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Case Report

Effective Management of an Advanced Gastric Cancer Patient by TS-1 Combined Chemotherapy Using Nasojejunal Tube and Successful Transfer to Home Care after Percutaneous Transesophageal Gastro-tubing (PTEG): A Case Report

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A 67-year-old woman with debilitation and massive ascites was admitted to our hospital and diagnosed with stage IV scirrhous gastric cancer with peritoneal dissemination. After successful nasojejunal tube feeding because of oral intake disability, TS-1 combined with paclitaxel chemotherapy was selected. TS-1 at 80 mg/m^2 was given daily via nasojejunal tube for 2 weeks, followed by a 1-week rest, and paclitaxel at 50 mg/m^2 was administered intravenously on day 1 and 8. There were no serious side effects. After 4 cycles, a partial response was observed and percutaneous transesophageal gastro-tubing (PTEG) was placed. After the fifth cycle, she was transferred to her home and received chemotherapy in an outpatient clinic. After 7 cycles, the disease progressed, and TS-1 combined with low-dose cisplatin was administered for 3 cycles. However, the patient died 16 weeks after discharge. PTEG was useful not only for a route of TS-1 administration, but also for receiving chemotherapy at home to maintain her quality.

Key words: TS-1 combined chemotherapy, gastric cancer, nasojejunal tube, percutaneous transesophageal gastro-tubing

Gastric failure is common in gastric cancer patients, who often become malnourished. Placement of feeding tubes into the stomach or small intestine can overcome some of the most common causes of impaired caloric intake caused by cancer [1]. The percutaneous transesophageal gastro-tubing technique (PTEG) was developed to drain gastrointestinal contents in patients with malignant obstruction or as an access route for enteral feeding [2, 3]. PTEG is a safe, effective and simple method that enabled patients to continue receiving further medical care at home [2].

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We report a patient with inoperable gastric cancer who underwent combination chemotherapy with TS-1 administration using a nasojejunal feeding tube, resulting in tumor regression, and who was subsequently treated in an outpatient clinic using PTEG, to maintain her quality of life.

Case Report

A stomach abnormality had been pointed out on a gastric radiograph of a 67-year-old woman 5 years previously, but she had refused further examinations at that time. Recently, a 4-kg body-weight loss over one month, incontinence, diarrhea and edema of the lower extremities caused her to visit a medical practitioner, on the gastric radiograph, gastric cancer was

highly suspected, but she refused further examination or therapy again and received only palliative therapy at home. However, her general conditions gradually declined, and she became dependent for all activities of daily living. She was then referred to Kojima Municipal Hospital. She became bedridden, and physical examination showed that the abdomen was distended with massive ascites. Abdominal computed tomography (CT) showed a thick stomach wall and paraaortic lymph node adenopathy with a large amount of ascitic fluid. Gastroendoscopy showed a type 4 infiltrating lesion in almost the whole stomach, and a biopsy specimen revealed poorly differentiated adenocarcinoma or signet ring cell carcinoma. The clinical stage was T3N3H0P1CY1M0 stage IV according to the Japanese Classification of Gastric Cancer (Second English version).

A nasojejunal tube was placed for enteral nutrition with a formula (Ensure Liquid (Abbott Japan Co., Ltd., Tokyo, Japan)) because of oral intake inability with impaired gastric motility. On day 11 after admission, renal function worsened because of external compression of the ureter therefore, a ureteral stent was inserted. On day 19, a CT scan before chemotherapy showed increased ascites and rectal stenosis by external invasion, and a decompression tube was inserted transanally into the sigmoid colon (Fig. 1). Once enteral nutrition was successful, the patient changed her attitude and became eager to live and had a positive attitude to chemotherapy. On day 23, TS-1 + paclitaxel was administered. TS-1 was administered twice a day, at a dose of 100 mg/body/day (80 mg/m^2/day), for 14 consecutive days via a nasojejunal tube followed by a 7-day rest period. TS-1 was administered by a simple suspension method in which capsules were dissolved in hot water without crushing. Paclitaxel was administered intravenously at a dose of 60 mg/body (50 mg/m^2) on days 1 and 8. Two cycles were completed, and the transanal tube was naturally expelled because of improving colonic stricture. After 3 cycles, the urinary stent was removed due to urinary infection, but ureteral stenosis did not occur. After 4 cycles were completed, a CT showed complete remission of paraaortic lymph nodes and decreased ascites (Fig. 2). Her activity was gradually restored and she could walk with help. She was eager to go home and percutaneous transesophageal gastrotubing was placed on day 108. After the fifth cycle on day 128, she was transferred to home care. After the seventh cycle, 6 weeks after discharge, TS-1 and paclitaxel failed because malignant pleural effusion

