A case of a fixed giant peritoneal loose body outside the peritoneum beside the rectovesical excavation

Running title: PLB outside the peritoneum

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Abstract

A peritoneal loose body (PLB) is a tissue completely separated from other intraperitoneal organs. It is rare and usually found incidentally during laparotomy, examination, or autopsy. It is usually located free in the peritoneal cavity and does not exist in the extraperitoneal space. It is generally thought to originate from the epiploic appendices released into the abdominal cavity following ischemic necrosis. We report a case of a giant PLB outside the peritoneal cavity, adjacent to the rectovesical excavation, in an asymptomatic 83-year-old man who underwent evaluation for cholecystolithiasis, preoperatively. Computed tomography revealed a mass with well-defined margins in the rectovesical excavation, consisting of a calcified core and peripheral soft tissue measuring 60 mm in diameter; it did not seem to invade adjacent organs. Although there were no symptoms or tumor growth over time, for a definitive diagnosis, we scheduled a laparoscopic extraction. On laparoscopic exploration, a white oval mass was found in the rectovesical excavation; there was no invasion of adjacent organs. We diagnosed the patient with a giant PLB. Postoperative recovery was uneventful. Most PLBs are asymptomatic and do not require surgery except when symptomatic, large in size, or
suspicious for malignancy. The PLB is rarely extraperitoneal and usually freely mobile; however, in our patient, it was fixed and outside the abdominal cavity, near the rectovesical fossa. Although it could not be diagnosed preoperatively as being extraperitoneal, it showed the typical imaging findings of PLB; thus, it was possible to remove the mass laparoscopically without bowel resection.

**Keywords:** extra peritoneum, peritoneal loose body, giant, fixed, laparoscopic surgery
Introduction

A peritoneal loose body (PLB) is a tissue that is completely separated from other intraperitoneal organs\(^1\). It is quite rare and presents as small (5-20 mm in diameter), white or pale gray, egg-shaped objects. It is usually asymptomatic and found incidentally during laparotomy, examination, or autopsy\(^2\). It is generally thought to originate from the epiploic appendices released into the abdominal cavity following ischemic necrosis and is usually free-floating in the peritoneal cavity\(^3\). Surgery is required if PLB is large or suspicious for malignancy. However, preoperative diagnosis is difficult and often requires invasive surgery such as laparotomy. We report, herein, a case of a giant PLB outside the peritoneum beside the rectovesical excavation for which laparoscopic extraction was performed.

Case presentation

An 83-year-old man with no symptoms underwent evaluation for cholecystolithiasis. Computed tomography (CT) incidentally revealed a well-circumscribed mass in the rectovesical excavation consisting of a calcified core and peripheral soft tissue and
measuring 60 mm in diameter; it did not seem to invade adjacent organs (Fig.1). Magnetic resonance imaging (MRI) also showed a hypointense mass with well-defined margins on both T1- (Fig.2A, arrow) and T2-weighted imaging (Fig.2B, arrow). Based on these radiologic findings, a tentative preoperative diagnosis of a peritoneal calcifying fibrous pseudotumor (such as a peritoneal loose body) was made. The differential diagnoses were rectal gastrointestinal stromal tumor and leiomyoma. The patient was asymptomatic and had no history of medical problems in the past. Laboratory tests, including those for tumor markers, were all within the normal range. Despite a 6-month follow-up, neither symptoms nor growth of the mass was observed over time. We scheduled a laparoscopic extraction after performing laparoscopic cholecystectomy for a definitive diagnosis. On laparoscopic exploration, a white oval-shaped mass was found in the rectovesical excavation outside the peritoneum; there was also no invasion of adjacent organs (Fig.3). We diagnosed the patient with a giant PLB, which we extracted through an enlarged median incision with partial use of hand-assisted laparoscopic surgery. The extracted specimen measured 60×55×50 mm and was whitish and oval shaped; it had a bony-hard and slightly glossy surface (Fig.4A). The cut surface of oval-shaped mass showed
concentrically lamellar structure (Fig. 4B). Histologically, the tissue was stained with eosin and appeared partially calcified; it had no cellular component (Fig. 5). These histopathological findings were characteristic of PLB. Postoperative recovery was uneventful, and the patient was discharged 5 days after surgery.

