Case Report

A Case of Peritoneal Encapsulation Presented as Acute Mechanical Small Bowel Obstruction: A Case Report and a Brief Literature Review

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Peritoneal encapsulation (PE) is a rare congenital malformation in which the small intestine is partially or totally encased in a supplementary peritoneal sac. PE is usually asymptomatic; therefore, it is one of the rarest etiologies of bowel obstruction. Our patient presented at the age of 55 with no prior surgical history and a 3-day history of abdominal pain associated with nausea, vomiting, belching, and constipation. An obstruction secondary to an internal hernia—visualized on a CT scan—was suspected as the initial etiology. On exploratory laparotomy, the small bowel was covered by a thick adherent sac. These findings are consistent with PE, a condition that deserves recognition among clinicians worldwide. Intraoperatively, the sac was excised, and the small bowel was pulled up to the peritoneal cavity starting from the ileocecal valve to the duodenojejunal junction. In the postoperative period, the patient was managed with intravenous fluids, analgesics, and antibiotics. Wound infection was the only postoperative complication. Otherwise, all symptoms subsided, and the patient improved and was discharged home on the 8th postoperative day.

1. Introduction

Small bowel obstruction is a typical surgical emergency, which often occurs due to postoperative or obstructed hernia adhesions [1]. One of the rarest etiologies of bowel obstruction is peritoneal encapsulation, a rare congenital malformation. The small intestine is partially or totally encased in a supplementary peritoneal sac [1–3]. Peritoneal encapsulation (PE) is usually asymptomatic. Therefore, it is often diagnosed accidentally, whether during laparotomy or autopsy [1, 3]. Despite that, PE may present with small bowel obstruction in rare cases [1, 3, 4]. In this case report, we describe a case of PE presented as an acute mechanical small bowel obstruction. Furthermore, we do a brief literature review for similar cases of PE that presented with a picture of small bowel obstruction.

2. Case Presentation

A 55-year-old male was admitted to the emergency department due to 3-day history of severe colicky left lower quadrant abdominal pain radiating to the back and associated with nausea, bilious vomiting, belching, and constipation. The patient had been having the same symptoms for over 35 years, and he used to relieve them with vomiting. This time, the pain did not subside with vomiting, and he became unable to bear it. The patient is a known case of type 2 diabetes mellitus, hypertension, hyperlipidemia,
and hyperthyroidism. He had no past surgical history. He was on metformin for type 2 diabetes mellitus, Bisoprolol for hypertension, atorvastatin for hyperlipidemia, and methimazole for hyperthyroidism. He had no relevant social or family history.

On physical examination, the abdomen was tender and rigid. An abdominal CT scan was obtained for further clarification, showing a small bowel obstruction and suspecting an internal hernia (Figures 1 and 2). The patient was admitted to the surgical department in preparation for exploratory laparotomy.

Under general anesthesia, a midline incision was done, and all abdominal wall layers were opened. The caecum was identified, but all small bowel was retroperitoneal and covered by a thick adherent sac. The surgeon started releasing the adhesions to expose the small bowel from the ileocecal valve. Although the adhesions were thick, all small bowel was released up to the duodenojejunal junction, which was dark in color, so warmed normal saline was applied. As a result, the small bowel returned to its normal color with visible peristalsis, and the sac was excise. There were two iatrogenic small bowel perforations repaired in two layers. An appendectomy was done during the adhesiolysis as it was adherent to the small bowel, and the hemostasis was secured. Two abdominal drains were applied, and then, the abdomen was closed. In the postoperative period, the patient was managed with intravenous fluids, analgesics, and antibiotics. Wound infection was the only postoperative complication. Otherwise, all symptoms subsided, and the patient improved and was discharged home on the 8th postoperative day.

3. Literature Review

In this section, we summarize the characteristics of a worldwide 25 cases of peritoneal encapsulation that have been published previously. It includes 17 male and eight female patients with a range of ages from 12 to 87 years old. They presented with a picture of acute or chronic small bowel obstruction. Their symptoms include colicky abdominal pain, nausea, anorexia, and vomiting. All of them were treated successfully by surgical resection of the sac (Table 1).

