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Case Report Open Access

Efficacy of Paclitaxel and S-1 in a Patient with Advanced Pseudomyxoma Peritonei Concomitant with Gastric Cancer

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Abstract

Pseudomyxoma Peritonei (PMP) is a rare disease characterized by disseminated intra-peritoneal implants and mucinous ascites.There is currently no standard treatment strategy for PMP.

Presentation of case: We present an unusual case of advanced PMP concomitant with early gastric cancer in a 61-year-old male. In the first operation, in December 2007, the gastric cancer was unrespectable by extensive dissemination of PMP. Therefore, cytoreductive surgery for PMP and appendectomy were performed. After systemic chemotherapy with paclitaxel (Taxo, PTX) plus S-1 for almost 1year, the dissemination on the stomach and intestines disappeared, and we were able to perform a subtotal gastrectomy to remove early gastric cancer. Afterwards, with the intermittent administration of irinotecan (CPT-11) in addition to the basal use of S-1, the patient survived more than five years. To the present day, systemic therapy is still being administered, and might lead to stabilization of disease.

Keywords: Pseudomyxoma peritonei; Chemotherapy; Gastric cancer

Introduction

Pseudomyxoma peritonei (PMP) is a rare disease characterized by disseminated intra-peritoneal implants and mucinous ascites. Although there is currently no standard treatment strategy for PMP, resection of the primary lesion and the removal of mucinous material are considered the most effective. However, in most cases complete excision is difficult, and various treatments are attempted, including chemotherapy. Here we present an atypical case of PMP that was concurrent with early gastric cancer. The patient could survive after surgical treatments and systemic chemotherapy.

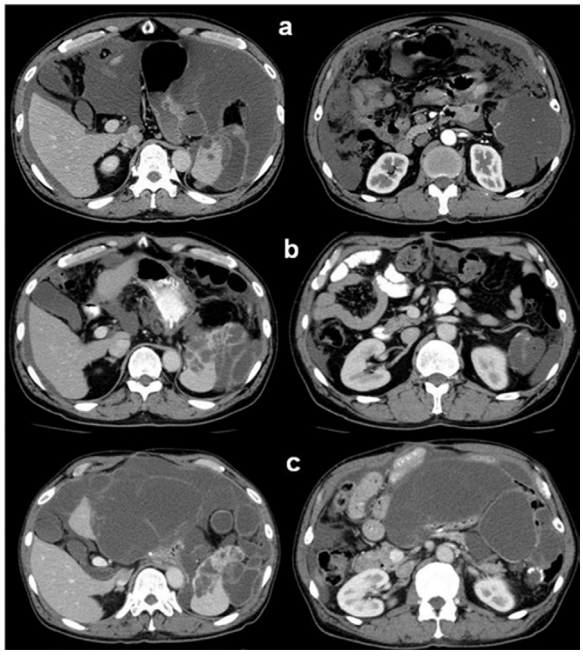

Figure 1: Enhanced abdominal CT scans throughout treatment. (a) Before the first operation.(b) After chemotherapy, demonstrating the reduction of ascites. (c) Before the third operation.

Case presentation

A 61-year-old male underwent surgery for a left inguinal herniain 2003 at another hospital, and mucinous ascites was detected at that time. No treatment was administered. In September 2007, abdominal distention appeared and abdominal computed tomography (CT) reveal edmassive mucinous ascites with septations and a partially scalloping spleen, which were characteristic of PMP (Figure 1a). Gastrointestinal endoscopy uncovered early gastric cancer.

In December 2007, surgery was executed for both gastric cancer and PMP. However, observing multiple peritoneal implants and dissemination to the stomach and small intestinal walls, the radical surgery to excise the gastric cancer was cancelled, and appendectomy, excision of the greater momentum, and incomplete cytoreduction were performed to treat the PMP. From pathological findings, we diagnosed the PMP as originating from the appendix (Figure 2).

