



Imaging findings of the cecal volvulus, description through a case

Hallazgos imagenológicos del vólvulo cecal, descripción por medio de un caso

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Key words (MeSH)

Intestinal obstruction
Intestinal volvulus
Cecal diseases

Palabras clave (DeCS)

Obstrucción intestinal
Vólvulo intestinal
Enfermedades del ciego

Summary

The cecum volvulus is intestinal torsion that affects the ascending colon or terminal ileum due to a mobile cecum. Described by Bundschuh in 1913, it represents 1 % of cases of intestinal obstruction and between 10 % to 40 % of colonic volvulus cases. Its incidence is low, affecting 2.8 to 7.1 million individuals per year, with a higher prevalence in young women. It can occur in patients with a surgical history, abdominal masses and constipation. Diagnostic images are important for its identification; abdominal radiography shows nonspecific but representative findings, computed tomography shows more sensitive and specific findings. A clinical case is presented and the most important findings of the cecal volvulus are reviewed.

Resumen

El vólvulo del ciego es la torsión intestinal que afecta al colon ascendente o al íleon terminal debido a un ciego móvil. Descrita por Bundschuh en 1913, representa el 1 % de los casos de obstrucción intestinal y del 10 % al 40 % de los vólvulos colónicos. Su incidencia es baja, afecta de 2,8 a 7,1 millones de individuos por año, con prevalencia en mujeres jóvenes. Se puede presentar en pacientes con antecedentes quirúrgicos, masas abdominales y estreñimiento. Las imágenes diagnósticas son importantes para su identificación: la radiografía de abdomen muestra hallazgos poco específicos, pero representativos; la tomografía computarizada muestra hallazgos más sensibles y específicos. A continuación, se presenta un caso clínico y por medio de este se revisan los hallazgos más importantes del vólvulo cecal.

Clinical case presentation

Female patient in the fourth day of life, with no surgical history, with a four-day clinical picture of pain in the right hemiabdomen and emetic episodes, pain on palpation, with no signs of peritoneal irritation.

The admission abdominal X-ray showed colonic bowel loop distention, with staggered hydroaerobic levels in the upper hemiabdomen, absence of distal gas and no radiological signs of perforation (Figure 1); with these findings the clinical picture was interpreted as a sigmoid volvulus. A second abdominal X-ray showed persistence of marked distention of the colon with non-stepped hydroaerobic levels; air in the rectum, due to a previous procedure and a pneumoperitoneum chamber secondary to perforation of the hollow vein (Figure 2).

Given the findings, an abdominal computed axial tomography (CT) with oral and intravenous contrast medium was performed, which showed marked distention of the cecum, with a bad position (anterior and superior), as well as that of the ileocecal valve and the appendix; A “swirling” image of the ileoceco-appendicular vessels was observed, characteristic findings of cecal valve; in addition, extensive pneu-

moperitoneum was identified, with a “gull wing” sign due to subdiaphragmatic air secondary to intestinal perforation (Figure 3).

The patient was taken to surgery where a cecal valve with organoaxial flange rotation was confirmed, extending from the epiploon to the anterolateral wall of the cecum, with areas of ischemia and microperforation. A right hemicolectomy was performed and latero-lateral anastomosis between the cecum and transverse colon. He received in-hospital antibiotic management for five days and was subsequently discharged without complications.

Discussion

This pathology consists of axial malrotation of the cecum on its mesenteric pedicles, affecting the ascending colon and/or the transverse colon.

The pathology consists of axial malrotation of the cecum on its mesenteric pedicles, affecting the ascending colon and/or the terminal ileum due to inadequate fixation of the primitive mesentery to the posterior parietal peritoneum during embryologic development, which generates a mobile cecum susceptible to displacement

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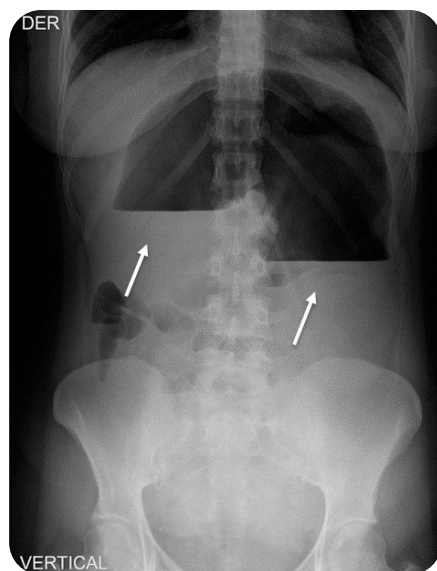


Figure 1. Abdominal X-ray in vertical position. There is marked dilatation of the intestinal loop of the colon, with staggered hydroaerobic levels (arrows) and absence of distal gas.

