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Atypical Dissemination of Pseudomyxoma Peritonei to Surgical Mesh: Case Report

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Abstract

Introduction: Pseudomyxoma peritonei (PMP) is a rare mucinous neoplastic condition, typically confined to the peritoneal cavity. Extrapertioneal spread is exceptionally uncommon.

Case Presentation: A 76-year-old woman with a history of umbilical hernia repair presented with abdominal pain. Imaging suggested an appendiceal mucocele. During surgery, mucin was unexpectedly found in the extraperitoneal space, in direct contact with a preaponeurotic mesh. Histology confirmed a low-grade appendiceal mucinous neoplasm.

Discussion: This case reveals an atypical extraperitoneal extension of PMP, likely facilitated by prior mesh placement. Such rare presentations complicate diagnosis and limit conventional treatment ap-proaches like HIPEC.

Conclusion: PMP can exceptionally extend beyond the peritoneum. Surgical history, especially involving im-plants, must be considered in atypical presentations.

Introduction

Pseudomyxoma peritonei (PMP) -also known as gelatinous ascites or gelatinous peritoneal disease- is a rare and complex clinical-pathological condition characterized by the presence of mucinous ascites. In approximately 90% of cases, peritoneal involvement arises from neoplastic lesions of the appendix [1], particularly low-grade appendiceal mucinous neoplasms (LAMNs). Less frequently, PMP originates from ovarian or colonic tumors, and only exceptionally from gastric, pancreatic, gallbladder, fallopian tube, urachal, pulmonary, or mammary sources. Regardless of the primary site, the estimated incidence of PMP is 1–2 cases per million individuals annually [5]. PMP is now recognized as a neoplastic process and is most effectively managed through a com-bined treatment approach involving complete cytoreductive surgery and intraperitoneal chemo-therapy, which can significantly improve patient outcomes.

In most cases, PMP's classical distribution involves the peritoneal cavity following a predictable course of spread via peritoneal surfaces, with mucin and neoplastic epithelium gravitating toward anatomical niches such as the pelvis, omentum, and paracolic gutters. However, emerging evidence reveals that PMP can also present in uncommon, extraperitoneal sites or in atypical intra-abdominal locations due to anatomical variants, congenital anomalies, or previous surgical interventions. Recognizing these atypical localizations is critical, as they may delay diagnosis, obscure the tumor's origin, and complicate therapeutic decisions.

This article reports the case of a patient who had previously undergone surgical repair of an umbilical hernia with placement of a preaponeurotic retro-muscular mesh. One year postoperatively, the patient presented with pseudomyxoma peritonei, necessitating surgery. Intraoperative exploration revealed an unexpected finding: mucinous material located extraperitoneally, in direct contact with the previously implanted hernial mesh. This case illustrates a highly atypical pattern of mucinous dissemination, highlighting the potential for PMP to extend beyond the peritoneal cavi-ty and involve prosthetic surgical implants.

Case Presentation

The patient, a 76-year-old woman with a significant surgical history—including a cholecystectomy two years prior and an umbilical hernia repair with placement of a preaponeurotic retro-muscular mesh one year earlier—had remained asymptomatic until recent events.

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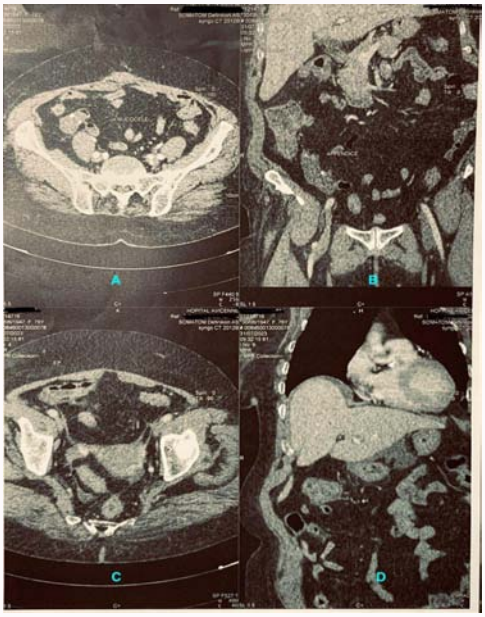

Figure 1: A- Axial CT scan image showing appendiceal mucocele; B-Coronal CT scan image showing appendiceal mucocele; C-Axial CT scan image showing low-volume pelvic effusion; D-Coronal CT scan showing low-volume perihepatic effusion.

She presented with acute right iliac fossa pain and mild abdominal distension. On examination, tenderness was localized to the right iliac fossa. Appendicitis was initially suspected, prompting an abdominal ultrasound, which failed to visualize the appendix. A subsequent abdomino-pelvic CT scan revealed a blind-ended tubular structure arising from the cecum, suggestive of an appen-diceal mucocele. The structure had liquid-density content, thin enhancing walls, and fine parietal calcifications, with surrounding fat stranding and intra-abdominal fluid (Figure 1). There was no evidence of lymphadenopathy, or pneumoperitoneum. Tumor markers were within normal limits.

Following multidisciplinary discussion, a surgical intervention was scheduled. During a midline laparotomy crossing the umbilicus, an unexpected finding was made prior to opening the perito-neum: mucin was present in the extraperitoneal space, in direct contact with the previously placed mesh prosthesis (Figure 2).

Intra-abdominal exploration revealed an inflamed appendix measuring 10 cm, with a perforated tip but a macroscopically intact base (Figure 3). Mucin deposits were observed in the pelvis. Given the presence of extraperitoneal extension and the impossibility of achieving complete cytore-duction, a surgical debulking was performed. This included removal of the perforated appendix and mucinous deposits from both the peritoneal cavity and the extraperitoneal space adjacent to the mesh. The prosthesis itself was preserved.

