Case report - Cecal volvulus in a child
PADMAPRIYA G GOVINDARAJAN
Department of Radio Diagnosis, CHRISTIAN MEDICAL COLLEGE

Abstract: Cecal volvulus is a rare condition seen in children and is an uncommon cause of intestinal obstruction. Patients usually present with vague abdominal pain. Plain radiograph findings may be contributory to the diagnosis. We present a case of a four year old child who presented to casualty with complaints of abdominal pain and distension. CT abdomen of the child was done which revealed a cecal volvulus. Child underwent surgery for the same. Since cecal volvulus is a rare condition high suspicion on imaging is necessary for the diagnosis.

Keyword: children, abdominal pain, dilated bowel, cecal volvulus

Case report:
A four year old girl child presented to the pediatric casualty department with complaints of abdominal pain for three days. There was also associated with abdominal distension since one day. The parents also gave history of three to four episodes of bilious vomiting in each day for the last three days. There was history of constipation for two days. There was no history of fever, jaundice, dysuria or frequency of micturition. There was no similar history in the past. On examination, she was in obvious pain and was crying. She was afebrile, tachycardic (heart rate – 170 / min) and tachypneic (respiratory rate – 40 / min). She was also dehydrated. There was abdominal distension, tenderness and generalized guarding. There were no palpable mass or lumps per abdomen. Blood investigations were done. The hemoglobin, total and differential counts, platelets, liver function tests renal function tests were normal. The electrolyte analysis showed normal sodium, potassium and bicarbonate values. Urine analysis for infection was also negative. However there was a marked increase in serum amylase was elevated (3794u/L, normal level is less than 200u/L), serum lipase was within the high normal range (196 u/L, normal usually less than 190u/L). Since the most common cause for a raised amylase level was pancreatitis and child had severe abdominal pain, possibility of pancreatitis was raised and hence child was sent for ultrasound of the abdomen. Ultrasound of the abdomen showed that the liver, spleen and kidneys were normal. There were no obvious mass in the abdomen. However there were no obvious collections seen in the abdomen. Plain radiograph of the abdomen (erect) showed an air filled dilated bowel loop in the left upper quadrant. There were no obvious dilated small bowel loops or evidence of free air in the peritoneal cavity.

Plain radiograph of the abdomen

Since the cause of the pain was still not obvious the child underwent CT of the abdomen. CT abdomen with oral and IV contrast showed collapsed rectum, sigmoid colon, descending colon and transverse colon up to the proximal part beyond which there was twisting of the bowel loops along with the mesenteric vessels.

Collapsed distal large bowel

Whirl sign - twisting of the bowel and mesenteric vessels

There was a markedly dilated bowel loop seen in the upper left abdomen with the apex at T9-10 level.

CT topogram
Rokitansky in 1837 was characterized by acute bowel obstruction. Cecal volvulus, first described by XV years (2). Cecal volvulus is rare in children. Here we report a child who presented to our hospital with cecal volvulus. In the mean while the child's condition worsened. After stabilization in the ICU she was taken up for emergency laparotomy. At laparotomy, ileo-cecal volvulus with multiple twists involving the ascending and transverse colon causing gangrene of the large bowel was identified. Gangrenous bowel was resected and ileotransverse anastomosis was done. Postoperatively, the patient had an uneventful course. She was discharged home on the seventh post-operative day on a normal diet with regular bowel movements.

**Discussion:**

Cecal volvulus is rare in children. Here we report a child who presented to our hospital with cecal volvulus. Cecal volvulus is uncommon diagnosis and is rarely seen in children. It carries a mortality of 40%. (1) The incidence of cecal volvulus is 2.8 to 7.1 million per year and accounts for 1-5% of all the intestinal obstruction. (2) Cecal volvulus accounts for about 25-40% of the volvulus of the colon and 1% of all cases with intestinal obstruction (3). After sigmoid volvulus, cecal volvulus is the most frequent type. In children also, sigmoid volvulus is the most common type (4). The low incidence of cecal volvulus along with nonspecific presentation and radiological signs, delays the diagnosis (5). The mean average age at presentation was 53 years (6). In India, average age of presentation is 33 years (2). Cecal volvulus, first described by Rokitansky in 1837 was characterized by acute bowel obstruction with strangulation. (12) Clinical presentation:

The most common presenting symptom is abdominal pain, nausea and vomiting, obstipation or diarrhea. (3) The clinical presentation may be non-specific. The clinical findings are also described in patterns like recurrent chronic intermittent, acute obstructive or acute fulminating types. (2) In the recurrent intermittent form there are recurrent symptoms of abdominal pain in the right lower quadrant, abdominal distension and resolution of symptoms after passage of flatus. This clinical presentation has been described in nearly half the patients before they present with acute volvulus. This pattern has also been referred to as the “mobile cecum syndrome.” Patients who present with acute obstructive and fulminant forms exhibit a picture that cannot be differentiated from acute small bowel obstruction. In the acute fulminant form the patients are usually have a toxic appearance with abdominal tenderness and there is associated peritonitis. (2) As cecal volvulus is uncommon in children, there should be high index of suspicion of volvulus in any child who presents with acute abdomen. Complications of cecal volvulus include closed-loop bowel obstruction, vascular compromise, gangrene, perforation and death.

