

Case Report

Efficacy of Enteral Nutrition to Preoperative Chemotherapy for Highly Advanced Gastric Cancer

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Abstract

Recent reports have described the efficacy of preoperative chemotherapy in the treatment of advanced gastric cancer. Preoperative enteral nutrition support has also been reported to be effective with accelerating recovery from operation for patients with gastric cancer. Preoperative chemotherapy is contraindicated in several patients with advanced gastric cancer; however, because they are generally unable to consume sufficient nutrition owing to pylorus stenosis, stomach obstruction, hemorrhage, or anorexia. We successfully used enteral nutrition to maintain or improve the nutritional status of patients with preoperative chemotherapy for highly advanced gastric cancer. For patients whose nutritional intake was compromised because of pylorus stenosis, we inserted a double elementary diet tube to drain gastric juice and administer enteral nutrients. For patients whose nutritional intake was limited to small amounts of food, we administered several types of oral liquid nutritional supplements. In our study, body mass index and serum albumin levels were maintained or improved by means of enteral nutrition during preoperative chemotherapy. The double elementary feeding tube also makes it possible not only to receive appropriate nutrition just after admission, but also to take initiate preoperative chemotherapy as soon as practicable without bypass surgery for patients with pyloric obstruction.

Keywords: Advanced gastric cancer; Enteral nutrition; Preoperative chemotherapy; Double elementary diet tube; Pylorus stenosis

Background

Gastric cancer is common worldwide and is a major cause of cancer-related deaths [1]. Surgery is the only curative treatment; however, the survival rate of chemotherapy with surgery is higher than that of surgery alone [2,3]. Recent reports have demonstrated the efficacy of preoperative chemotherapy (PC) for advanced gastric cancer with invasion of surrounding tissues, multiple lymph node metastases, or suggestive peritoneal metastasis. In addition, it has been reported that compared with adjuvant chemotherapy, PC for advanced gastric cancer improves survival [4]. Several patients with advanced gastric cancer are generally unable to ingest sufficient nutrition owing to stenosis, stomach obstruction, or anorexia, and thus, are unsuitable candidates for PC. If initiated, PC can lead to diminution physical strength in these patients. Preoperative enteral nutrition (EN) support has been reported to facilitate postoperative gastrointestinal absorption of nutrients in patients with gastric cancer as well as accelerate recovery [5].

This case report describes the successful use of EN in patients who underwent PC for highly advanced gastric carcinoma to maintain or improve their nutritional condition.

Case Presentation

Patient clinical characteristics

Between April 2015 and April 2017, 6 patients (4 men) with highly advanced gastric cancer underwent PC with EN total gastrectomy (with or without distal pancreatectomy). Average patient age was

71.5 (59–79) years. Their American Society for Anesthesiologists scores were class 1 (1 patient) and class 2 (5 patients). Four patients had cStageIIIB cancers, and 2 patients had cStageIIIC cancers. Four patients had pyloric stenosis due to gastric cancer and could not consume food, and 4 patients had pancreatic invasion (Table 1).

Method of administration of enteral nutrition

All the patients had poor dietary intake or inability to consume any food; therefore, they were admitted to our hospital immediately following their first visit. For the 4 patients who were unable to consume food owing to pylorus stenosis, we inserted a double elementary diet tube (W-ED tube) before PC and administered enteral nutrients (semi digestion nutrition agent, immunonutrition). The other 2 patients who were able to ingest small amounts of food, were administered several types of oral liquid or jellied nutritional supplements.

W-ED tube is 150cm long double lumen tube, and has connectors both for drainage and nutrition. One lumen has its openings at the side of the tube, 60cm above the leading edge, for drainage. Another lumen has its openings at the end of the tube for feeding

Preoperative chemotherapy

We started PC just after diagnosis of highly advanced gastric cancer. These patients received S-1 and CDDP (SP), S-1 + CDDP + docetaxel (DCS), or S-1 + oxaliplatin (SOX) as PC. Five were administered 2 courses, and 1 patient was administered 3 courses. Adverse events included oral mucositis (2 cases), nausea (3 cases), diarrhea (2 cases), decrease in neutrophil count (3 cases), decrease

Table 1: Patient clinical characteristics.

