

Extended Resection of Locally Advanced (T4) Stomach Cancer

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Abstract

Introduction: The surgical management of locally advanced (T4) stomach cancer remains controversial and many still question the benefits of an extended resection. The aims of this study were to examine the morbidity and mortality associated with extended resection and also to determine the survival benefit. **Materials and Methods:** A retrospective review of all stomach cancer operations performed from 1989 to 1998 was carried out and the relevant case histories retrieved and analysed. **Results:** Out of the 980 stomach cancer operations performed, 784 (80%) had tumour resection and 20 (2.5%) also had extended resection of adjacent involved organs. These 20 patients had a 10% postoperative morbidity and the operative mortality was 15%. The survival ranged from 2 to 35 months (median 17 months). **Conclusions:** Extended resection of T4 stomach cancer is feasible and carries an acceptable operative morbidity and mortality. However, there is poor survival benefit and it should only be performed in a selected group of patients.

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Key words: Extended resection, Mortality, Perioperative morbidity, Survival

Introduction

Cancer is the most common cause of death in Singapore. Although there is a gradual decline in incidence of stomach cancer over the years, it is the third (10.1%) most common cancer in males and the fifth (6.5%) most common cancer in females in Singapore.¹

The overall prognosis and survival of patients with stomach cancer is generally poor, although there have been reports of improvement especially from Japanese studies. An overall 5-year survival rate averages around 15%. Many patients present late with more than 70% in stage III and IV.²

Locally advanced (T4) stomach cancer is defined as a tumour which has invaded through the serosa of the stomach and is involving adjacent structures or organs. The surgical management of T4 stomach cancer remains controversial. Some consider it as incurable and a simple palliative gastrectomy would suffice, shaving tumour off adjacent structures or leaving gross macroscopic cancer behind. Others believe that extended en-bloc resection of the stomach together with adjacent involved organs carries a higher mortality and morbidity, and may not confer a survival benefit.

However, various authors have shown that the combined resection of stomach cancer with adjacent organs confers

a superior 5-year survival as opposed to non-resection or incomplete resection of adjacent involved organs.³⁻⁵

We reviewed our results for extended resection of T4 stomach cancer with regards to the postoperative morbidity and mortality and survival outcome.

Materials and Methods

A retrospective case series review of all operations for stomach cancer performed in the Department of Surgery, Singapore General Hospital, from 1989 to 1998, was made. The relevant case histories of patients with T4 stomach cancer who had undergone extended resection of the tumour including adjacent involved organs were analysed. Patients with metastatic disease were excluded from the study.

The diagnosis of stomach cancer was made after a complete history and physical examination, and confirmed with an oesophago-gastro-duodenoscopic examination. A biopsy was taken for histological confirmation of the diagnosis. All patients had computed tomography (CT) scan done to help determine the local extent of the disease, adjacent organ invasion, lymph node involvement and possible liver or peritoneal disease. The usual laboratory and blood investigations were performed to determine the patient's fitness and in preparation for surgery.

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At surgery, on finding a locally advanced stomach cancer with one or more adjacent organ involvement, non-resectability was determined by multiple liver metastases or peritoneal seedlings. There were also cases whereby the local invasion was deemed too extensive and the patient unable to tolerate an extended resection. These cases were not analysed. If deemed resectable, a gastrectomy was performed (either partial, subtotal or total) depending on the location of the tumour. Together with a gastrectomy either one or more of the following was performed: splenectomy, left lateral segmentectomy of the liver, transverse colectomy or extended right hemicolectomy, or distal pancreatectomy. Reanastomosis was performed with either staples or hand-sewn using sutures. A standard lymphadenectomy was performed taking the first echelon (D1 group) of lymph nodes and not a more radical D2 lymphadenectomy. A splenectomy was performed only if the tumour appears to be invading or is close to the spleen, or as part of the planned operative procedure especially for tumours involving the cardia or the fundus. Peritoneal washings for cytology were not sent as a routine.

Upon discharge, the patients were followed-up regularly at the specialist outpatient clinics, initially 2 weeks, 1 month, 6 weeks and then 3 to 4 monthly. They were assessed for symptoms and signs of recurrence. There were no routine tests or investigations performed unless the patient was symptomatic or had a significant physical finding.

Patients who had splenectomy carried out together with a gastrectomy as part of the operative procedure for carcinoma involving the cardia or fundus were excluded from this study. In this series, there were no cases of histologically proven tumour involving or invading into the spleen.

Statistical analysis was performed using the SPSS statistical software. The survival rates were calculated using the Kaplan-Meier estimation method.

Results

Out of a total of 980 stomach cancer operations performed from 1989 to 1998, 784 (80%) had some form of tumour resection, either partial, subtotal or total gastrectomy. Twenty patients (2.5%) had extended resection of adjacent involved organs together with gastrectomy.

