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Case Report

Unravelling a case of rare peritoneal encapsulation following blunt abdominal trauma: a case report

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ABSTRACT

Peritoneal encapsulation (PE) is a rare condition that has been described interchangeably with sclerosing encapsulated peritonitis as well as abdominal cocoon. Here we report a case of perforative peritonitis following blunt injury abdomen in a 30-year-old male patient. Computed tomography (CT) of the abdomen showed pneumoperitoneum possibly gastrointestinal tract perforation. Exploratory laparotomy was performed and the entire small bowel was encapsulated in a peritoneal sac. Peritoneal sac was excised. Perforation was noted in the proximal jejunum and primary closure done. Post-operative recovery was uneventful. PE is an extremely rare congenital condition in which there is abnormal return of the midgut loop to the abdominal cavity in the early stages of development. The small intestine is thus covered by the original dorsal mesentery, forming the characteristic accessory peritoneal sac. Management of cases is difficult as CT findings may not be characteristic and may only be diagnosed at laparotomy. A discussion of the case and review of the literature are presented.

Keywords: Intestinal obstruction, Peritoneal encapsulation syndrome, Peritonitis

INTRODUCTION

This condition is characterized by the small bowel lying behind a thin, accessory but otherwise normal peritoneal membrane without being adherent to its serosal layer.[1] This membrane is attached to the ascending and descending colon laterally, to the transverse mesocolon cranially, and to the posterior parietal peritoneum caudally. The accessory peritoneal sac is derived from the yolk sac. The relative position of the viscera is normal, as is the length of the small bowel. Clinically, most patients have been identified incidentally during unrelated surgery or at autopsy and most late in life as the condition is largely asymptomatic.[2,3] Only 4 cases have been reported in children.[2-6] Few patients present with bowel obstruction.[4,5] When encountered incidentally during surgery, the membrane can be easily excised.

We present a case of peritoneal encapsulation diagnosed during surgery for a case of blunt injury abdomen.

CASE REPORT

A 30-year-old male patient presented to our surgical unit following a blunt injury to the abdomen with history of abdominal pain and vomiting. The patient had no other positive medical history of note. On examination, patient was found to be hemodynamically stable. Abdominal examination revealed perforative peritonitis. The chest and abdominal radiographs were found to be normal. Computed tomography (CT) abdomen shows pneumoperitoneum with possibility of gastrointestinal tract perforation with moderate free fluid. Patient was taken up for emergency surgery.

At laparotomy, the entire small bowel was encapsulated in a peritoneal sac. The peritoneal sac was attached laterally to the ascending and descending colon, superiorly to the transverse colon and inferiorly to the pelvic peritoneum. The peritoneal sac was transparent and it contained the entire small bowel and toxic fluid (Figure 1-3).

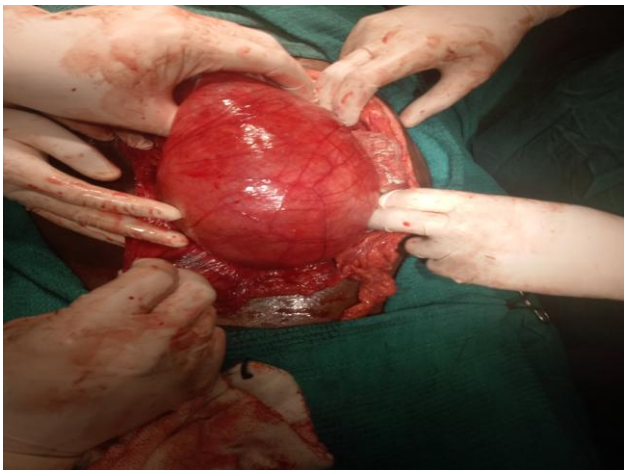

Figure 1: Complete view of the accessory peritoneal sac covering entire small intestine.