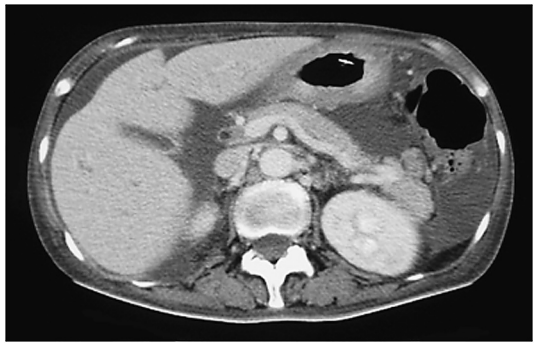

Fig. 2 Abdominal CT scan (after four cycles of chemotherapy) Complete remission of paraaortic lymph node metastasis and decreased ascites.

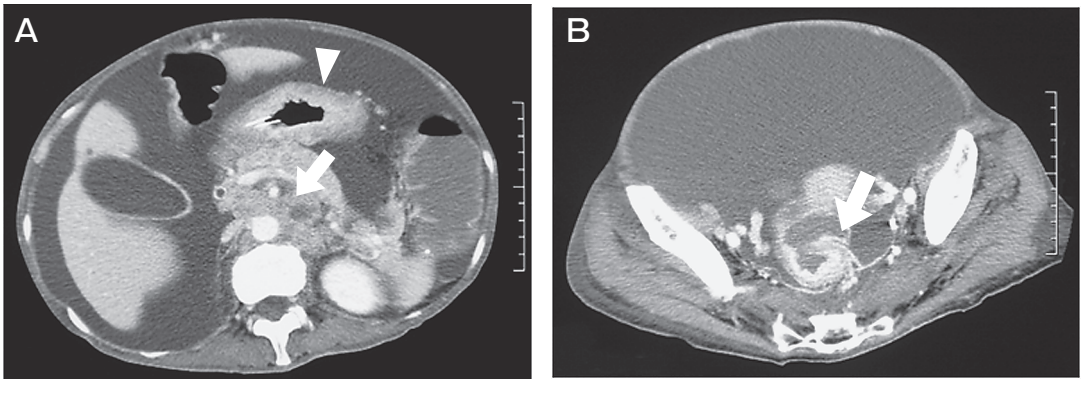

Fig. 1 Abdominal CT scan (before chemotherapy). **A**, Thickness of the stomach wall (arrowhead), paraaortic lymph node adenopathy (arrow); **B**, An large amount of ascites and rectal stricture (arrow).

was observed. TS-1 was then combined with weekly low-dose cisplatin. TS-1 was administered at 100 mg/body/day (80 mg/m^2/day) for 2 weeks, followed by a 1-week rest. Cisplatin was administered at 25 mg/body (20 mg/m^2) on day 1 and 8. After 3 cycles, 16 weeks after discharge, she was admitted to our hospital because of pulmonary failure with effusion and died the next day. During home care, there were no serious side effects or technical problems.