**Discussion**

Peritoneal loose body is rare and usually found incidentally during laparotomy, examination, or autopsy. The exact pathogenesis of loose bodies has not been fully elucidated; however, they have been generally thought to originate from epiploic appendices released into the abdominal cavity following ischemic necrosis that are then covered by fibrous tissue to form a PLB. Most PLBs do not require surgery except when they are symptomatic (with symptoms such as abdominal pain, bowel obstruction, urinary retention or urinary frequency), large in size, and suspicious for neoplasm. The PLBs are usually small (0.5–2.5 cm in diameter) but may reach a diameter of 5–10 cm and are then termed “giant” or “huge” peritoneal bodies. We searched for “giant peritoneal loose bodies” and identified 29 patients including ours. The clinical features of patients with
PLBs in previously published reports are summarized in Table 1. Only in our patient did the PLB exist outside the peritoneum, and only in few cases were they fixed; both occurrences are considered rare as most PLBs are usually found in the abdominal cavity.

There may be a mechanism other than that mentioned above regarding the pathogenesis of PLB. To perform minimally invasive surgery, it is important to have a preoperative diagnosis. Following close examination, our patient was suspected of having PLB before surgery, although it could not be diagnosed as being extra-peritoneal. We performed laparoscopic surgery, which reduced surgical invasion. Furthermore, the patient did not require intestinal resection. However, it is difficult to distinguish PLBs from other mobile lesions of the pelvic cavity, such as calcified uterine leiomyomas, peritoneal calcifying fibrous pseudotumors, foreign body granulomas, desmoid tumors, teratomas, metastatic lesions of ovarian cancer, spontaneously amputated ovaries, fecaliths, lymphatic glands in the mesentery, nodal calcifications, tuberculosis, urinary stones, and gallstones\(^2\). To make an accurate diagnosis, it is important to think comprehensively and keep in mind this rare entity. Imaging examinations are also helpful. X-ray films show a calcified lesion in the abdomen, which moves with a change in the posture of the patient; a high index of
suspicion is needed for the diagnosis of a giant PLB. However, there are exceptions, as in our patient. Additional tests that can be performed to diagnose PLB include CT and MRI scans, which can be useful in differentiating PLB from other lesions. The PLBs are characteristically well-defined, oval or round soft tissue masses with central calcification, usually located in the abdomen, surrounded by distinct fat planes separating them from adjacent organs. The MRI signal is similar to that of muscle, and a central hyperintense area may be seen on T1-weighted imaging. The PLBs do not exhibit enhancement; this is useful in differential diagnosis as leiomyomas and teratomas exhibit contrast enhancement.

Conclusion

We have reported a case of a fixed giant PLB outside the peritoneum beside the rectovesical excavation that was removed by laparoscopy. Giant PLBs are rare, and those exiting outside the peritoneum are even rarer. It is important to be aware of this entity and its characteristic features so as to establish an accurate diagnosis. Accurate diagnosis of a giant PLB is expected to reduce unnecessary surgical treatments for asymptomatic
patients in whom the finding is incidental.

**Disclosures:** The authors have no conflicts of interest to declare.

This study was not funded by external sources.

**Informed consent:** Written informed consent was obtained from the patient for publication of this case report.
Figure Legends

Figure 1. Computed tomography shows a well-circumscribed mass in the rectovesical excavation of an 83-year-old man, consisting of a calcified core and peripheral soft tissue, measuring 60 mm in diameter (arrow); it does not appear to be invading adjacent organs.

Figure 2. Magnetic resonance imaging findings (A, arrow) T1-weighted imaging; (B, arrow) T2-weighted imaging; both T1- and T2-weighted images show a mass and intensity similar to that of muscle tissue.

Figure 3. Laparoscopic exploration revealed a white oval-shaped mass covered by peritoneum and fixed at the rectovesical excavation (A, dotted line, B, arrow). No invasion of adjacent organs is seen.

Figure 4. Extracted specimen. The peritoneal loose body, measuring 60 mm, was white and oval shaped and had a bony-hard and slightly glossy surface (A). The cut surface of oval-shaped mass showed concentrically lamellar structure (B).