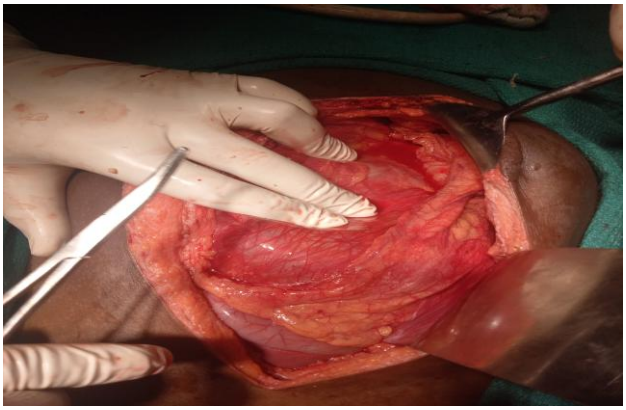

Figure 2: The accessory peritoneal sac doesn't have any attachment with greater omentum.

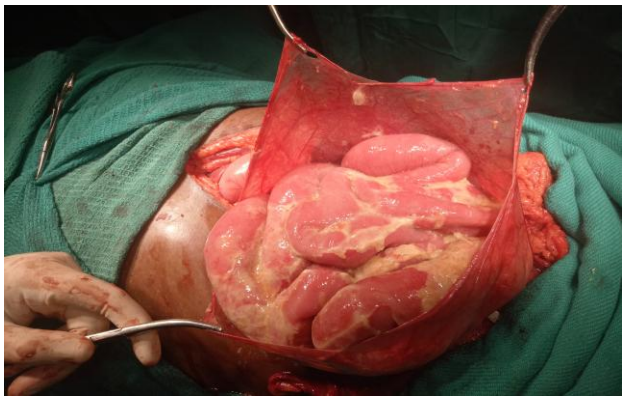

Figure 3: Entire small bowel surrounded by plaques after opening the peritoneal sac.

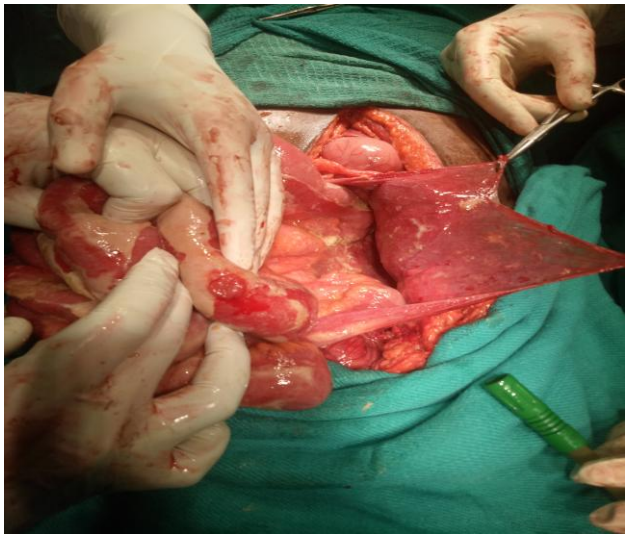

Figure 4: Jejunal perforation and peritoneal sac to be excised.

On opening of the peritoneal sac, the small bowel loops were freely mobile and covered with plaques. A single perforation of size 1×0.5 cm is noted in the proximal jejunum (Figure 4). The peritoneal sac was excised. Primary closure of the perforation was done. The patient's post-operative period was uneventful and he recovered well. Patient was discharged after 5 days.

DISCUSSION

Congenital encapsulation of the peritoneum is an utmost unique and rare condition that occurs during the 12th week of foetal development, because of the abnormal return of the midgut into the abdominal cavity. Because of this migration the covering layer of the yolk sac is persisting over the small bowel inspite of its normal position at the umbilical pedicle. The accessory peritoneal sac has its relation with transverse mesocolon superiorly and inferiorly by parietal peritoneum with no relation to greater omentum (Figure 2). The patients with this condition are usually asymptomatic. They are commonly found during autopsy in most of the cases. Other clinical presentations are acute small intestinal obstruction and incidental finding during laparotomy for other conditions. Preoperative diagnosis of peritoneal encapsulation cannot be made easily. The abdominal and chest X-ray will be normal in most of the cases. CT abdomen will show very non-specific findings.[7]

PE was first reported by Cleland. Defining the true incidence of PE has been hampered by the failure to distinguish this condition from abdominal cocoon and sclerosing encapsulating peritonitis (SEP).

