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CASE REPORT

유방암 과거력이 있는 환자에서 발생한 복막가성점액종

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Pseudomyxoma Peritonei in a Patient with History of Breast Cancer

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Pseudomyxoma peritonei is a very rare condition, and even rarer in patients with history of cancer. A 70-year old woman with a history of breast cancer was admitted with abdominal pain and distention. Abdominal computed tomography revealed ascites collection, diffuse engorgement and infiltration of the mesenteric vessel, suggesting peritonitis or peritoneal carcinomatosis. Diagnostic paracentesis was attempted several times, but a sufficient specimen could not be collected due to the thick and gelatinous nature of the ascites. Therefore, the patient underwent diagnostic laparoscopy for tissue biopsy of the peritoneum, which indicated pseudomyxoma peritonei. However, the origin of the pseudomyxoma peritonei could not be identified intraoperatively due to adhesions and large amount of mucoceles. Systemic chemotherapy was performed using Fluorouracil, producing some symptomatic relief. After discharge, abdominal pain and distention gradually worsened, so at 18 months after initial diagnosis the patient received palliative surgery based on massive mucinous ascites and palpable mass at the omentum. The patient expired after surgery due to massive bleeding. **(Korean J Gastroenterol 2016;67:153-157)**

Key Words: Pseudomyxoma peritonei; Appendiceal neoplasms; Adenocarcinoma, mucinous

INTRODUCTION

Pseudomyxoma peritonei refers to the infiltration of gelatinous ascites in the peritoneum, greater omentum, and the abdominal cavity, regardless of cause or malignant status. It was first reported by Rokitansky in 1842, and the term pseudomyxoma peritonei was coined by Werth in 1884. It is a rare condition that occurs in two in one million people each year,[1] and is two to three times more common in women than in men.[2] Published research on pseudomyxoma peritonei is very limited, a result of the rarity of the condition, and the etiology and histological pathogenesis are largely unknown. It most commonly occurs in the appendix in men, and in the ovaries and appendix in women.[1] Other sites include the large bowel, rectum, stomach, gallbladder, small bowel, bladder, lungs, breasts, fallopian tubes, and the pancreas.[3] The Pathologic Anatomic National Automated Archive (PALGA), Netherlands Cancer Institute (NKI), lists 267 patients with pseudomyxoma peritonei, of whom 86 did not have a clear primary site.[1] However, it is difficult to find reports of patients with pseudomyxoma peritonei who have histories of cancer. We report a case of pseudomyxoma peritonei due to mucinous adenocarcinoma in the appendix of a patient who had a history of breast cancer, with a discussion of effective diag-

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nostic methods and treatment for pseudomyxoma peritonei.

CASE REPORT

A 70 year old female patient presented to the outpatient clinic with a four day history of abdominal pain and distention. She had a fever and rebound tenderness, so was admitted to the hospital for possible peritonitis. She had a history of left mastectomy for invasive ductal carcinoma at the age of 66, five years before presentation at the clinic, and had been taking medications for 10 years for hypertension and diabetes. Her vital signs at the time were blood pressure of 110/60 mmHg, pulse rate of 92 beats/min, respiratory rate of 20 breaths/min, and body temperature of 38.0°C, suggesting acute pathology, but she was alert and oriented. Physical examination showed distended abdomen, severe tenderness, and rebound tenderness, suggesting peritonitis. Her blood tests showed white blood cell count of 10,250/mm^3 (neutrophil count 85.6%), hemoglobin level of 11.9 g/dL, and platelet count of 387,000/mm^3. Blood biochemistry showed BUN of 30.6 mg/dL, creatinine 1.5 mg/dL, AST 25 IU/L, ALT 18 IU/L, CRP 20.758 mg/dL, and tumor markers CEA 3.60 ng/mL, and CA 19-9 13.36 IU/mL.

To identify the cause of peritonitis, the patient underwent abdominal CT, revealing ascites in the lower abdomen and the pelvis. There was increased density in the peritoneum and segmental wall thickening of the distal ileal loops (Fig. 1).

