


A giant caecal diverticulum presenting as an acute abdominal emergency

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Introduction

Giant colonic diverticula are defined as diverticula larger than 4 cm in diameter (1). They are uncommon with 85% of them associated with colonic diverticular disease. By 2015, 166 cases have been reported in the literature, 90% involving the sigmoid colon (1, 2). They are usually acquired, seen in individuals aged more than 60 years, presenting with features of diverticulitis such as abdominal pain, constipation, fever and vomiting. Caecal diverticula are uncommon and they are considered congenital in origin. Hence, they present in the paediatric population with diverticulitis, often misdiagnosed as acute appendicitis and discovered only intraoperatively. They are true diverticula, the wall containing all layers of the colon and can be complicated by inflammation, abscess formation, perforation, volvulus and obstruction. Of the few cases of giant caecal diverticuli published, two presented following torsion of the diverticular base. Ours is a similar case of a 15-year-old girl presenting as an acute abdomen.

Case presentation

A 15-year-old girl presented to the Accident and Emergency Department of the Teaching Hospital Karapitiya, Galle with generalised, severe and cramping type of abdominal pain, 6 episodes of non-bilious and non-blood-stained vomiting and fever for 2 days. She had not opened bowels for 2 days. She was previously well and there was no reported change in bowel habits prior to the presentation.

At 2 years of age, she had been investigated for recurrent urinary tract infections. A micturating cystourethrogram and cystoscopy performed detected a wide mouthed, right sided diverticulum of the bladder, confirmed by ultrasound scan. Excision of the diverticulum had been performed in 2013 at the age of 7 years. She was subsequently asymptomatic and did not require further follow up or treatment.

On examination, her abdomen was distended with tenderness in the right iliac fossa; with no palpable masses. Bowel sounds were sluggish and stools were present on digital rectal examination.

Biochemical parameters indicated significant sepsis. WBC count was $14,000 \times 10^3 \mu/L$ the C-RP level was 336 mg/L. INR was 1.6. UFR showed 10-15 pus cells and urine hCG was negative.

Erect abdominal X-rays showed multiple air fluid levels and a dilated coffee bean shaped small bowel loop on right side (Figure 1).

The USS abdomen showed a few dilated small bowel loops in left abdominal cavity with absent peristalsis indicating paralytic ileus. Free fluid was noted.

CECT abdomen showed a markedly dilated small bowel loop 4.9 cm in diameter, in the pouch of Douglas related to the site of obstruction (Figure 2). Dilated fluid and air-filled small bowel noted up to mid ileal level. A small amount of free fluid was noted but no free gas identified. The cause of the obstruction was not identified.

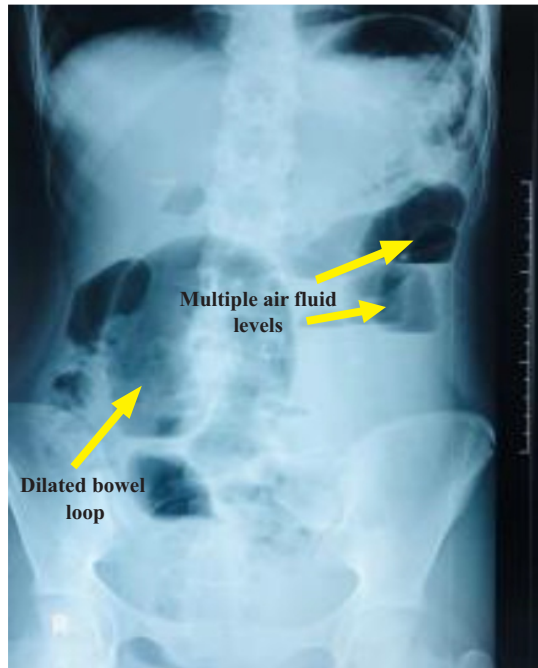


Figure 1: Erect X-ray of Abdomen

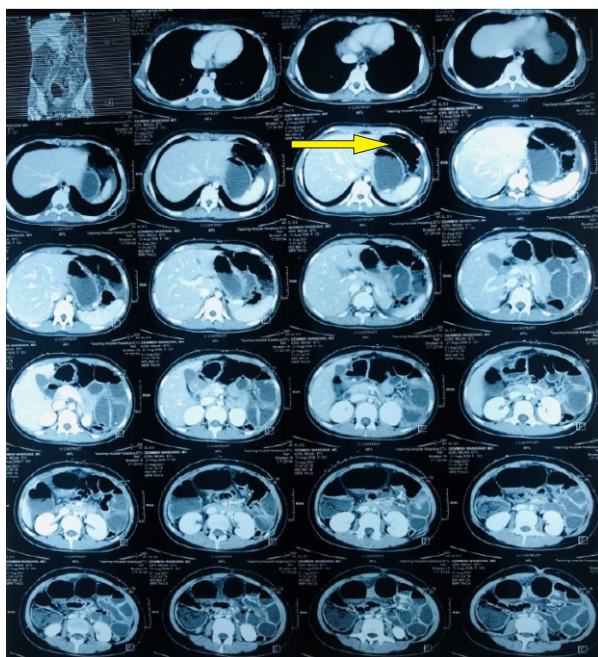


Figure 2: CECT Abdomen and Pelvis Dilated small bowel loop with air fluid level pointed in yellow arrow

As the patient's condition was deteriorating, an emergency exploratory laparotomy was performed.

