invasive, much faster, and has several imaging signs, such as the "whirl sign" and "bird's beak sign", with superior sensitivity and specificity in comparison to plain radiography and contrast enema[16]. In the clinical setting, CT has replaced barium enema as the preferred imaging modality for the diagnosis of acute cecal volvulus,

and the appearance of "coffee bean", "bird's beak", and "whirl sign" are three of the common CT findings associated with acute cecal volvulus[3,6]. CT demonstrates "whirl sign" in all cases of volvulus, which is defined as the twisting of the mesenteric vessels and bowel loops around central mesenteric fat; it is usually possible to identify the anatomical site of the "whirl sign" and thus distinguish sigmoid volvulus from cecal volvulus[16].

On the other hand, the "whirl sign", which is seen on axial CT sections, is reportedly visible only in 13.6% of cases of volvulus[17]. Recently, multi-detector computed tomography (MDCT) has evolved to become the best imaging modality to evaluate cecal pathology; the benefits of MDCT include the rapid acquisition of images, high spatial resolution, and its ability to create multi-planar reconstructed (MPR) images that are useful in the diagnosis of colon volvulus[18-20].

In our patient, plain abdominal radiography showed a grossly distended colon but no "coffee bean" appearance; therefore, we suspected colon obstruction. Since our patient presented with severe abdominal pain and unstable general condition, a contrast enema examination could not be performed. As described above, MPR by MDCT showed "whirl sign" (Fig. 2) and "bird's beak" (Fig. 3), indicative of a diagnosis of strangulated ileus secondary to bowel obstruction; therefore, we suspected colon volvulus.

Cecal volvulus can be divided into the three following types[8,20]: (1) the axial twisting of the ascending colon, cecum, and terminal ileum around the mesentery (axial torsion); (2) the anterosuperior folding of the cecum without axial rotation (cecal bascule); and (3) the dilated cecum that has twisted and inverted and moved to occupy the left upper quadrant of the abdomen (loop twist). Our case was diagnosed as the loop twist type based on CT imaging and the operative findings.

The treatments for cecal volvulus include colonoscopic reduction and open surgical procedures. Colonoscopy is useful and is commonly performed for the diagnosis and treatment of sigmoid colon volvulus in patients whose general condition is good; however, the results of endoscopic therapy for cecal volvulus are considered to be inferior to the results of similar therapy for sigmoid colon volvulus[15]. The success rate of colonoscopic reduction of cecal volvulus is approximately 30%, and the recurrence rate exceeds 50%[21,22]. Further, because of the potential for colonoscopic perforation and delays in operative treatment associated with unsuccessful colonoscopic reduction, this technique is not recommended for the initial treatment of cecal volvulus[4].

Recently, laparoscopic cecopexy for cecal volvulus has been shown to be effective for patients whose general condition is good, when the disorder is diagnosed preoperatively, which allows elective surgery to be performed at a later date[11]. When suspected strangulation ileus secondary to colon obstruction manifests as cecal volvulus, surgical interventions such as detorsion, cecopexy, cecostomy, and bowel resection with or without anastomosis should be performed as soon as possible. Surgical resection is considered to be the most effective treatment for cecal volvulus, with clear improvements in the associated mortality and morbidity[4,13]. Moreover, almost no recurrence of volvulus is observed with surgical resection; therefore, ileocecal resection with primary anastomosis should be considered rather than cecopexy or cecostomy for cases of cecal volvulus[13].

Cecal volvulus is complicated by intestinal necrosis in about 20% of cases, which increases the mortality rate by about 3-fold[1,7]. In the presence of peritonitis or strong suspicion of necrosis, gangrene, or perforation of the bowel, the resection of the affected intestine is absolutely mandatory[4].

In conclusion, cecal volvulus is a very rare disease that is difficult to diagnose preoperatively because of the lack of a specific clinical presentation. We encountered an elderly patient with cecal volvulus, with a history of chronic constipation, long-term bed rest, and absence of the fixation of the bowel. MDCT was considered crucial to the prompt and accurate diagnosis of colon volvulus, and we safely performed ileocecal resection with favorable outcome. If patients with a similar history complain of abdominal symptoms, the possibility of cecal volvulus should be borne in mind.