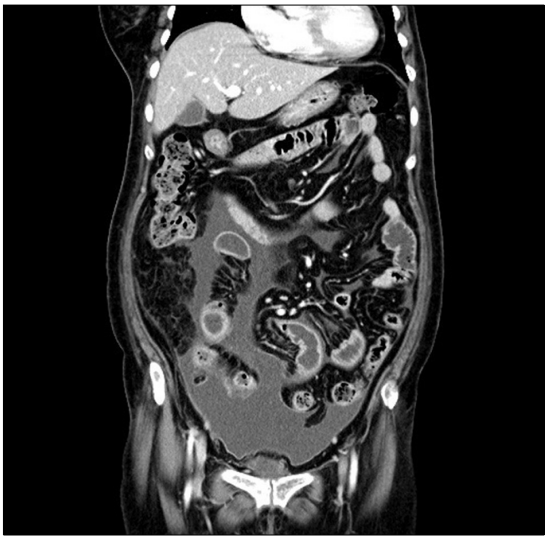

Fig. 1. Abdominopelvic CT findings on the day of admission. Ascites collection in the lower abdomen, pelvic cavity with diffuse peritoneal enhancement and segmental wall thickening of the distal ileal loops.

The patient underwent paracentesis for suspected intestinal tuberculosis or peritoneal carcinomatosis, but we could not obtain a specimen sufficient for testing. Paracentesis was re-attempted under ultrasound guidance, which yielded approximately 1 mL of jelly-like ascites. Cytology of this specimen was negative for malignancy. Further ultrasound-guided paracentesis was unsuccessful, so the patient underwent diagnostic laparoscopy. Laparoscopy showed a large amount of gelatinous ascites, but the primary site could not be identified due to adhesions, the ascites, and mucoceles. However, we identified mucin pools, so we diagnosed her with pseudomyxoma peritonei (Fig. 2). Following surgery, the patient received single agent fluorouracil therapy with good symptomatic and laboratory test outcome, and she continued observation as an outpatient. She underwent colonoscopy after a year, which showed mucocele in the orifice of the appendix (Fig. 3), with histology indicative of appendiceal mucinous neoplasm.

Eighteen months after diagnostic laparoscopy and chemotherapy the patient presented again with lower right abdominal pain and abdominal distention. A repeat abdominal CT showed a large amount of ascites, scalloping of the liver surface (Fig. 4A), and a mass in the omentum of the lower right abdomen (Fig. 4B).

Laparotomy performed for palliative therapy showed that the abdomen was full of mucous ascites, and there was a mass with dimensions of 30×20×20 cm in the omentum. There were multiple metastases in the liver, ileum, right large bowel, and the ovaries. Histology of the masses from the omentum, peritoneum, ileum and the right ovary showed mu-

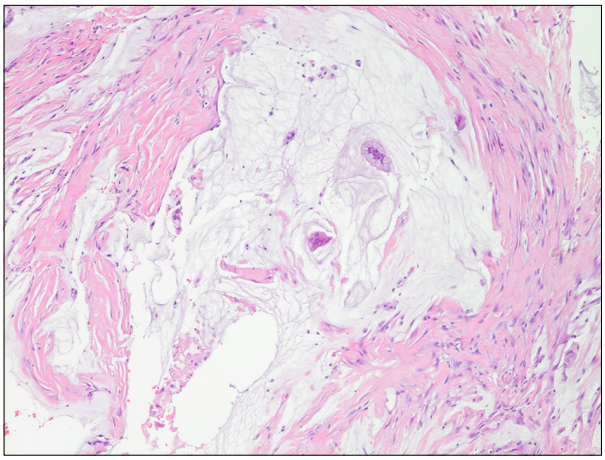

Fig. 2. Biopsy on peritoneal tissues taken from laparoscopy. Pools of mucin with a few clusters of mucinous columnar epithelium (H&E, ×100).

