

On-line Case Report

## Is laparotomy the unavoidable step to diagnose caecal volvulus?

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### ABSTRACT

Caecal volvulus is the axial twist of the caecum, ascending colon and terminal ileum around the mesenteric pedicle. This infrequently encountered clinical entity is responsible for 1–1.5% of all intestinal obstruction with a mortality of 10–40% depending on the presence of colon viability or intestinal gangrene. Many factors have been referred as correlated to caecal volvulus development, mainly anatomical predisposition and previous abdominal operations. Pre-operative diagnosis plays an important role in the management of such patients. Unfortunately, clinical signs, symptoms and laboratory tests are never specific enough to lead to a prompt diagnosis. Abdominal radiography and computed tomography may allow a diagnosis if typical signs are present. However, up to 30% of patients do not show these radiographic peculiarities, making the diagnosis difficult or impossible. Moreover, the low incidence of this disease is often responsible of a wrong or imprecise diagnosis, especially for radiologists who work with low volume of patients. We report a case of a patient with caecal volvulus, in which laparotomy was unavoidable to reach a diagnosis.

*Keywords:* Caecal volvulus – Pre-operative diagnosis – Surgical management

Accepted 24 March 2010; published online 4 June 2010

Caecal volvulus, whose first description is ascribed to Rokitsky in 1837,<sup>1</sup> is defined as the axial twist of the caecum, ascending colon and terminal ileum around the mesenteric pedicle.<sup>2</sup> This infrequently encountered clinical entity, whose incidence ranges from 2.8–7.1 per million of people per year,<sup>3</sup> is responsible for 1–1.5% of all intestinal obstruction<sup>3</sup> with a mortality of 10–40% depending on the presence of colon viability or intestinal gangrene.<sup>4</sup> Caecal volvulus is more common in women than in man<sup>5</sup> and the average age of presentation is 50–60 years.<sup>6</sup>

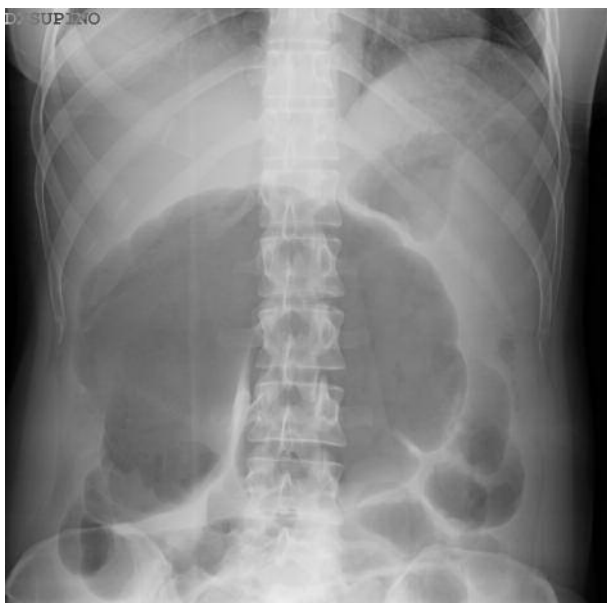
We report a case of a patient with caecal volvulus with history of previous gynaecological surgery, in which laparotomy was unavoidable to reach a diagnosis.

### Case history

A 41-year-old woman presented in the evening to the emergency room of our hospital with acute abdominal pain, nausea, vomiting and constipation lasting from the afternoon before.

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**Figure 1** Huge caecal dilatation at the plain supine abdominal X-ray.

The patient was haemodynamically stable, the abdomen was diffusely distended with rebound tenderness at physical examination, and revealed no muscle rigidity or Blumberg's sign.

Her history included two previous operations performed about 39 months before for rupture of ovarian cyst. Laboratory tests were normal for age and sex and showed white blood cell count of  $6.4 \times 10^6$  cells/l, haemoglobin of 11.0 g/dl, platelet  $325 \times 10^9/l$  and normal electrolytes.

Abdominal X-ray examination showed a markedly dilated colon in all the abdominal quadrants, the presence of various air-fluid levels, with lack of air in the sigmoid colon and in the rectum (Figs 1 and 2). This finding suggested a volvulus of the transverse colon, but it was not specific enough to lead to a diagnosis. A subsequent abdominal computed tomography (CT) scan showed a dilated bowel loop in the centre of the abdomen, diameter 95 mm, with an air-fluid level, and right displacement of the mesenteric vessels (Fig. 3).

