IJCRR

Section: Healthcare

ISI Impact Factor
(2019-20): 1.628

IC Value (2019): 90.81

SJIF (2020) = 7.893

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Laparoscopy for Secondary Sclerosing Encapsulating Peritonitis – A Case Report

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ABSTRACT

Introduction: Abdominal cocoon is a rare condition in which the abdominal viscera may be partially or completely enclosed within a thick fibro-collagenous membrane. This can be a rare cause of bowel obstruction presenting as a surgical emergency.

Case Report: Here, we report a case of a 38-year-old man who presented with acute intestinal obstruction and underwent an emergency diagnostic laparoscopy during which the cause of obstruction was confirmed as an abdominal cocoon. An adhesiolysis with the release of obstructive fibrous bands was done and deemed as adequate management.

Discussion: It is predominant in women living in tropical regions. It can be either primary (idiopathic) or secondary to peritoneal injury due to infective, malignant aetiology or pharmacological irritants. Although it is usually diagnosed intra-operatively, computed tomography can rarely identify the presence of a thin capsule enclosing dilated bowel loops.

Conclusion: A thorough knowledge of secondary causative factors of sclerosing encapsulating peritonitis and its management is of prime importance. It is usually associated with a good prognosis.

Key Words: Laparoscopy, Sclerosing encapsulating peritonitis, Abdominal cocoon, Adhesiolysis, Bowel obstruction, Surgical emergency

INTRODUCTION

Dynamic bowel obstruction is one of the most frequently encountered surgical emergencies. Intra-abdominal adhesions account for 60% of these cases.¹ Previous abdominal surgery causes secondary inflammatory and fibrotic changes in the peritoneum producing adhesions. However, previous surgery leading to the formation of a dense peritoneal membrane forming a cocoon is infrequent. Abdominal cocoon syndrome, also known as sclerosing encapsulating peritonitis, is thought to be a form of peritonitis leading to the formation of a dense membrane surrounding the intra-abdominal organs. The membrane formation is more commonly seen secondary to peritoneal insult than primarily or idiopathic. The documented evidence of abdominal surgical or medical procedures producing a cocoon is limited to peritoneal dialysis, peritoneovenous shunts for refractory ascites², ventriculoperitoneal shunts, intra-peritoneal chemotherapy³, trauma-related⁴ and liver transplantation⁵. In our case, a history of

previous transverse rectus abdominus muscle flap surgery appears to be the inciting factor for a possible secondary abdominal cocoon. After an extensive review of literature, we have been unable to identify case reports of abdominal cocoon following abdominal wall surgeries. Although previous abdominal surgery raises the suspicion of adhesions causing acute intestinal obstruction, it very rarely presents as an abdominal cocoon. The ease of laparoscopy permits the management to be maintained as minimally invasive as possible, limiting further peritoneal damage.

CASE REPORT

A 38-year-old man presented with complaints of abdominal pain for 1 day which was diffusely present, colicky in nature, non-radiating. It was associated with 2 episodes of bilious vomiting on the same day. There was no history of constipation or abdominal distension. The patient had previously

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ISSN: 2231-2196 (Print)

ISSN: 0975-5241 (Online)

Received: 27.03.2021

Revised: 13.05.2021

Accepted: 18.07.2021

Published: 01.12.2021

undergone a right-sided transverse rectus abdominus muscle flap surgery for a traumatic leg injury 20 years ago. He had no known co-morbidities and no significant family history. Clinically, he was hemodynamically stable. Per abdominally, guarding and rigidity were noted with diffuse abdominal tenderness. The absence of bowel sounds was noted. On per rectal examination, stools were present. A clinical diagnosis of acute intestinal obstruction possibly due to post-operative adhesions was made.

Investigations

Routine laboratory blood investigations done were within normal limits. A plain abdominal radiograph revealed multiple air-fluid levels.

Contrast-enhanced computed tomography of the abdomen showed mildly dilated distal jejunal and proximal ileal loops with a zone of transition was seen in the mid ileal loops in the right lumbar region. Clumping of the small bowel loops and close opposition to the anterior abdominal wall in the right lumbar region suggestive of adhesions between the bowel loops and the anterior abdominal wall.

Differential diagnosis

A working diagnosis of mechanical bowel obstruction secondary to possible post-operative adhesions was made and the patient was worked up for the same. Abdominal cocoon was not suspected pre-operatively due to its rarity, the absence of a mass palpable per abdomen and the lack of suggestive radiological features. Peritoneal encapsulation, a differential diagnosis closely related to abdominal cocoon, is thought to be a developmental anomaly and is usually an incidental finding.

Treatment

A nasogastric tube was inserted to decompress the bowel. The abdominal girth was monitored to watch for distension. The patient underwent an emergency diagnostic laparoscopy during which the cause of obstruction and the diagnosis was confirmed to be an abdominal cocoon. The surgical approach included a palmer's point camera port with 2 left lower abdominal working ports. Intra-operatively, a dense membrane covering the bowel loops and intense extensive inter-loop adhesions was noted. The adhesions were released and part of the sac encompassing the obstructive segment of mid-ileum was excised and sent for histopathological examination. Progressive peristaltic movement of the bowel loops was noted once the constricting adhesions were released which concluded the procedure.