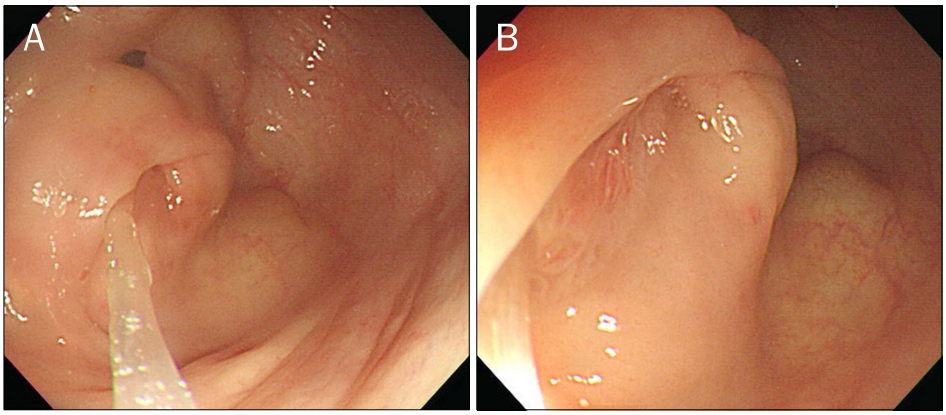

Fig. 3. Colonoscopic findings of the orifice of appendix. (A) Colonoscopy showing mucin leaking out from the appendix orifice and (B) mucoceles on the appendix orifice.

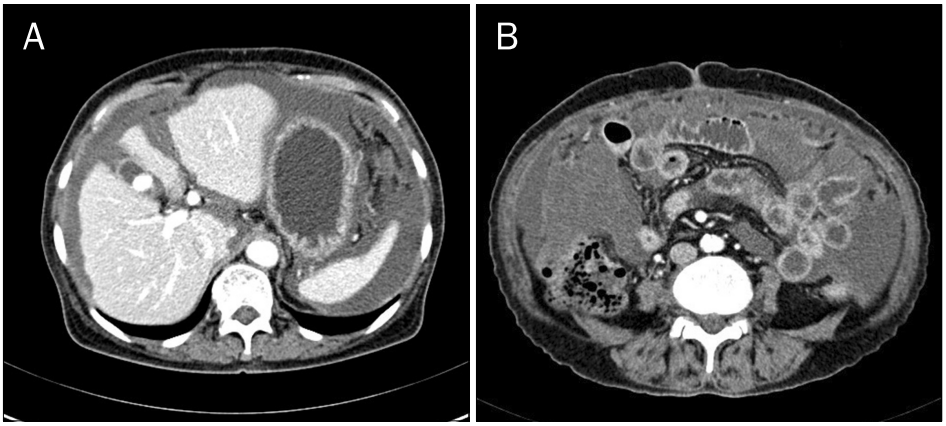

Fig. 4. Abdominopelvic CT findings before the palliative surgery. (A) Ascites and hepatic surface scalloping and (B) soft tissue mass at the omentum.

cinous adenocarcinoma (Fig. 5). Unfortunately the patient expired from excessive bleeding and hypovolemic shock after the operation.

DISCUSSION

Pseudomyxoma peritonei is a very rare condition, occurring in two in every one million people yearly,[3] and reported in two in every 10,000 cases of laparotomy.[2] Its exact cause is unclear, but it is more common in women. It is difficult to diagnose pre-operatively, so is often an unexpected finding in laparotomy. There are no set diagnostic criteria due to limited number of cases.

The most common cause of pseudomyxoma peritonei is presumed to be the increase in the amount of mucin and the number of mucinous tumor cells in the appendix, leading to the expansion and perforation of the appendix. This in turn leads to the spreading of the mucinous tumor cells into the abdominal cavity.[4] This phenomenon of mucous ascites is known as gelatinous ascites, or jelly belly.[5] We were able to observe gelatinous ascites through ultrasound-guided paracentesis, but could not obtain a specimen sufficient for cytology and additional tests. It is difficult to collect a sufficient amount of specimen due to the highly gelatinous nature of the ascites, and the presence of septations in some cases. Even when a sufficient amount of specimen is collected, it often contains only normal cells, and thus paracentesis is not recommended for diagnosing pseudomyxoma peritonei.[3]