Figure 5. Histopathological examination revealed that eosin-stained vitrified fibrous material was composed of layered tissue, and some fine-grained calcification was observed (magnification X40, inset X400).
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Fig. 1
Fig. 2
Fig. 3
Fig. 4
Fig. 5
| Author          | Published year | Gender | Age | Size of PLB (mm) | Location                                                                 | PLB mobility | Surgical approach          |
|-----------------|----------------|--------|-----|-----------------|---------------------------------------------------------------------------|--------------|----------------------------|
| Takada A        | 1998           | M      | 79  | 70              | Douglas pouch                                                             | free         | Open                       |
| Nomura H        | 2003           | M      | 63  | 50              | Pelvic cavity                                                             | free         | Laparoscopy                 |
| Ghosh P         | 2006           | M      | 63  | 58              | Peritoneal cavity                                                        | Attached to the bladder and sigmoid colon | Open           |
| Mohri T         | 2007           | M      | 73  | 95              | ND                                                                        | ND           | Open                       |
| Hedawoo JB      | 2010           | M      | 65  | 95              | Right iliac fossa                                                         | ND           | Open                       |
| Sewkani A       | 2011           | M      | 64  | 70              | Left pelvic wall                                                          | Attached to omentum | Open           |
| Jang P          | 2012           | M      | 60  | 45              | Intrapelvic cavity                                                       | Free         | Laparoscopy                 |
| Kim HS          | 2013           | M      | 50  | 75              | Pelvic cavity                                                             | Free         | Laparoscopy                 |
| Rubinkiewicz M  | 2014           | F      | 70  | 200             | Peritoneal cavity                                                        | Free         | Open                       |
| Makinemi H      | 2014           | M      | 52  | 60              | Recto-vesical pouch                                                      | ND           | Open                       |
| Sahadev R       | 2014           | M      | 52  | 70              | Intra-peritoneum                                                         | Free         | Laparoscopy                 |
| Zhang H         | 2015           | M      | 51  | 50              | Pelvic cavity                                                             | Free         | Laparoscopy                 |
| Sussman R       | 2015           | M      | 52  | 100             | ND                                                                        | Free         | Laparoscopy                 |
| Suganuma I      | 2015           | F      | 35  | 75              | ND                                                                        | Connected to the uterus via a pedicle | Laparoscopy |
| Lee KH          | 2016           | F      | 61  | 60              | Left iliac fossa                                                          | Free         | Laparoscopy                 |
| Elsner A        | 2016           | M      | 52  | 52              | Lesser pelvis                                                            | Free         | Laparoscopy                 |
| Rosic T         | 2016           | M      | 73  | 66              | Pelvis                                                                   | Free         | Laparoscopy                 |
| Huang Q         | 2017           | M      | 79  | 104, 76         | Vicinity of the spleen, pelvic cavity                                    | Free         | Laparoscopy                 |
| Matsubara K     | 2017           | M      | 70  | 58              | Pelvic cavity, between the rectum and the urinary bladder                | Free         | Laparoscopy                 |
| Oom R           | 2018           | M      | 64  | 60              | Pelvic cavity                                                             | Free         | Laparoscopy                 |
| Cojocari N      | 2018           | M      | 72  | 65              | Recto-vesical pouch                                                      | ND           | Laparoscopy                 |
| Obaid M         | 2018           | M      | 58  | 60              | Pelvic cavity                                                             | Free         | Laparoscopy                 |
| Guo S           | 2019           | M      | 49  | 55              | ND                                                                        | ND           | Open                       |
| Baert L         | 2019           | M      | 53  | 55              | Right iliac fossa                                                        | Free         | Laparoscopy                 |
| Teklewold B     | 2019           | M      | 50  | 75              | Right paracolic gutter                                                   | Adhesion to bowel | Laparoscopy |
| Li R           | 2020           | M      | 46  | 45              | Pelvic cavity                                                             | Free         | Laparoscopy                 |
| Dhoot NM        | 2020           | M      | 75  | 62              | Pelvic cavity                                                             | Free         | Laparoscopy                 |
| Allopi N        | 2021           | M      | 79  | 45              | Pelvic cavity                                                             | Free         | Laparoscopy                 |
| Our case        | -              | M      | 83  | 60              | Rectovesical excavation                                                  | Fixed at extraperitoneal | Laparoscopy |

PLB: peritoneal loose body, ND: not described