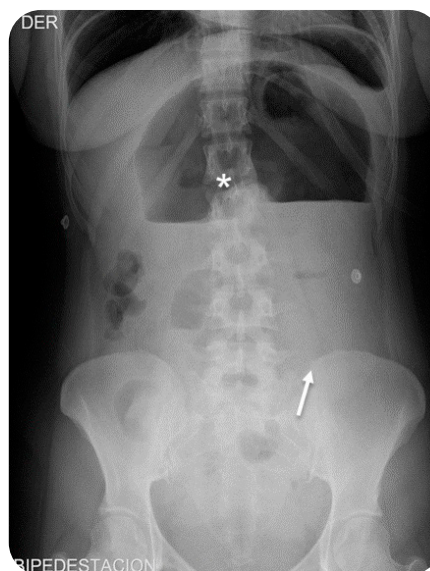


Figure 2. Abdominal X-ray in bipedestacion in anteroposterior position. There is persistent segmental dilatation of the colon (arrow), located in the upper hemiabdomen, with staggered hydrous levels; bilateral subdiaphragmatic pneumoperitoneum chamber, with sign of "gull wings" (*), secondary to perforation of the hollow vein.

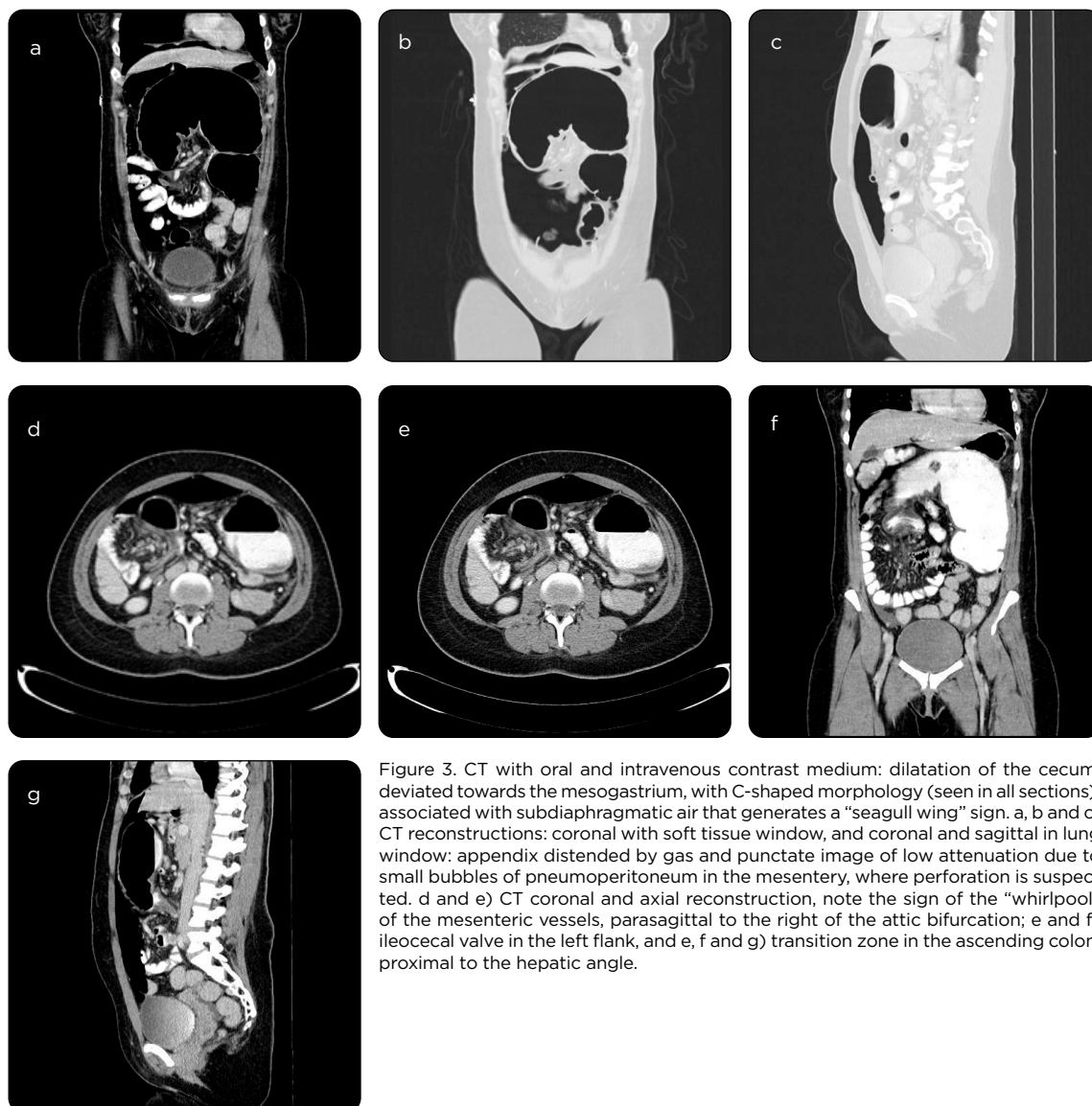


Figure 3. CT with oral and intravenous contrast medium: dilatation of the cecum, deviated towards the mesogastrium, with C-shaped morphology (seen in all sections), associated with subdiaphragmatic air that generates a "seagull wing" sign. a, b and c) CT reconstructions: coronal with soft tissue window, and coronal and sagittal in lung window: appendix distended by gas and punctate image of low attenuation due to small bubbles of pneumoperitoneum in the mesentery, where perforation is suspected. d and e) CT coronal and axial reconstruction, note the sign of the "whirlpool" of the mesenteric vessels, parasagittal to the right of the attic bifurcation; e and f) ileocecal valve in the left flank, and e, f and g) transition zone in the ascending colon, proximal to the hepatic angle.

and intestinal obstruction, according to the rotational compromise; with the additional factor of hyperfixation of the leon and the ascending colon as the axis of rotation of the cecum (1, 2).

There are 3 subtypes: the axial twist of the cecum about its own axis, clockwise; the counterclockwise twist of the cecum about the terminal lion; and the cecal bulla, in which an anterior or posterior folding of the cecum occurs over the ascending colon. It is estimated that the first two represent about 90% of the cases of this entity and the last one, the remaining 10% (3, 4).

There is no clearly established etiology; however, it is related to extreme changes in diet, high fiber consumption, chronic constipation, sedentary lifestyle, paralytic reading, abdominal masses, late pregnancy, endometriosis and a history of abdominal surgery and colonoscopy; a strong relationship between these last two factors has been found, with an incidence of up to 52% (1, 3, 5).

The clinical picture of this pathology is nonspecific: diffuse, progressive colicky abdominal pain, nausea, vomiting, constipation, or acute abdominal symptoms frequently associated with intestinal obstruction or intestinal perforation, although without differentiation between causal entities. This is the fundamental role of imaging in the diagnosis (6).

The simple abdominal X-ray is the study that is initially requested when there is a diagnostic suspicion of intestinal obstruction. It has a sensitivity of 75% for cecal volvulus and the main findings are cecal dilatation (98% of cases), hydroaerobic levels (72%), small bowel dilatation (73%), absence of gas in the distal colon (91%), "coffee bean" sign - described as an image of a dilated closed loop - frequently associated with sigmoid volvulus; however, it