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TRAPPED IN A COCOON: A CASE OF PERITONEAL ENCAPSULATION SYNDROME PRESENTING AS RECURRENT BOWEL OBSTRUCTION

General Surgery

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ABSTRACT

Peritoneal Encapsulation Syndrome (PES) is a rare congenital anomaly in which the small bowel is partially or completely enclosed within an accessory peritoneal membrane. Its clinical presentation often mimics other causes of small bowel obstruction, making preoperative diagnosis difficult. We report a case of a 48-year-old male who presented with recurrent diffuse abdominal pain, distension, and intermittent vomiting, with a similar episode one year earlier managed conservatively. Examination revealed a tender abdominal lump and hyperperistaltic bowel sounds. Imaging with contrast-enhanced CT demonstrated a thick fibrous capsule encasing the small bowel, suggestive of abdominal cocoon syndrome. Emergency laparotomy revealed a pseudo membrane covering most of the small bowel, dense adhesions, and a pus pocket within a clumped ileal segment. Surgical management included membrane excision, adhesiolysis, resection of the affected ileal segment, and double-barrel ileostomy. The patient had an uneventful recovery and was discharged in stable condition. This case illustrates that, although PES is classically a benign congenital anomaly, secondary inflammatory changes may develop, leading to complications requiring bowel resection. PES should be considered in adults with unexplained recurrent small bowel obstruction, and timely surgical intervention can lead to favourable outcomes.

KEYWORDS

Peritoneal encapsulation, Small bowel obstruction, Abdominal cocoon syndrome

INTRODUCTION

Peritoneal encapsulation syndrome (PES) is a rare congenital anomaly caused by an abnormal peritoneal development that results in the small bowel being partially or completely enclosed within an accessory peritoneal membrane [1]. Due to its rarity and clinical similarities with other intra-abdominal conditions, PES has often been confused with **abdominal cocoon syndrome (ACS)** and **sclerosing encapsulating peritonitis (SEP)** [2]. However, PES is a **developmental defect** characterized by a **mesothelium-lined membrane,** whereas ACS and SEP are **inflammatory conditions** that lead to fibrosis and adhesion formation. While fewer than 60 cases of PES had been reported in the literature as of 2012 [3], its actual prevalence is likely higher, as many asymptomatic cases go undiagnosed.

Small bowel obstruction (SBO) is a **significant cause of morbidity,** accounting for approximately **15% of surgical admissions** for acute non-traumatic abdominal pain [4]. Adhesions and hernias are among the most common causes, but rare congenital anomalies like PES should also be considered, particularly in patients with no prior history of abdominal surgery. The **first documented case of PES dates back to 1868** [5]. Despite being congenital, PES can **remain asymptomatic for years,** with symptoms arising only when the peritoneal sac restricts bowel motility, leading to mechanical obstruction. Patients may present with **abdominal pain, nausea, vomiting, and distension,** mimicking other causes of SBO, such as **internal hernias or adhesive disease. Preoperative diagnosis is challenging** since imaging findings on **contrast-enhanced CT (CECT)** can resemble those of other intra-abdominal pathologies. As a result, PES is frequently diagnosed **intraoperatively,** when a distinct peritoneal sac encasing the small bowel is identified [6].

This report describes a **case of PES in a middle-aged male who presented with recurrent episodes of small bowel obstruction**. This case highlights the importance of considering PES in the differential diagnosis of unexplained intestinal obstruction, as well as the role of imaging and surgical intervention in its management.

Case Presentation

A 48-year-old male was apparently asymptomatic until 4 days prior to admission when he developed sudden-onset, gradually progressive, diffuse abdominal pain. The pain was localized to the abdomen without radiation and temporarily subsided following the administration of an enema. Four days before admission, he experienced a single episode of non-bilious vomiting, after which another enema was administered. Despite conservative management at an outside facility, his symptoms persisted.

The patient had a history of a similar episode one year ago, which was managed conservatively. There was no history of diabetes mellitus, hypertension, tuberculosis, or seizures.

Examination findings revealed a diffuse, tender abdominal lump measuring approximately 4×4 cm, mild abdominal distension, and a centrally located, inverted umbilicus. Digital rectal examination showed retained stool. Bowel sounds were hyperperistaltic.

Investigations

Imaging studies included abdominal radiographs, which showed multiple air-fluid levels suggestive of small bowel obstruction. Contrast-enhanced CT (CECT) of the whole abdomen revealed a thick, enhanced fibrous capsule encasing the small bowel, suggestive of **abdominal cocoon** with partial obstruction [FIGURE 1] Additionally, bilateral renal cysts were noted. Major abdominal vessels appeared normal, with no lymph node enlargement or free fluid.

Differential Diagnoses

Differential diagnoses considered included abdominal cocoon syndrome, peritoneal encapsulation, tuberculous peritonitis, peritoneal carcinomatosis, sclerosing mesenteritis, and adhesive small bowel obstruction.

Treatment

The patient underwent **emergency laparotomy**, release of the pseudo membrane, resection of the clumped ileal segment, and double-barrel ileostomy following anaesthesia clearance. Subhepatic and left pelvic drains were placed. Intra-operatively, a **pseudo membrane** was found covering most of the small bowel, with dense adhesions surrounding it [FIGURE 2] A pus pocket was noted within the clumped ileal segment [FIGURE 3].

The patient had an uneventful postoperative recovery and was discharged in stable condition.