These 20 patients consisted of 13 male and 7 female patients (male to female ratio was 1.9:1). Their ages ranged from 38 to 81 years with a median of 65 years. The mode of presentation was mainly epigastric pain or discomfort in 10 (50%) patients. Six (30%) of the patients presented with anaemia for investigation and 4 (20%) presented with symptoms of early satiety. The duration of symptoms prior to presentation ranged from 1 to 3 months.

The site of the tumour was mainly in the body and antrum in 16 (80%) patients. There were 3 (15%) patients with tumours of the cardia and 1 (5%) patient with tumour occurring in the remnant stomach. The adjacent organs resected together with the stomach included the transverse colon in 10 patients, tail of the pancreas in 10 patients, segmental liver resection (left lobe) in 3 patients and spleen in 11 patients.

All resected specimens were sent for histopathological analysis with confirmation of direct tumour invasion into the adjacent organs.

There was a total of 9 patients who had one other organ resected together with the stomach. The organ resected was transverse colon in 6 patients, liver in 2 patients and pancreas in 1 patient. A total of 7 patients had 2 organs resected together with the stomach. Five patients had both the tail of pancreas and spleen resected. The transverse colon and spleen were resected in 2 patients. Four patients had three organs resected together with a gastrectomy. Three patients had concurrent removal of the spleen, tail of the pancreas and transverse colon whereas 1 patient had the combined resection of the stomach together with a splenectomy, distal pancreatectomy and segmental liver resection.

The postoperative complications and morbidity included 2 wound infections, 2 chest infections, 1 prolonged ileus, 1 deep vein thrombosis and 1 anastomotic leakage. The majority of the complications were minor and resolved with conservative medical treatment. However, 2 (10%) of the complications i.e. the deep vein thrombosis and anastomotic leak, resulted in the demise of the patients. The total postoperative hospitalisation stay ranged from 6 to 22 days with a median of 10.5 days.

We had a total of 3 (15%) postoperative mortalities. The first was a 79-year-old patient who developed chest infection, rapid atrial fibrillation with underlying ischaemic heart disease and eventually succumbed. The second was a 70-year-old who developed an anastomotic leak on the eighth postoperative day but refused relaparotomy. The third was a 65-year-old patient who developed deep vein thrombosis and collapsed from pulmonary embolism.

The patients were followed-up at the outpatient clinic and 10 (50%) of them were noted to have developed recurrence of the disease. Five presented with hepatomegaly at 3, 5, 7, 10 and 33 months postoperatively and were found to have developed liver secondaries as confirmed by CT scan. Two were found to have enlarged supraclavicular lymph nodes at 2 and 3 months respectively, and fine-needle aspiration cytology confirmed metastatic tumour. Two patients developed ascites at 6 and 10 months after surgery and peritoneal fluid cytology showed tumour cells. One was found to have an ovarian secondary when she

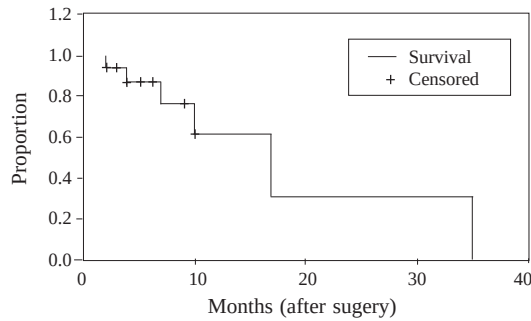


Fig. 1. Survival curve of patients with resected T4 stomach cancer (median 17 months, 95% CI 6.58, 27.42).

presented with lower abdominal pain and swelling 10 months after operation, and this was confirmed with CT scan. The time to occurrence of recurrent disease ranged from 2 to 33 months with a median of 6.5 months.

The overall survival of these 20 patients with T4 stomach cancer was poor. The survival after surgery, after excluding the 3 postoperative mortalities, ranged from 2 to 35 months with a median survival of 17 months [standard error (SE) 5.32, 95% confidence interval (CI) 6.58, 27.42]. Only 1 patient survived more than 2 years (Fig. 1). Two patients are currently still alive and on follow-up. Only 2 patients in this cohort underwent postoperative chemotherapy and radiotherapy. One survived 3 months and the other 9 months. The other 18 patients did not have adjuvant therapy either because they were unfit or did not want to. However, the number of patients is too small for statistical analysis to detect a significant difference in survival between those receiving and not receiving adjuvant therapy.

Discussion

Even though the treatment of stomach cancer with gastrectomy has been performed for more than a 100 years, the prognosis is generally poor. Patients often present late with advanced disease and the extent of resection and lymphadenectomy is still a subject of much controversy and debate. Survival results also vary from different centres and countries.