4. Discussion

This case report highlights the first described by Cleland in 1868 [5]. It is a very rare congenital malformation with less than 50 cases reported in the literature [6]. As a result of this low number, the etiology is not well understood yet, and most patients are diagnosed accidentally. An accessory peritoneal membrane that covers part of the small bowel is the most likely etiology for this condition [7]. Even though the cause is poorly understood, most of the existing theories suggest that PE occurs probably due to malrotation of the bowel during the 12th fetal week and, as a result, an abnormal return of the midgut into the abdominal cavity of the fetus occurs [2].

During normal fetal development, the yolk’s sac coat stays in the umbilical pedicle, while in PE, the coat migrates to the intestine, causing the formation of an accessory peritoneal membrane [2]. PE, however, can occur with other congenital anomalies such as incomplete situs inversus and congenital epigastric hernia [8].

Peritoneal encapsulation is usually asymptomatic; therefore, it is often diagnosed accidentally during laparotomy or autopsy. In extremely rare cases, as in the presented one, the patient may present with small bowel obstruction [1, 9]. It is, however, difficult to diagnose peritoneal encapsulation preoperatively in such cases since the radiological findings are usually normal or nonspecific [2, 7].
| Case | Author name                  | Year  | Country      | Age  | Sex | Presentation                      | History of presentation                                                                 | Management                                    |
|------|------------------------------|-------|--------------|------|-----|-----------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------|
| 1    | Tojal, André, et al.         | 2021  | Portugal     | 41   | M   | Small bowel obstruction          | Colicky epigastric abdominal pain associated with bilious vomiting                          | Surgical resection of sac                    |
| 2    | Lasheen, Omar, and Mohamed ElKorety | 2020  | UK           | 41   | M   | Small bowel obstruction          | Abdominal pain for 1 wk. associated with nausea, repeated vomiting, and relative constipation | Limited resection of the ileum with anastomosis |
| 3    | Robbins, K.J., Kooperkamp, H.Z. and Corsetti, R.L | 2019  | New Orleans, LA | 82   | M   | Small bowel obstruction + Meckel diverticulum | Diffuse abdominal pain accompanied by nausea and anorexia                                 | Surgical resection of sac                    |
| 4    | Renko, Abagayle E., Katelin A. Mirkin, and Amanda B | 2019  | USA          | 38   | M   | Small bowel obstruction          | Severe, sharp, right lower quadrant abdominal pain with abdominal distention, for 24 hours | Surgical resection of sac + adhesiolysis     |
| 5    | Toma, Elena-Adelina, et al.  | 2019  | Romania      | 21   | M   | Small bowel obstruction          | Intense-abdominal pain, asymmetrical abdominal distension                                   | Surgical resection of sac                    |
| 6    | McMahon, James, et al.       | 2018  | Australia    | 20   | M   | Small bowel obstruction          | Intermittent-severe abdominal pain for 7 years                                              | Surgical resection of sac                    |
| 7    | Wolski, Marek, et al.        | 2017  | Poland       | 12   | M   | Intestinal strangulation         | Vomiting and abdominal pain for 2 days                                                      | Surgical resection of sac                    |
| 8    | Arumugam, P. K., and A. K. Dalal | 2017  | India        | 22   | F   | Small bowel obstruction          | Abdominal pain, vomiting, and abdominal distension                                         | Surgical resection of sac                    |
| 9    | Griffith, D. G. L., M. Boal, and T. Rogers | 2017  | UK           | 12   | M   | Small bowel obstruction          | Abdominal pain and vomiting for 1 wk.                                                      | Surgical resection of sac                    |
| 10   | Zoulamoglou, Mentelos, et al.| 2016  | Greece       | 28   | F   | Small bowel obstruction          | Intermittent abdominal pain for 1 yr, asymmetric distension of the abdomen                 | Surgical resection of sac                    |
| 11   | Stewart, David, Rajay Rampersad, and Sebastian K. King | 2014  | Australia    | 16   | M   | Small bowel obstruction          | Intermittent, chronic abdominal pain, and nonbilious vomiting, since the age of 4 years    | Surgical resection of sac                    |
| 12   | Wani, Imtiaz, et al.         | 2013  | India        | 28   | M   | Small bowel obstruction          | Generalised, intermittent abdominal pain and bilious vomiting since 21 days               | Surgical resection of sac                    |
| 13   | Mitroulias, Vasilieos, et al.| 2012  | Greece       | 87   | F   | Small bowel obstruction          | Bilious vomiting and abdominal pain for 3 days                                              | Surgical resection of sac                    |
| 14   | Shamsuddin, Syed, et al.     | 2012  | Pakistan     | 16   | F   | Small bowel obstruction          | Abdominal pain and distension, vomiting, and weight loss for 5 days                         | Surgical resection.                          |
| 15   | Sherigar, Jagannath M., Brendon McFall, and Jaweed Wali | 2007  | United Kingdom | 82   | F   | Small bowel obstruction          | Lower abdominal pain, progressive abdominal distension, and vomiting for 3 days             | Surgical resection of sac                    |
| 16   | Chew, M. H., et al.          | 2006  | Singapore    | 38   | M   | Small bowel obstruction          | Right groin pain and swelling for two months                                                | Surgical resection of sac                    |
| 17   | Shioya, Takeshi, et al.      | 2005  | Japan        | 34   | M   | Small bowel obstruction + right inguinal hernia | Colicky pain, abdominal fullness, and vomiting                                             | Surgical resection of sac                    |
| 18   | Mordehai et al.              | 2001  | Israel       | 15   | F   | Small bowel obstruction          | Episodic crampy abdominal pain for 6 months                                                 | Surgical resection of sac                    |
| 19   | Okobia, M.N., U. Osime, and I. Evbuomwan | 2001  | Nigeria      | 15   | F   | Small bowel obstruction          | Abdominal pain                                                                             | Surgical resection of sac                    |
| 20   | Lee, Seong, et al.           | 2000  | South Korea  | 22   | F   | Small bowel obstruction          | Intermittent abdominal pain and distension                                                  | Surgical resection of sac                    |
| 21   | Casas, J. Dario, A. Mariscal, and N. Martinez | 1998  | Spain        | 43   | M   | Small bowel obstruction          | Intermittent abdominal pain for 6 months                                                    | Surgical resection of sac                    |
Table 1: Continued.