is identified in the cecal loops in 35%, dilated intestinal loop with haustras (54%) and, occasionally, ectopic localization of the cecal appendix in the upper left quadrant (45%) (6,7). Despite having an acceptable sensitivity, these findings are associated with the diagnosis in 50 % of the cases and represent a correct diagnosis in only 17 %, for which reason it is preferred, in the event of any variation from the normal image, to request a tomographic study. When a pneumoperitoneum chamber is identified in the X-ray, due to the high risk of intestinal perforation, further imaging studies are indicated.

The most important tomographic findings are cecal dilatation (45%), which is classified according to its diameter as mild (5-7.9 cm), moderate (8-9.9 cm) or severe (>10 cm); the latter is the most frequent, with a sensitivity of 100% and a specificity of 81%. The ectopic location of the cecal plexus in the left upper quadrant (36%) (sensitivity 90%, specificity 66%) and the sign of the central appendix, given by the location of the appendix near the midline (sensitivity 92%, specificity 68%); other relevant findings are the swirl sign (73%), one of the most important, which corresponds to mesenteric vessels with swirling traces, associated with increased attenuation of adjacent mesenteric fat (sensitivity 95%, specificity 62%); the bird's beak sign reflects the transition zone with absence of contrast medium passage to distal loops (sensitivity 86%, specificity 85%); absence of gas in distal colon (91%); presence of transition zones (82%); the "X-mark" sign (27%), reflecting two superimposed transition zones given by the complete rotation of the two portions of the loop and the separation of the cecal walls by invagination of the surrounding pericolic fat (54%). Finally, associated with these signs, there is stratification of the intestinal wall,

intestinal pneumatosis, abnormal gas in the portal vein, gas or free fluid in the peritoneal cavity and ingurgitation of the mesenteric vessels (6-8).

After establishing the diagnosis, an urgent surgical approach should be performed. In patients with viable bowel, mortality is 12%, so devolution is recommended (4).

Conclusions

Cecal volvulus is a rare pathology, which requires an accurate and timely radiological diagnosis. Most of the radiological signs visualized in this pathology integrate the general radiological diagnosis of intestinal obstruction; however, more specific radiological signs have been described in the literature, such as the dilated loop with haustras located in the left upper quadrant, ectopia of the cecal plexus and the central appendix, which can guide the correct diagnosis and are very useful for the patient and his surgeon. CT plays a fundamental role in the diagnosis of this pathology and allows a more precise diagnosis to be established.

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Received for evaluation: August 3, 2020

Accepted for publication: March 23, 2021