The literature suggests that incidence of PE ranges between 20 and 40 cases.[6,8] PE is usually found incidentally autopsy or at laparotomy, like in this paper.[9] Rarely, PE may present with either complete or incomplete small bowel obstruction in patients who

usually have a long history abdominal pain.[10] Small bowel gangrene and aortic occlusion have each been reported once.[11,12]

The literature supports the excision of the peritoneal sac when encountered incidentally at laparotomy with lysis of interloop adhesions, if present, in symptomatic patients. Histological examination of the excised peritoneal sac invariably demonstrates normal peritoneum without signs of inflammation.[2]

Peritoneal encapsulation must be distinguished from two other conditions namely abdominal cocoon and SEP. SEP is an acquired condition characterized by the covering of the small bowel with a thick greyish white fibre collagenous membrane. SEP is associated with chronic ambulatory peritoneal dialysis, the beta-blocker protocol (now withdrawn from use), recurrent peritonitis, ventriculoperitoeal and peritoneovenous shunts, sarcoidosis, tuberculosis, mediterranean fever, protein-S deficiency, following liver transplantation, systemic lupus erythematosus, and fibrogenic foreign material.[13]

The abdominal cocoon was first described by Foo et al.[14] Classically, this condition was described as occurring in young adolescent females from the tropical and subtropical countries. However, case reports from temperate zones have been reported in all age groups regardless of gender.[15,16] The aetiology of the abdominal cocoon is poorly understood. Various theories have been proffered, including retrograde menstruation with a superimposed viral infection, retrograde peritonitis, and cell-mediated immunological tissue damage incited by gynaecological infection. It is probable that the abdominal cocoon is the result of "subclinical" peritonitis. The abdominal cocoon has been described as "idiopathic SEP". The small bowel is encapsulated by a fibro collagenous membrane in a manner not dissimilar to that encountered in SEP. The association with embryologic abnormalities such as greater omentum hypoplasia and mesenteric vessel malformation suggests that developmental abnormality may be a probable etiology.[17] Not-withstanding the reported differentiation of SEP and abdominal cocoon on the basis of aetiology, it is reasonable to assume that these conditions belong to a similar pathological process resulting in the fibrous encapsulation of the small bowel.

In patients presenting with small bowel obstruction associated with the fibrous encapsulation of the small bowel, two clinical signs have been described. The first is a fixed, asymmetrical distension of the abdomen, which does not vary with peristaltic activity due to the unvarying position of the fibrous capsule. The second is the difference in the consistency of the abdominal wall to palpation. The bowel proximal to the capsule can distend and is soft to palpation, as opposed to the flat area that is firm, due to the dense fibrous capsule that encases the underlying small bowel.[18]

Although standard radiographic studies are usually normal, it has been suggested that a combination of barium meal will follow through studies, and abdominal CT may contribute to making a preoperative diagnosis.

In abdominal cocoon, barium studies may demonstrate a serpentine-or concertina-like configuration of dilated small bowel loops in a fixed U-shaped cluster and delayed transit of the contrast medium.

CT of the abdomen may demonstrate congregation of small bowel loops to the centre of the abdomen encased by a soft-tissue density mantle representing the peritoneal membrane; other features include signs of obstruction, fixation of intestinal loops, bowel wall thickening, ascites, and localized fluid collections.

CONCLUSION

Despite anecdotal reports of a preoperative diagnosis of peritoneal encapsulation being established, in the majority of cases this is fortuitous particularly in the absence of discerning clinical signs. However, a better awareness of this condition with appropriate use of imaging techniques may facilitate preoperative diagnosis.

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