A 25-year review of gastric cancer in the United Kingdom showed 79% of patients presenting in stage IV and less than 1% in stage I. The 5-year survival rates for stage I, II and III were 72%, 32% and 10%, respectively.⁶ A similar review of more than 18,000 stomach cancer patients in the United States revealed survival rates at 5 years of 50% for stage I, 29% for stage II, 13% for stage III and 3% for stage IV.⁷ Our review of stomach cancer patients showed that a majority (75%) presented with late or metastatic disease. The survival at 2 years was 60% for stage I and II, 54% for stage III and 0% for stage IV.² In contrast, studies from Japan showed that more than 30% of patients presented with early gastric cancer. The 5-year survival rates were reported as being 90% for stage I, 71% for stage II, 44% for

stage III and 9% for stage IV.⁸

Radical resection of stomach cancer is advocated to reduce the chance of recurrence and also improve survival. Factors which predict recurrence and death include failure to obtain adequate microscopically clear margins and inadequate regional lymphadenectomy to encompass at least one echelon of uninvolved nodes beyond the tumour.⁹ However, the limits of radical surgery are recognised as peritoneal dissemination, liver metastasis, distant lymph node metastasis and diffusely infiltrating carcinoma.⁸

Locally, the issue of extended resection of T4 stomach cancer has not been previously addressed. As a large majority of our patients present late with stage III disease, the role and benefits of an extended resection need to be answered.

This study has shown that the survival of patients with locally advanced T4 stomach cancer is poor even after an extended resection of the tumour together with adjacent involved organs. Patients only survived a median of 17 months and the median time to tumour recurrence was 6.5 months.

The rate of postoperative morbidity was 10%, comparable to other series. The postoperative mortality following extended resection was 13.6% in one study⁴ and this is quite similar to our rate of 15%. The organs resected together with the stomach in all the series were similar and included the pancreas, colon, liver and spleen.³⁻⁵

This is in contrast to other studies of locally advanced T4 stomach cancer, whereby extended resection has resulted in good 5-year survival rates ranging from 25% to 46%.³⁻⁵ Extended resection of gastric cancer involving adjacent organs was shown to have a 5-year survival of 36.7% as opposed to 17.4% for gastrectomy alone or incomplete resection of invaded adjacent organs.³ Another series had a 5-year survival of 25% for patients who had undergone combined gastrectomy with resection of adjacent organs.⁴ A third series had 46% of patients who had undergone extended resection surviving 5 years.⁵

The limitations of this study are the small number of patients and the retrospective nature of this review. The difference in survival between our group of patients and the patients from other studies could be attributed to a few factors. Firstly, our numbers are small when compared to the other series and may not reflect the actual situation. Secondly, even though the technique of resection and reanastomosis is similar, in our series an extended lymphadenectomy is not performed once the tumour is deemed locally invasive. Extended resection of adjacent involved organs is performed but not a radical lymphadenectomy. The good results obtained from the other studies may be a result of radical lymphadenectomy performed together with an extended resection. In addition,

the other authors may have used a very highly selected group of patients.

However, in all the above series, no mention was made about the use of adjuvant therapy in the form of either chemotherapy or radiotherapy. Only 2 of our patients had any adjuvant therapy and it was in the form of postoperative chemotherapy. All the authors made no mention whether any adjuvant therapy was given either in the form of neoadjuvant chemotherapy or postoperative chemotherapy and radiotherapy to the tumour bed. This is relevant as it may affect long-term survival and locoregional tumour recurrence.

At the present moment, treatment of stomach cancer is surgery. However, various studies have shown that chemotherapy and radiotherapy confer moderate toxicity in locally advanced and unresectable tumours.¹⁰⁻¹³ There is tumour response to therapy but with no survival advantage. Tumour response to neoadjuvant chemotherapy, either partial or complete has also been shown to predict survival and increase the resectability rate.¹⁴⁻¹⁶ However, at the moment, there are no randomised controlled trials to validate this. There may also be a role for early postoperative intraperitoneal chemotherapy.^{17,18} Unfortunately, all the above studies show a dismal and unproven survival benefit and require accurate preoperative tumour staging for correct patient selection.

The aim of treatment of locally advanced stomach cancer, if not for cure, is for palliation of symptoms and ensuring a good postoperative quality of life. Studies have shown that surgery, such as a gastrectomy, can have an impact on the patient's functional outcome, life-style, performance status, food tolerance and outlook in life.^{19,20} This area, though important, is not addressed in our study as this is a retrospective review but would be very important in future prospective studies, as successful treatment of T4 stomach cancer is not merely measured in terms of median survival but also in the patient's overall postoperative quality of life.

Conclusion

We conclude that extended resection of T4 stomach cancer can be carried out with acceptable morbidity and mortality rates. However, the overall long-term survival benefit is dismal. The rationale for extended resection should be the palliation of symptoms and the attainment of a good quality of life postoperatively. Therefore, a careful selection of fit and symptomatic patients should be made before embarking on such an extensive surgery for T4 stomach cancer.

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