Approximately half of all diagnosed mucinous tumors of the appendix are asymptomatic and incidentally found.[6] The most common symptom is abdominal pain, present in more than 80% of the patients.[6] Other common symptoms include a palpable mass in the right iliac fossa, nausea, vomiting, and weight loss.[6] The infiltration of the mucinous tumor into the abdominal cavity occurs through perforation, forming gelatinous ascites, and leading to abdominal distention. This condition is related to elevated tumor markers CEA and CA 19-9, which are associated with adenoma and adenocarcinoma.[7] A study of 532 patients with mucinous tumors showed that CEA was elevated by 56.1%, and CA 19-9 by 67.1%, and 78.8% of the patients had elevated levels in at least CEA or CA 19-9.[7] As these two tumor markers are also elevated in the

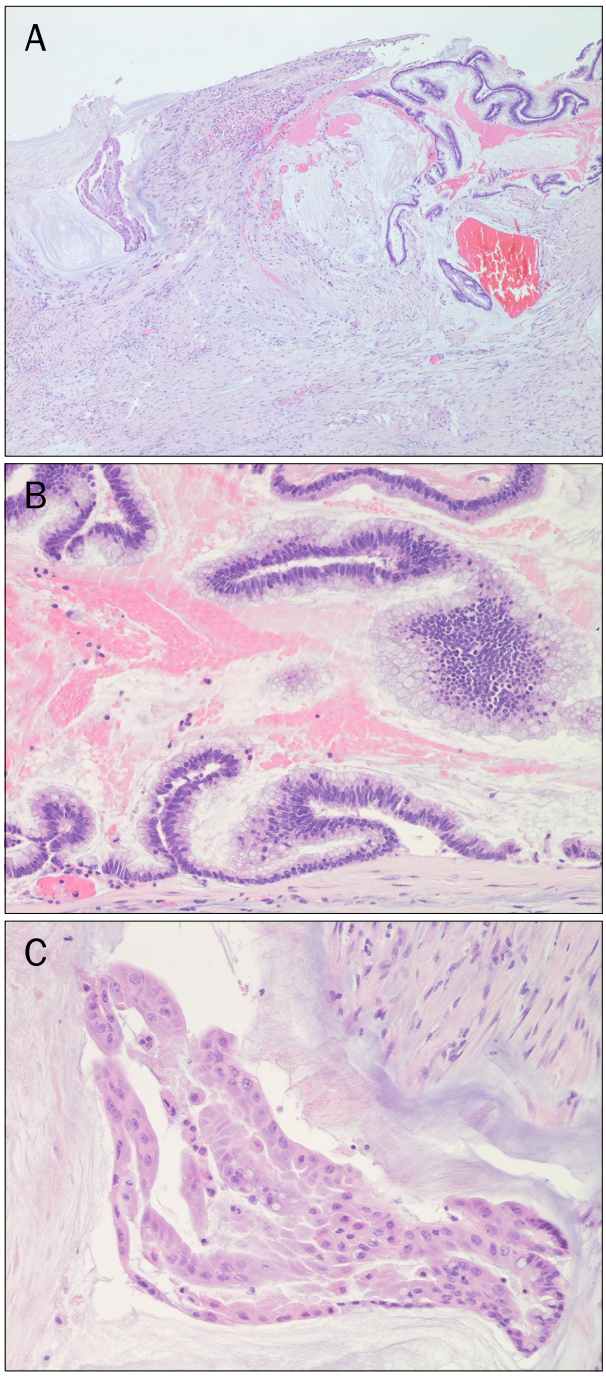

Fig. 5. Biopsy on peritoneal tissues taken from palliative surgery (H&E). (A) Peritoneal involvement of mucinous neoplasm (×40). (B) Abundant extracellular mucin with strips of low grade mucinous epithelium (×200). (C) Foci of mucinous epithelium with high grade cytologic atypia were identified. Findings are consistent with mucinous carcinoma peritonei (×200).

presence of other gastrointestinal tumors, diagnostic imaging for differential diagnosis is important. The patient in this case had normal levels of CEA and CA 19-9 at the time of her presentation, but these increased significantly to about CEA 46.51 ng/mL and CA 19-9 164.30 IU/mL, when she was found to have multiple metastases of the mucinous tumor.