DISCUSSION

Peritoneal Encapsulation Syndrome (PES) is a rare congenital condition in which the small bowel is enclosed within an accessory peritoneal membrane. This anomaly arises due to aberrant fetal development in the 12th week of gestation, during the return of the midgut to the abdominal cavity. PE is often misdiagnosed as abdominal cocoon syndrome (ACS) or sclerosing encapsulating peritonitis (SEP), both of which are acquired conditions with inflammatory etiologies. While PE is generally asymptomatic, it can present with recurrent small bowel obstruction due to intermittent trapping of bowel loops within the membranous sac. Most reported cases describe patients with incidental intraoperative findings, mild symptoms, or recurrent subacute intestinal obstruction, with the bowel loops lying freely within the sac and without the need for resection [1,7].

Our patient, a 48-year-old male, initially presented with sudden-onset, progressively worsening abdominal pain and intermittent vomiting, symptoms suggestive of mechanical small bowel obstruction. His history of a similar episode one year earlier raised suspicion of a chronic underlying condition. On examination, a diffuse, tender abdominal lump was noted, accompanied by mild distension and hyperperistaltic bowel sounds. Unlike cases of SEP, which typically present with signs of peritonitis due to chronic inflammation, our patient did not exhibit fever, guarding, or rebound tenderness. Digital rectal examination revealed retained stool, which, in conjunction with imaging findings, supported the diagnosis of small bowel obstruction.
Imaging plays a crucial role in distinguishing PES from its mimics. Abdominal radiographs showed multiple air-fluid levels, while contrast-enhanced CT (CECT) revealed a thick, enhanced fibrous capsule encasing the small bowel, initially suggestive of ACS. However, ACS is typically associated with chronic peritoneal inflammation, factors absent in our patient [8]. The intraoperative findings were key in differentiating PES from other encapsulating peritoneal disorders. During laparotomy, a pseudomembrane covering most of the small bowel was found, along with dense adhesions and a pus pocket within the clumped ileal segment. In contrast to classical PES, where the membrane is usually thin and avascular, our patient had a significant inflammatory component, necessitating resection of the affected ileal segment and a double-barrel ileostomy. This is in stark contrast to most reported cases of PE, where the peritoneal sac can be easily dissected without the need for bowel resection [9].

The presence of a pus pocket and dense adhesions in our case suggests that chronic low-grade inflammation may have developed over time, leading to secondary complications. This makes our case distinct from previous reports, which describe PES as a purely congenital, non-inflammatory entity. The majority of published cases do not require resection, whereas in our patient, the development of adhesions and localized infection warranted more extensive surgical intervention. Additionally, PES is usually diagnosed incidentally or at laparotomy for recurrent obstruction, but in our case, the presence of an inflammatory mass further complicated the clinical picture. These findings challenge the traditional notion that PES is always a benign anatomical anomaly and highlight the possibility of secondary inflammatory changes altering its clinical course.

Surgical intervention remains the definitive treatment for PES. Simple membrane excision and adhesiolysis are typically sufficient; however, in cases where bowel ischemia or perforation occurs, resection may be necessary. In contrast to SEP, which has a high surgical mortality rate due to frequent anastomotic breakdowns, PES generally has a favourable prognosis following surgical management. Our patient had an uneventful postoperative recovery and was discharged in stable condition, further supporting the notion that timely surgical intervention leads to good outcomes in PES. However, due to the unusual inflammatory findings, close long-term follow-up is warranted to monitor for recurrence or complications.

This case adds to the limited literature on PES and provides a rare instance where PES was associated with significant inflammatory changes necessitating bowel resection. It underscores the importance of recognizing PES in patients with unexplained recurrent small bowel obstruction and highlights that, although classically described as a congenital anomaly, PES can present with inflammatory complications requiring more extensive surgical management. Future studies are needed to explore whether a subset of PES cases may undergo secondary inflammatory transformation, leading to presentations more akin to SEP or ACS.

Figure Legends

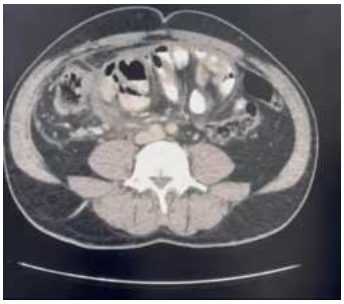

Figure 1: CT scan shows encapsulated small bowel loops with a thickened peritoneal membrane, characteristic of abdominal cocoon syndrome.

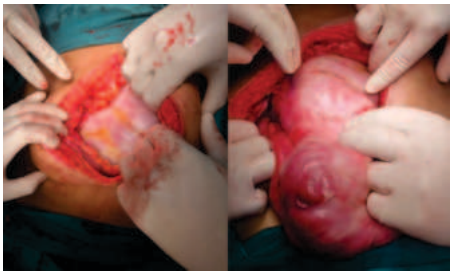

Figure 2: Intraoperative view of a thick, translucent fibrous membrane encasing the small intestine, characteristic of peritoneal encapsulation

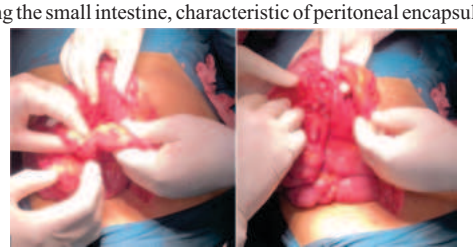

Figure 3: Intraoperative view after adhesiolysis and clumped ileal segment

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