After the PMP operation, the patient received 8 cycles of systemic chemotherapy with S-1120 mg/body (2 weeks on continuous medication and 2 weeks off) and paclitaxel (Taxol, PTX) 80 mg/m^2 (on days 1 and 15). Owing to the adverse event of peripheral neuropathy for PTX, the regimen was changed from PTX to irinotecan (CPT-11) 80 mg/m^2 (on days 1 and 15) with S-1 120 mg/body (3 weeks on continuous medication and 2 weeks off) for 3 weeks. We considered that S-1 was still effective, and therefore we continued basal use of S-1. After almost 1 year of systemic chemotherapy, CT showed that mucinous ascites

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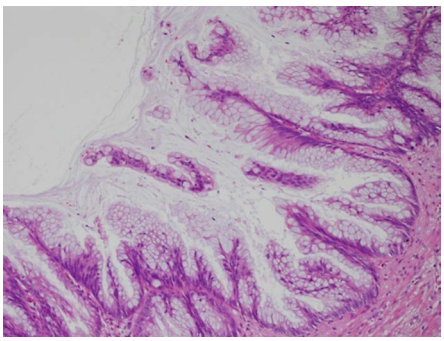

Figure 2: The mucinous epithelium of the appendix displayed minimal cytological atypia and mitotic activity to warrant a diagnosis of mucinous cystadenoma (hematoxylin/eosin staining, ×100 magnification).

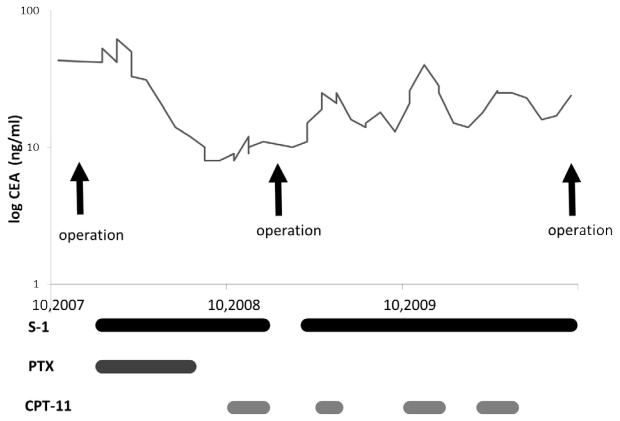

Figure 3: A schematic depiction of therapeutic interventions and the dynamics of CEA.

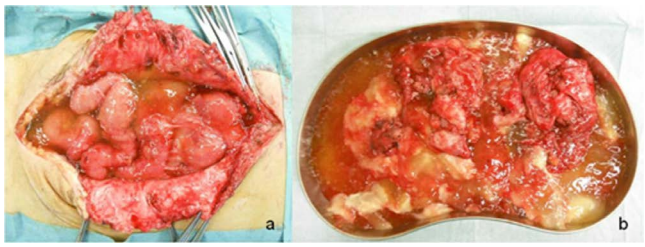

Figure 4: Operation findings. (a) The patient's abdomen was distended because of mucinous ascites. (b) The weight of the resected mucinous materials was 2074 g.

were remarkably decreased (Figure 1b) and the patient's serum carcino embylonic antigen (CEA) level was reduced by a large margin (Figure 3). We judged that systemic chemotherapy was effective and decided to perform surgery to treat gastric cancer in January 2009.

During the cancer operation, we found that the previous dissemination on the stomach and small intestinal walls had disappeared, and we were able to perform a subtotal gastrectomy according to the standard protocol. Pathological findings indicated well-differentiated adenocarcinoma of with mucosal invasion, without lymph node metastasis and vascular invasion.

After the operation, the patient received a regimen of 5 cycles of S-1120 mg/body (4 weeks on medication and 2 weeks off) with intermittent administration of CPT-1180 mg/m^2 (on days 1and 15) from April 2009 to May 2010. After that, he received only oral chemotherapy: 3 cycles of S-1 120 mg/body (4 weeks on medication and 2 weeks off).

There was no evidence of any recurrence or metastasis of gastric cancer; however, abdominal distention worsened because of PMP growth (Figure 1c), and a third operation was performed in 2013. At that time, the patient's CEA level was up to 79 mg/ml. During the third operation, we observed massive mucinous materials in the abdominal cavity, as well as scalloping of the liver lateral segment region and spleen (Figure 4a, b). We removed as much of the mucinous material as possible. There were no postoperative complications. At present (August 2013), the patient hasreceivedS-1 alone and the PMP is stable and asymptomatic.