**Etiology and risk factors:**

Large bowel volvulus is due to abnormalities of fixation of the bowel, abnormal mobile segment of the cecum and abnormal mesocolon or mesentery (6). Even though failure of retroperitoneal fixation of the cecum occurs in 10-15% of normal population cecal volvulus is still uncommon in children (7). The risk factors which have been described for cecal volvulus include neurological impairment, constipation, dietary factors, term pregnancy, abdominal or pelvic masses and procedures like previous laparotomy, laparoscopy, fundoplication or colonic enema. (1, 2) It has been rarely associated with Cornelia de Lange syndrome. (8) Types of cecal volvulus: Bowel torsion that results in obstruction is termed as “volvulus”. Cecal bascule occurs when the cecum folds anteriorly without any torsion. (9) This is also classified as type 1 cecal volvulus. (10) Cecal bascule is seen as a dilated bowel loop in the mid abdomen. In 50% of patient’s cecum twists in the axial plane, rotating clockwise or counterclockwise around its long axis and is usually seen in the right lower quadrant (9). The other half of the patients have loop type of volvulus in which the cecum twists and inverts and seen in the left upper quadrant of the abdomen. This type of cecal volvulus in which the cecum is seen in the left upper quadrant is called type 2 cecal volvulus. (10) The terminal ileum is also involved in the twist. Visualizing the gas filled appendix confirms the diagnosis of cecal volvulus (7). Plain radiographs: Plain radiographs show a dilated cecum along with distension of the small bowel. Classically it is seen as an air distended bowel with hastral markings extending from the right lower quadrant towards the left upper abdomen (11). The cecum may also be seen as an air filled structure in the left mid abdomen, left upper quadrant or at any other ectopic location. The cecum may assume the shape of a kidney. (6). It may rarely resemble a coffee-bean as seen with a sigmoid volvulus (11). The two signs that allow identification of the dilated loop as the cecum include: the presence of hastral markings and an air-fluid level within the cecum. These two findings along with absence of gas in the distal colon permit the diagnosis in 70 percent of cases. (12) The plain radiograph in our patient showed a large dilated bowel loop located in the left upper quadrant. (Image as shown above) Barium enema: Bird-beak appearance in barium enema is seen in cases of cecal volvulus. The bird’s beak represents the point of twisting in a volvulus; the beak uses the vascular pedicle in the base of the malpositioned and dilated cecum. In most cases the contrast will not pass beyond the obstruction and there will be no filling of the cecum. CT abdomen: Several signs have been described on CT abdomen in cases of cecal volvulus. Bird’s beak sign refers to progressive tapering of the afferent and the efferent loops terminating at the site of torsion. The twisted loops of bowel along with the mesentery appear to have a swirling appearance of soft tissue and mesenteric fat. This is known as whirl sign and is highly suggestive of intestinal volvulus and should suggest the possibility of a closed loop obstruction (13). The whirl is composed of spirally twisted loops of the bowel along with mesenteric fat and engorged mesenteric vessels. Whirl sign seen in our patient is shown (Image included)

Distended cecum in the left upper quadrant; Stomach is compressed and displaced

Pancreas

Stomach was compressed and displaced to the right side. Pancreas was normal on the CT scan. These findings were highly suggestive of cecal volvulus. In the mean while the child’s condition worsened. After stabilization in the ICU she was taken up for emergency laparotomy. At laparotomy, ileo-cecal volvulus with multiple twists involving the ascending and transverse colon causing gangrene of the large bowel was identified. Gangrenous bowel was resected and ileotransverse anastomosis was done. Postoperatively, the patient had an uneventful course. She was discharged home on the seventh post-operative day on a normal diet with regular bowel movements.

**Whirl sign**
Other two signs that have been described in cecal volvulus include X-marks-the-spot sign and split wall sign. Due to complete rotation of the bowel, two transition points are seen at two different levels and appear to cross each other like a X. Split wall sign is seen when there is invagination of the pericolic fat between the twisted bowels giving the appearance of a split wall. CT can also diagnose the complications of cecal volvulus like ischemia and gangrene of the bowel. If the classic radiographic signs (severe cecal distention, distended cecum directed toward the left upper quadrant, absence of air within the distal colon) are present, a diagnosis of cecal volvulus is highly likely. (11)

**Treatment:**
Various surgical treatment options include cecostomy, operative detorsion, cecopexy, colectomy and colostomy tube placement.

**Conclusion:** Cecal volvulus must be suspected in any patient who present with signs of bowel obstruction and plain radiograph showing a large single dilated large bowel loop.

**References:**
5. Perez EL, Perez MJM, Gonzalez TR, Miralles RV, Blasco LF. Cecal volvulus: Imaging features, Radiologia. 2010; 52: 333-41