A giant caecal diverticulum was identified, grossly distended and gangrenous (Figure 3). The base of the diverticulum had undergone torsion (Figure 4).



Figure 3: Intraoperative image with diverticulum distended, gangrenous giant caecal diverticulum indicate in yellow arrow

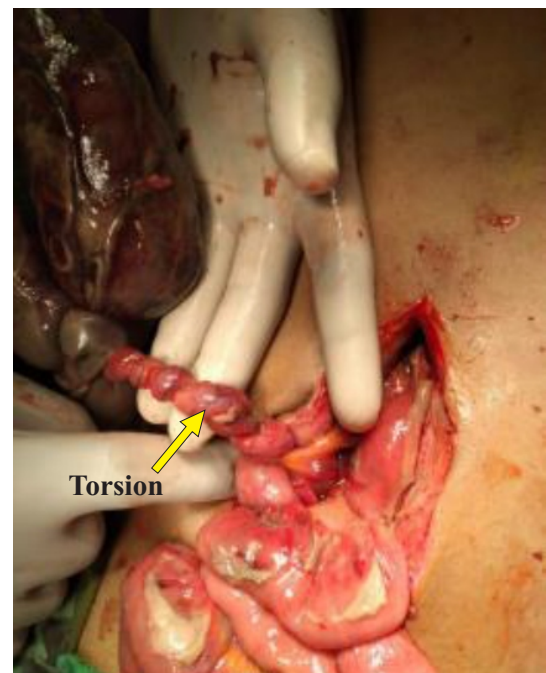


Figure 4: Torsion of the base of diverticulum

There was no perforation. The appendix was inflamed, the base grossly oedematous. Obstruction of bowel was due to kinking of the caecum with torsion of the diverticulum. The diverticulum was resected and an appendicectomy was done.

Specimens were sent for histopathological examination.

Recovery was uneventful, and patient was discharged on post-op day 4.

Histopathology revealed a 32 cm-long diverticulum with acute ischaemic necrosis and secondary suppuration. Viable colonic mucosa was noted 3 cm from the resection margin. A perforation with thinned out wall 4.5 cm from the resection margin was present. Omental fat showed evidence of peritonitis. A faecolith was seen in the lumen of the appendix.

Blood, urine and peritoneal fluid cultures showed no bacterial growth.

Discussion:

Giant colonic diverticula were described in 1946 by Bonvin and Bonte (3). The pathogenesis of giant colonic diverticula is not clear. The ball valve theory proposes a one-way valve forming between the bowel lumen and the diverticulum, allowing only air into the diverticulum. This increases the intraluminal pressure, gradually leading to enlargement. The second mechanism postulates that the diverticulum begins as a gas forming cyst of the colon. Obliteration of the neck of the diverticulum due to chronic inflammation allows only the distal end to enlarge. In 1988 McNutt *et al.*, proposed a histological classification of giant diverticuli (4):

- a) Type 1 (22%) - Known as pseudodiverticula, they are of the pulsion type, with mucosa herniating through bowel wall. The diverticular wall consists of remnants of muscularis mucosa and muscularis propria with granulation tissue.
- b) Type 2 (65%) - The commonest type, they form following a sealed subserosal perforation, resulting in a walled off abscess. This communicates with the colonic lumen gradually increasing in size. The wall consists only of inflammatory scar tissue.
- c) Type 3 (13%) - These are true diverticuli, the wall consisting of all 4 bowel layers.

A literature review yielded five reported cases of giant solitary diverticula of the caecum. Only two presented following torsion of the base, akin to our case.

MacPherson *et al.*, (1985) reported a case of a 2-year-old boy presenting with an acute abdomen (5). Laparotomy revealed a giant gangrenous caecal diverticulum, 10 cm in diameter attached to the medial border of the caecum by a pedicle that had undergone torsion and a diverticulectomy performed. In the second case, Martens and Fierens (2010) reported a 12-year-old girl, found to have a giant caecal diverticulum on laparotomy, measuring 30 cm in length and 7 cm in diameter and ischaemic following torsion of its base (6). Detorsion was done and diverticulectomy performed.

Ramu *et al.*, (2015) reported a case of a 11-year-old girl with an acute abdomen (7). A 15 cm long, 5 cm diameter caecal diverticulum attached to the lateral and inferior aspect of the caecum was discovered with a faecolith. Appendix was absent in this patient and histology revealed a pseudodiverticulum. Rathod *et al.*, (2019) reported a case of a giant caecal diverticulum in a 40-year-old male, 35 cm in length and 10 cm in diameter and inflamed (8). Histology showed chronic inflammation and atrophic caecal mucosa. Mishra *et al.*, (2019) reported a case of a 30-year-old male who underwent emergency laparotomy, who was found to have a giant caecal diverticulum (9). A limited colectomy was performed with an ileo-ascending colon anastomosis. Histology revealed a true diverticulum with no signs of malignancy.

Conclusions

Caecal diverticula are uncommon, with the giant type rarely encountered. They are frequently confused with acute appendicitis in the paediatric population. CT remains the modality of choice in diagnosis yet can be inconclusive, with accurate identification only possible intra-operatively. In an emergent situation, surgical intervention is both diagnostic and therapeutic. A simple diverticulectomy is sufficient in the young. In older patients, a limited *en bloc* resection of the colon with the diverticulum and primary anastomosis is advocated.

Informed written consent has been obtained from the patient to publish this case report with photographs.

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