REFERENCES

1) Rabinovici R., Simansky D.A., Kaplan O., Mavor E. and Manny J.: Cecal volvulus. Dis Colon Rectum. 33:765-769, 1990.
2) Madiba T.E. and Thomson S.R.: The management of cecal volvulus. Dis Colon Rectum. 45: 264-267, 2002.

3) Moore C.J., Corl F.M. and Fishman E.K.: CT of cecal volvulus: unraveling the image. AJR Am J Roentgenol. 177:95-98, 2001.
4) Takeuchi H., Ikeda Y., Komori Y., Tahara K., Shiromizu A., Hayashi H. and Muto Y.: Cecal volvulus in cerebral palsy: Report of a case. Surg Today. 38:170-173, 2008.
5) Rokitansky C.: Intestinal strangulation. Arch Gen Med. 14:202-204, 1837.
6) Consorti E.T. and Liu T.H.: Diagnosis and treatment of caecal volvulus. Postgrad Med J. 81:772-776, 2005.
7) Ballantyne G.H., Brander M.D., Beart R.W. and Ilstrup D.M.: Volvulus of the colon. Incidence and mortality. Ann Surg. 25:83-92, 1985.
8) Gingold D. and Murrell Z.: Management of colonic volvulus. Clin Colon Rectal Surg. 25:236-244, 2012.
9) Howard D.G. and Catto J.: Cecal volvulus. A case for nonresectional therapy. Arch Surg. 115:273-277, 1980.
10) Wolfer J.A., Beato L.E. and Anson BJ.: Volvulus of the cecum. Anatomical factors in its etiology: report of a case. Surg Gynecol Obstet. 74:882-894, 1942.
11) Tsushimi T., Kurazumi H., Takemoto Y., Oka K., Inokuchi T., Seyama A. and Morita T.: Laparoscopic cecopexy for mobile cecum syndrome manifesting as cecal volvulus: report of a case. Surg Today. 38:359-362, 2008.
12) Haskin P.H., Teplick S.K., Teplick J.G. and Haskin M.E.: Volvulus of the cecum and the right colon. JAMA. 245:2433-2435, 1981.
13) Katoh T., Shigemori T., Fukaya R. and Suzuki H.: Cecal volvulus: report of a case and review of Japanese literature. World J Gastroenterol. 15:2547-2549, 2009.
14) McGraw J.P., Kremen A.J. and Rigler L.G.: The Roentogen diagnosis of volvulus of the cecum. Surgery. 24:793-804, 1984.
15) Swenson B.R., Kwaan M.R., Burkart N.E., Wang Y., Madoff R.D., Rothenberger D.A. and Melton G.B.: Colonic volvulus: presentation and management in metropolitan Minnesota, United States. Dis Colon Rectum. 55:444-449, 2012.
16) Farnam J. and Wallach M.: Cecal volvulus diagnosed on CT in two distinct clinical settings. RI Med J . 97:45-47, 2014.
17) Lassandro F., Giovine S., Pinto A., De Lutio Di Castelguidone E., Sacco M., Scaglione M. and Romano L.: [Small bowel volvulus - combined radiological findings]. Radiol Med. 102:43-47, 2001. [Article in Italian]
18) Heller M.T. and Bhargava P.: MDCT of acute cecal conditions. Emerg Radiol. 21:75-82, 2014.
19) Hoeffel C., Crema M.D., Belkacem A., Azizi L., Lewin M., Arrive L. and Tubiana J.M.: Multi-detector row CT: spectrum of diseases involving the ileocecal area. Radiographics. 26:1373-1390, 2006.
20) Matsui Y., Takaoka M., Soda Y., Michishita N., Hayashi J., Yoshida K., Naomoto Y., Kawamoto H. and Mimura H.: A case of cecal volvulus in a cerebral palsy patient: Usefulness of multidetector computed tomography for preoperative diagnosis. Kawasaki Med J. 38:205-209, 2012.
21) Theuer C. and Cheadle WG.: Volvulus of the colon. Am Surg. 57:145-150, 1991.
22) Montes H. and Wolf J.: Cecal volvulus in pregnancy. Am J Gastroenterol. 94:2554-2556, 1999.