None of these findings led to a specific diagnosis, so the patient was operated on to identify the intra-abdominal origin of the symptoms 2 h after her admission. Laparotomy revealed a marked distension of the caecum and a dilated intestinal loop whose diameter was 15 cm that had rotated around its long axis and inverted. An adhesion was identified as the cause for the volvulus.

After division of the adhesion, the caecum was emptied of intestinal air, by using a simple cannula needle introduced through the taenia. Finally, as the caecum remained partially dilated but equally viable, it was



**Figure 2** Plain supine abdominal X-ray with lateral view. Some air-fluid levels are evident.



**Figure 3** CT showing the right dislocation of the mesenteric vessels. No whirl sign was detectable.

sutured with absorbable stitches to the right parietocolic peritoneal space, in order to restore the normal anatomical condition.

The patient had an excellent recovery and was discharged 4 days after the operation.

### Discussion

Caecal volvulus occurs when an anatomic predisposition exists.<sup>7</sup> However, previous abdominal surgery is thought to be important in the development of a volvulus, since postoperative adhesions may create an axis around which the caecum can rotate.<sup>7</sup> Our patient had a history of surgery for ruptured ovarian cysts. Other risk factors are late-term pregnancy, high-fibre intake, adynamic ileus, chronic constipation, distant colon obstruction, inflammation of the peritoneal cavity, pelvic tumours or cysts,

heavy lifting, blows to the abdomen, psychiatric disorders, or abuse of laxatives.<sup>8,9</sup>

Pre-operative diagnosis plays an important role in the management of such patients. Clinical presentation generally includes acute intermittent pain, abdominal distension, obstruction, nausea, vomiting and constipation,<sup>10</sup> such as in our case. Physical examination shows tympanic note on percussion and absence of bowel sounds. If gangrene or perforation are present, caecal volvulus shows as acute abdomen with signs of peritoneal irritation and shock.<sup>6</sup> Unfortunately, the clinical signs and symptoms are never specific enough to lead to a prompt diagnosis and their intensity varies depending on the amount of bowel involved and on the degree and duration of the twist.<sup>11</sup> Laboratory tests are neither sensitive nor specific for the diagnosis.<sup>7</sup>

Abdominal radiography may allow a diagnosis if three typical signs are present: (i) caecum dilatation; (ii) a single air-fluid level in the right lower quadrant; and (iii) absence of gas in the colon. However, up to 30% of patients do not show these radiographic features.<sup>7</sup> In our case, neither the marked intestinal dilatation, nor the lack of air in the sigmoid colon and rectum allowed us to reach a diagnosis of the site of occlusion.

Barium enema is generally not recommended for the evaluation of patients with advanced obstruction, suspected perforation and gangrenous bowel. For this reason, abdominal CT is replacing barium enema as the preferred imaging modality for the diagnosis of acute caecal volvulus in many practice environments.<sup>10</sup> Unfortunately, the low incidence of this disease is often responsible of a wrong or imprecise diagnosis, especially for radiologists who work with low volume of patients.

The 'coffee bean', 'bird beak', and 'whirl' signs are three of the common CT findings associated with acute caecal volvulus. The 'coffee bean' sign refers to the rounded focal collection of air-distended bowel with haustral creases visualised in the left upper quadrant or anywhere within the abdominal cavity.<sup>3-12</sup> The 'bird beaks' are images correlating with the progressively tapering efferent and afferent bowel loops terminating at the site of torsion.<sup>3</sup> More specific for volvulus is the 'whirl sign', in which the whirl is composed of spiralled loops of collapsed caecum and sigmoid colon.<sup>12</sup> In our case, none of these specific CT findings was evident in the pre-operative scans, except the enormous loop distension and the right dislocation of the mesenteric vessels.

In some cases, pre-operative diagnosis can be performed only with the support of radiological imaging.<sup>13</sup> However, in up to 10% of cases, caecal volvulus is diagnosed only at laparotomy,<sup>11</sup> which represents the unavoidable step to clarify the disease of the patient. Our case required laparotomy; the laparoscopic approach was not performed because of the presence of adhesions resulting from the previous surgery and the reduction of the intra-abdominal space subsequent to the large intestinal distension.

Although caecal volvulus is a rare entity, it should be considered whenever a non-specific bowel occlusion occurs. In these cases, pre-operative diagnosis may be difficult or impossible to perform, so laparotomy represents both the diagnostic and therapeutic moment in which the surgeon is required to manage such critical condition.

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