Sex	Male		4 (67%)
	Female		2 (33%)
Age (years)			71.5 (59–79)
ASA score	Class 1		1 (17%)
	Class 2		5 (83%)
	Class 3		0
Clinical stage		IIIB	4 (67%)
		IIIC	2 (33%)
pyloric stenosis			4 (67%)

Table 2: Operative characteristics.

Type of surgery	Open total gastrectomy	6 (100%)
	With distal pancreatectomy	3 (50%)
	Jejunum fistula	6 (100%)
Operation time (min)		356.2 (249–456)
Volume of hemorrhage (ml)		750 (400–1100)

Table 3: Postoperative course.

Complications		3 (50%)
	Ileus	1 (17%)
	Pancreatic fistula	3 (50%) (Grade A: 1) (Grade B: 2)
	Abdominal abscess	1 (17%)
Hospital stay (days)		26–57 (mean: 39.33)
Adjuvant chemotherapy		5 (84%) (S-1: 3) (SOX: 2)

in platelet count (1 case), and inappropriate secretion antidiuretic hormone syndrome (1 case).

Nutrition index

We examined serum albumin levels and body mass index (BMI) as the nutrition index before and after PC. Serum albumin level was 2.2–4.0 (mean: 3.23) g/dL before PC, and 2.5–4.3 (mean: 3.68) g/dL after PC. BMI was 17.1–30.1 (mean: 22.2) kg/m² before PC and 17.2–27.4 (mean: 21.15) kg/m² after PC.

Size of primary tumors and metastatic lymph nodes decreased in all the patients, and all had total gastrectomy and jejunum fistula after PC, including 3 patients with distal pancreatectomy, and could undergo resection (operative characteristics; Table 2). Histopathological findings revealed that 2 patients had ypStageIIB, 3 patients ypStageIIIB, and 1 patient ypStageIIIC cancers. In terms of chemotherapy effect, 2 patients had Grade1b, and 4 patients had Grade2 cancers.

Pancreatic fistula occurred in 3 patients after surgery, and abdominal abscess occurred in 1 patient, although all the patients were mobile when discharged. Five patients underwent adjuvant chemotherapy with S-1 or SOX (Postoperative course; Table 3).

Discussion

It has been reported that PC may reduce tumor burden and eradicate micro metastatic foci outside the surgical field and

improve survival compared with adjuvant chemotherapy [5–7], although PC is associated with significant toxicity, particularly in nutritionally depleted patients. Malnutrition is associated with the early termination of neoadjuvant chemotherapy in patients with gastric cancer [8]. Preoperative enteral nutrients, especially immunonutrition, accelerates recovery after upper intestinal surgery [5–9].

Patients with highly advanced gastric cancer can develop pyloric stenosis leading to inadequate dietary intake and malnutrition. These patients often do not undergo adequate PC or highly invasive radical surgery, thus, frequently requiring bypass surgery. With bypass surgery, however, patients may have no option but to postpone PC during recovery from the bypass procedure.

In these patients, we inserted the W-ED tube instead of performing bypass surgery and therewith started aggressive immunonutrition. For patients able to consume even small amounts of food, we started several types of oral liquid or jellied nutritional supplements just after admission. After that, we could start PC to these patients as soon as possible. As a result, BMI and serum albumin levels were maintained or improved during PC, and all the patients could complete 2 or 3 courses of PC and underwent R0 resection. The W-ED tube is beneficial in supplying enteral nutrients to patients with pyloric obstruction because of highly advanced gastric cancer. The tube also makes it possible to initiate PC as soon as possible without bypass surgery.

The W-ED tube is relatively thick; therefore, it can lead to mental stress in certain patients and can cause aspiration pneumonia over several months of use. We must therefore pay close attention to the physical and mental condition of patients using the W-ED tube.

Conclusion

EN may be beneficial for patients with highly advanced gastric cancer receiving PC, especially with use of the W-ED tube in patients with pyloric obstruction.

Authors' Contributions

All authors contributed and approved the final version of the manuscript.

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