The patient tolerated the procedure well, with an uneventful postoperative course and discharge after three days. Histopathological examination confirmed a low-grade appendiceal mucinous neoplasm [3] (LAMN).

Postoperative surveillance involves regular CT imaging to monitor for recurrence. The most re-cent scan revealed a collection near the laparotomy site and a thin peritoneal fluid layer, which was managed conservatively following multidisciplinary review.

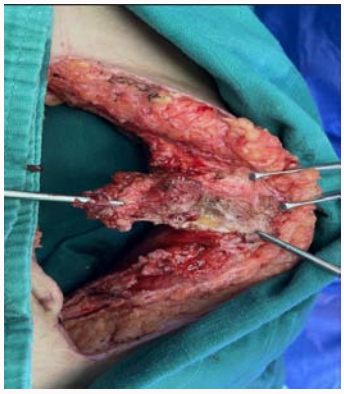

Figure 2: Peroperative image showing mucin in direct contact with the previously placed mesh.

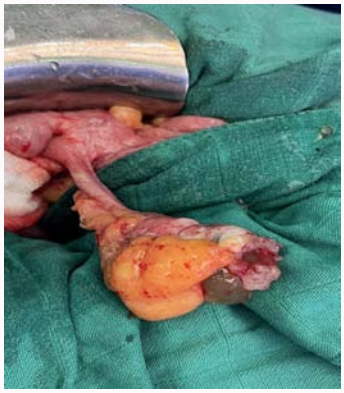

Figure 3: Peroperative image showing appendiceal mucocele.

Discussion

Pseudomyxoma peritonei is a clinical syndrome characterized by the accumulation of mucinous material within the peritoneal and/or pelvic cavity. Importantly, it is a descriptive term rather than a definitive histopathological diagnosis. The principal pathophysiological model explaining PMP involves the rupture of a mucinous appendiceal tumor, resulting in the dissemination of both mu-cus and neoplastic epithelial cells throughout the peritoneal cavity. Unlike many malignancies, hematogenous or lymphatic spread is rare in PMP. Consequently, the development of visceral metastases remains anecdotal and poorly documented in the literature.

Clinically, the symptoms of PMP are often vague and nonspecific. Patients may present with ab-dominal distension, symptoms mimicking acute appendicitis, or various gastrointestinal disturbances. In advanced stages, computed tomography (CT) can offer crucial diagnostic insights. Radi-ological features such as hepatosplenic scalloping [2]—caused by copious gelatinous ascites infiltrating the paracolic gutters—along with an omental cake and central displacement of the small bowel, are nearly pathognomonic. Positron emission tomography–computed tomography (PET-CT) may further assist in evaluating disease extent and guiding therapeutic decisions. Additional-ly, serum tumor markers like CA 19-9 have been proposed as potential prognostic indicators for disease recurrence. Nonetheless, definitive diagnosis requires histopathological examination of the gelatinous material.

The optimal management of pseudomyxoma peritonei involves complete cytoreductive surgery combined with hyperthermic intraperitoneal chemotherapy [4] (HIPEC). This strategy yields fa-vorable long-term outcomes, with 5- and 10-year survival rates of approximately 90% and 85%, respectively. When complete cytoreduction is not feasible—typically due to extensive small bowel involvement—palliative debulking is performed. HIPEC serves as a complementary therapy aimed at eradicating microscopic residual disease through the use of high-concentration chemo-therapeutic agents.

Extrapertioneal dissemination of PMP is exceedingly rare [6] and generally attributed to iatrogen-ic causes or congenital anatomical abnormalities. Until 2013, only Around 44 cases of Exptraperi-noneal PMP have been reported in the literature. In the typical disease course, mucinous deposits follow a "redistribution phenomenon," wherein mucin accumulates in gravity-dependent regions of the peritoneum that facilitate fluid reabsorption. These anatomical zones include the greater omentum, the right subdiaphragmatic space, the retrohepatic area, the left paracolic gutter, the ligament of Treitz, and the pelvic cavity.

However, the operative findings in the case under discussion deviated significantly from this typi-cal pattern. Unexpectedly, mucinous deposits were discovered in direct contact with a hernial prosthetic mesh, located in the extrapertioneal space—an observation not previously reported in the literature. This rare presentation rendered complete cytoreduction virtually impossible without sacrificing a substantial portion of the abdominal wall, and diminished the utility of HIPEC, which is specifically designed for intra-peritoneal disease.

These findings raise important hypotheses regarding potential mechanisms of extrapertioneal dis-semination [9]. One possibility involves cellular migration through areas of weakened tissue or the formation of fistulous tracts. A critical consideration is whether prior surgical interventions, particularly those involving prosthetic material, may have contributed to the breach of the perito-neal barrier and facilitated mucin migration. The prosthesis itself may have created a structural vulnerability or an unintended conduit for neoplastic spread into extrapertioneal compartments.

This unusual case underscores the need for further investigation into the long-term implications of surgical implants in patients with PMP and calls attention to the importance of tailored surgical strategies in managing atypical presentations of this rare disease.

Conclusion

This article presents a rare case of pseudomyxoma peritonei characterized by the presence of ex-traperitoneal mucinous deposits in direct contact with a surgical prosthesis. The atypical localiza-tion of the disease in this instance renders the case particularly noteworthy, given its significant diagnostic and therapeutic implications. It underscores the critical role of surgical history in the management of PMP and emphasizes the need for further investigation into the mechanisms of disease extension and dissemination—extending beyond traditional local and peritoneal pathways to include extrapertioneal spread.

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