The abdominal CT with oral, rectal, and venous contrast is most useful in diagnosing mucinous tumors of the appendix, or pseudomyxoma peritonei.[8] Mucinous tumors of the appendix are associated with dilation of the appendix with encapsulation, and low attenuation of the tumor. In approximately half of these cases, the appendix wall is calcified.[9] However it is difficult to assess the malignancy of the mass in the appendix using abdominal CT alone.[10] Once the disease has progressed to pseudomyxoma peritonei, diagnostic features are ascites and scalloping of the liver and splenic surface.[11] In addition, the attenuation of gelatinous ascites is 5-20 HU (Hounsfield units), compared to around 0 HU for normal ascites.[12] In this case, the patient's ascites had attenuation between 10-20 HU, together with scalloping pattern of the liver surface (Fig. 4A).

Abdominal ultrasound is also useful for patients for whom contrast agents cannot be used. Ultrasound is useful for fine needle aspiration biopsy, but as mentioned earlier, this is not always successful due to the same reasons as in paracentesis.[3]

Magnetic resonance imaging may be helpful for staging pseudomyxoma peritonei and for aiding the decision to undergo cytoreductive surgery, but this is still not researched.[13]

A small number of cases of pseudomyxoma peritonei are diagnosed incidentally during colonoscopy, but can only be identified if the tumor has expanded into the appendix.[14] Hence, colonoscopy is not used as a diagnostic tool. In this case, however, we identified leakage of the mucin from the appendix (Fig. 3A), together with a mucoceles in the appendix orifice (Fig. 3B). According to the PALGA, NKI, the most common primary site of pseudomyxoma peritonei is the appendix in 82% of women and 91% of men.[1]

The diagnosis of pseudomyxoma peritonei is confirmed through histology from laparoscopy. In this case, the patient was treated with antibiotics first due to suspected peritonitis, and paracentesis did not have significant diagnostic value. The patient had a history of breast cancer, raising suspicion of carcinoma in the peritoneum. Breast cancer metastasizes to intra-abdominal organs in 10% of cases, while ascites occurs in 5.4% and peritoneal carcinomatosis 2.6%.[15] Therefore, it was important to perform diagnostic laparoscopy promptly with pseudomyxoma peritonei and peritoneal carcinoma in mind.

Pseudomyxoma peritonei frequently disseminates to the peritoneum and other organs, making treatment difficult. Recommended treatment includes cytoreduction surgery of the primary site and other sites of metastasis, together with hyperthermic intraperitoneal chemotherapy (HIPEC).[16] HIPEC is done following cytoreduction therapy by increasing the abdominal temperature to 41.5°C followed by washout using mitomycin C as a single agent.[17] Following this, Flurouracil is injected into the abdominal cavity for five days as early postoperative intraperitoneal chemotherapy (EPIC).[16] Preoperative adjuvant systemic chemotherapy is not recommended for pseudomyxoma peritonei,[16] and repeated cytoreduction surgery is recommended for those with unsuccessful cytoreduction surgery as this is associated with poor prognosis.[18] A recent study of 2,298 patients with pseudomyxoma peritonei who received cytoreduction surgery, HIPEC, and postoperative EPIC therapy reportedly yielded three year survival rates of 80%, five year rates of 74%, and 10 year rates at 63%.[16] However, surgery is very difficult in these patients due to intra-abdominal adhesions, and a recent study found a significant complication rate of 24%, which can lead to invasive treatment, repeat surgery and even death.[16] Postoperative EPIC can improve the prognosis, but is associated with bone marrow toxicity,[19] and can lead to the formation of fistula from intra-abdominal chemotherapy or complications in the suture site.[20]

In conclusion, pseudomyxoma peritonei is a condition that is difficult to diagnose and treat. Several studies have suggested the use of preoperative abdominal CT and other tests, but this condition is difficult to distinguish from other conditions. Diagnostic laparoscopy and tissue biopsy are required in patients with cancer history, as pseudomyxoma peritonei must be distinguished from peritoneal metastases. Thus, early diagnostic laparoscopy and tissue biopsy are important. It is believed that active cytoreduction surgery, HIPEC, and postoperative EPIC following diagnosis are important to improve the patients' prognosis, but there are no set treatment guidelines for this condition. In this study, we report a case of pseudomyxoma peritonei in a patient with a history of breast cancer.

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