Discussion

PMP is revealed by the appearance of abdominal distention and a new-onset inguinal hernia, or in the timing of surgery for acute appendicitis in many cases [1]. Complete cytoreduction by surgery certainly improves the prognosis of the patients with PMP [2]. Ascytoreductive surgical de-bulking procedures, Sugar baker proposed extensive peritonectomy including greater omentectomy-splenectomy, stripping of the left and right hemi diaphragm, cholecystectomy and lesser omentectomy, antrectomy, and pelvic peritonectomy with resection of the rectosigmoid colon. However, this procedure is associated with a high complication rate, and the safety and efficacy of the procedure are uncertain [3]. Although Miner et al. [4] reported that complete excision of PMP was possible in 53 cases among 97 patients (55%), the rate of recurrence in those 53 cases was 91% at a median follow-up period of 24 months. Treatment based on complete cytoreductive surgery with hypothermic intraperitoneal chemotherapy (HIPEC) may improve the prognosis. Using mitomycin C, CPT-11, and oxaliplatin for intraperitoneal chemotherapy with intravenous perfusion of 5-fluorouracil (5-FU) and leucovorin, Elias et al. [5] reported that the disease recurrence decreased to 26% when administered as HIPEC. Sugarbaker's new standard protocol of complete cytoreduction with HIPEC [2] results in a 20-year survival rate of 70%. However; there is no strategy for managing advanced PMP with metastases or with gross residual disease after cytoreductive surgery. Although conventional systemic chemotherapy did not improve the prognosis of PMP [6], a couple of cases have achieved long-term stabilization of PMP disease after incomplete cytoreduction using oxaliplatin/fluorouracil/leucovorin (FOLFOX4) [7] or bevacizumab with capecitabine [8].

In the present case, combination of S-1 and PTX surely helped to remove gastric cancer after incomplete cytoreduction surgery; we observed that the disseminated tumor cells that were spread extensively on the gastric and intestinal walls had disappeared at the second operation. Administration of PTX provides effective control of malignant ascites. The concentration of PTX in ascites is maintained within the optimal level for the treatment of cancer cells for up to 72 h after intravenous administration [9]. Moreover, the effect of S-1is also expected, as a previous study demonstrated a successful outcome with capecitabine, apro-drug of 5-FU [10]. In that exploration, a phase study evaluating the use of concurrent mitomycin C and capecitabine in patients with advanced unrespectable PMP, 15 of 39 assessable patients (38%) benefited from the chemotherapy regimen, which resulted in either reductions in mutinous deposition or stabilization of progression.

Serum CEA is often useful to evaluate the efficacy of therapy in patients with PMP in many cases [11]. In our case, CEA level was

also useful for following disease progression. Judging from CEA level, from April 2009 to May 2010 (between the second and third operation), the combination of S-1 and CPT-11 was apparently more effective for disease control than S-1 alone (Figure 3). Every dose of CPT-11 decreased the rising CEA level. Almost 1 year of intermittent administration of CPT-11 in addition to the basal use of S-1 led to the stabilization of CEA level. The effect of CPT-11 in PMP treatment is reportedly limited to the HIPEC procedure; CPT-11 has been employed at concentrations of 100-360 mg/m^2 [5,12]. The 80 mg/m^2 dose of CPT-11 by intravenous injection with S-1 led to disease stabilization, and had no adverse events. Our regimen of CPT-11 combined with S-1 is based on our previous study [13] of advanced and recurrent colorectal cancer, and was changed to prolonged S-1 administration to improve the patient's tolerance. Although the effect of systemic chemotherapy on PMP remains questionable, we suggest that systemic chemotherapy might be considered in a palliative setting for patients with recurrent or advanced disease.

It is rare to have other cancer at the same time as PMP [14]. While researching the origin of PMP, we should be careful regarding the possibility of other concomitant cancer. Moreover, we should consider multidisciplinary treatment when it is impossible to treat both PMP and a concomitant cancer in a single operation.

More clinical experience and additional studies are needed to determine the benefit of systemic chemotherapy. This case report emphasizes the efficacy of S-1 plus PTX or CPT-11 as systemic chemotherapy against advanced PMP.

Author Contributions

Hirofumi YAMAMOTO performed the operation and provided substantial information regarding the patient's case. All authors have read and approved the final manuscript.

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