Post-operatively, the patient was managed with analgesics, intravenous antibiotics and nutritional support. Nil by mouth with nasogastric drainage status was maintained until post-operative day 2. Passage of flatus was used as the

confirmatory sign for initiating oral feeds. Thereafter, he was started on sips of liquids and progressed to soft solids. The surgical site was inspected on post-operative day 3 and was found to be healthy. Adequate limb mobilisation and spirometry was ensured as part of routine post-operative care. The patient was discharged on post-operative day 3. Suture removal from port sites was done on post-operative day 10. The histopathological examination of the peritoneal membrane revealed fibro collagenous tissue with chronic inflammation with no evidence of granulomas/malignancy. The patient was followed up until 1-month post-procedure.

DISCUSSION

Abdominal cocoon or Encapsulating peritoneal sclerosis has been observed as early as 1907, first described by Owtschinnikow as peritonitis chronica fibrosa incapsulata.⁶ In 1921, Winnen reported the first case of SEP, terming it *Zuckerguss-darm*, literally translated as 'icing gut', in reference to the whitish appearance of intestinal surface. It was later in 1978 that Foo et al. coined the term of Abdominal cocoon after observing an unusual cause of intestinal obstruction in 8 adolescent girls – hypothesized to be due to retrograde menstruation or subclinical viral peritonitis.⁷ Deeb et al. coined the term "sclerosing encapsulating peritonitis" for the same.⁸ It can be primarily idiopathic or more commonly secondary to conditions such as tuberculosis⁹, sarcoidosis, systemic lupus erythematosus¹⁰, use of abdominal washout agents such as povidone iodine¹¹ or practolol.^{12,13}

Irrespective of the cause, the pathogenesis is thought to be a subclinical peritonitis resulting in fibro-inflammatory changes in the peritoneum with membrane damage. Histologically, inflammatory infiltrate and submesothelial thickening, collagen deposition, and activation and proliferation of peritoneal fibroblasts is seen.¹⁴ Mesothelial irritation produces serositis which may be due to a single insult or multiple, recurrent episodes. The ultimate insult is mesothelial loss which predisposes the peritoneum to fibro-neogenesis.¹⁵ The resulting characteristic feature is conversion of the peritoneum into a thickened, dense fibro-collagenous membrane adherent to the small bowel loops.

Anatomically, Primary SEP can be classified into 3 types. Type I is partial encasement of the intestine; Type II is when the entire intestine is encompassed within the membrane. Type III involves additional encasing of the stomach, liver, appendix, *caecum*, ascending colon and ovaries.⁵

This may or may not result in a mechanical bowel obstruction if compression or inter-loop adhesions of the contents occur within the membrane. Most patients present with recurrent episodes of sub-acute intestinal obstruction which may resolve with conservative management and hence, it can go undiagnosed. It is only in cases of acute obstruction

that visualisation of the abdominal contents during laparoscopy or laparotomy that the diagnosis is made.

Imaging can rarely provide clues to arrive at a preoperative diagnosis. Abdominal radiograph depicts multiple air-fluid levels. Ultrasound of the abdomen can reveal clumped, dilated bowel loops; presence of free fluid; membranous covering of bowel loops. A classical picture of clumped bowel loops resembling a "concertina" or "accordion" with a mesenteric attachment giving rise to "cauliflower sign" has been described on ultrasound imaging.^{16,17} Contrast-enhanced computed tomography findings can reveal peritoneal abnormalities such as thickening, sclerosis, bowel encapsulation and visceral and parietal calcifications.^{18,19} The small bowel changes include narrowing of lumen with dilated proximal loops, mural thickening and fibrosis, inter-loop adhesions.^{17,20,21}

Acute intestinal obstruction mandates surgical intervention. Adhesiolysis with sac excision is the procedure of choice. Open abdominal surgery with laparotomy is usually preferred. However, if there is adequate expertise with laparoscopy, it can be used as an alternative with the advantages of minimal invasiveness, lesser peritoneal insult, faster post-operative recovery and better wound healing. Extensive adhesiolysis can lead to post-operative acute small bowel obstruction. Hence, gentle tissue handling while dissecting and releasing fibrous bands is advised. These outcomes can be achieved with laparoscopy as long as the surgeon is well experienced. In our case, laparoscopy proved to be both the diagnostic and therapeutic procedure. The long-term outcome is usually favourable.^{22,23}

CONCLUSIONS

- Dynamic intestinal obstruction due to secondary post-surgical abdominal cocoon is extremely rare. A high index of suspicion is necessary.
- Surgical intervention with sac excision and adhesiolysis at the earliest is essential for acute intestinal obstruction.
- Thorough knowledge of secondary causative factors and their management for sclerosing encapsulating peritonitis is of prime importance to maximise surgical outcome and patient recovery.

ACKNOWLEDGEMENT

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed

Department of General Surgery, SRIHER, Porur, Chennai

Source of Funding: Nil

Conflict of Interest: Nil

Authors' Contribution: NA was the primary surgeon and contributed to editing the manuscript. DS drafted the manuscript and was the primary assistant in the surgery.

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