| Case | Author name                        | Year | Country | Age | Sex | Presentation                  | History of presentation                                                                 | Management                        |
|------|------------------------------------|------|---------|-----|-----|-------------------------------|------------------------------------------------------------------------------------------|-----------------------------------|
| 22   | Adedeji, O. A., and W. A. McAdam   | 1994 | UK      | 40  | M   | Small bowel obstruction       | Constant lower abdominal pain associated with nausea, anorexia, and vomiting for days    | Surgical resection of sac         |
| 23   | Tsunoda, Tsukasa, et al.           | 1993 | Japan   | 52  | M   | Small bowel obstruction +central abdominal mass | Abdominal fullness and discomfort for 1 month                                              | Surgical resection of sac         |
| 24   | Huddy, S. P. J., and M. E. Bailey. | 1988 | UK      | 56  | M   | Small bowel obstruction       | Intermittent colicky abdominal pain                                                      | Surgical resection of sac         |
| 25   | Lifschitz, O., Tiu, J. & Sumeruk, R. A | 1987 | Ciskei  | 66  | M   | Small bowel obstruction       | Abdominal pain, distension vomiting, for 3 wk                                             | Surgical resection of sac         |
We did a literature review for 25 cases of peritoneal encapsulation that have been presented with a picture of acute or chronic small bowel obstruction. Their symptoms include colicky abdominal pain, nausea, anorexia, and vomiting. All of them were treated successfully by surgical resection of the sac (Table 1).

In conclusion, cases with small bowel obstruction require immediate surgery, including excision of the accessory peritoneal membrane and lysis of the adhesions between the small bowel. After surgery, the survival rate is high, and the recurrence is low [1, 10].

5. Conclusion

PE is a very rare congenital malformation, which, so far, remains underdiagnosed, undertreated, and mismanaged. It is more rarely associated with acute small bowel obstruction. Such patients need high clinical suspicion, should be investigated appropriately, and usually require hospitalization and emergency surgical intervention.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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