Discussion

Poorly differentiated gastric carcinoma has a poor prognosis [4], especially the scirrhous type, despite sufficient chemotherapy, with a median survival of 6 months [5]. Metastatic gastric cancer is considered incurable and has a poor prognosis [6], most patients with peritoneal dissemination die within 6 months of diagnosis [7, 8]. In such a situation, optimal palliation and prolongation of life are the main goals of treatment.

TS-1 has been proved to be effective for gastric cancer patients with an overall response rate of 40–49% in a phase II study [9, 10]. In patients with peritoneal dissemination, TS-1 was also effective with acceptable toxicity and improvement of prognosis [7, 8]. After the oral administration of S-1, 5-fluorouracil passes through the peritoneum, and a high concentration is maintained in the peritoneal cavity [11].

Paclitaxel is also considered an active chemotherapeutic agent for gastric cancer and in a retrospective study of a weekly regimen as a second line, the overall response was 16–24% with a median survival of 5–7.8 months [12, 13]. In a pharmacokinetic study, paclitaxel was highly infiltrative into ascites [14]; Wiernik PH *et al.* reported that the concentration of paclitaxel in ascitic fluid increased for several hours and then stabilized at a level approximately 40% above that in plasma [15]. Based on these results, a combination of TS-1 and paclitaxel was expected to be effective in gastric cancer, especially in peritoneal dissemination. Previous phase I/II trials [16–18] of TS-1 combined with paclitaxel showed that the overall response rate was about 50%. In terms of adverse events, grade 3 or more hematological and non-hematological toxicities occurred in less than 20% and 28% of cases, respectively [18]. On the other hand, TS-1 combined with cisplatin is also considered to be effective chemotherapy for gastric cancer. A phase I/II study in patients with advanced gastric cancer obtained a response of 76%, with a median overall survival of 383 days and tolerable toxicity [19]. However, this regimen requires a short hospital stay for hydration to prevent the renal toxicity induced by cisplatin. In our patient with renal function problems and general edema with massive ascites, such a regimen was likely to induce further impairment of renal function and general edema. In addition, the patient did not wish to undergo this treatment because of required the hospital stay. On the basis of these details, platinum-based chemotherapy was contraindicated. Furthermore, the patient's poor general condition necessitated chemotherapy with low toxicity and high efficacy, and TS-1 and paclitaxel combination chemotherapy was thus considered the best option.

For patients with oral intake disability, TS-1 administration through gastrostomy [20] or a feeding tube [7, 21] is an alternative method and useful option that improves the quality of life and enables home care. A pharmacokinetics study revealed that plasma concentration levels via a catheter were equivalent to oral intake, and no severe adverse effects, particularly on the digestive systems, were observed [20, 21]. In patients with peritoneal metastasis and ascites without bowel obstruction or with oral intake disability due to gastric dysfunction alone, an appropriate access route is required for enteral nutrition or drug intake; available options include surgical or endoscopic jejunostomy. A surgical approach is likely not to be well tolerated in already compromised patients, and an endoscopic approach might be challenging. On the other hand, long-term use of a nasojejunal tube feeding should be avoided, especially in an outpatient setting, because it would likely increase the incidence of complications, including rhinitis, aspiration pneumonia, and technical problems such as inadvertent removal or occlusion, as well as cosmetic issues and discomfort. By contrast, PTEG was useful and enabled the possibility of transfer to home care and was effectively improved her quality of life. Further, if enteral feeding using this methods should have failed because of intestinal obstruction due to carcinomatosa with resistance to chemotherapy, other options, such as decompression at the site would have been available. In our case, fortunately, there were no technical or serious problems for management of

PTEG at home. In such a deteriorated case, home care is usually considered difficult to manage; however, with the support of her husband, the patient was able to live at home. The conjugal bonds were renewed and the pateint's last days were precious and memorable, making her death less painful.

In conclusion, TS-1 administration via a nasojejunal feeding tube was an effective administration method that enabled a more effective combination chemotherapy regimen. PTEG was less stressful and an appropriate choice for administering chemotherapy at home, and maintaining the dying patient's quality of life.

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