

# Gastrojejunostomy for gastric outlet obstruction in patients with gastric carcinoma

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## Summary

**Objective.** To investigate the utility of gastrojejunostomy for the palliation of gastric outlet obstruction in irresectable or incurable gastric carcinoma.

**Methods.** This is a retrospective review of 67 patients who underwent a gastrojejunostomy for gastric outlet obstruction caused by gastric carcinoma between 1 January 1996 and 31 May 2003.

**Results.** There were 19 complications after surgery, including 4 patients with unsatisfactory gastrojejunostomy drainage. Sixty patients were discharged from hospital having resumed normal eating. Their median survival after surgery was 9 months.

**Conclusion.** Gastrojejunostomy offers worthwhile palliation and may prolong survival in a significant group of patients with irresectable gastric carcinoma and gastric outlet obstruction.

The management of irresectable gastric carcinoma with gastric outlet obstruction is controversial. Some authors question the role of gastrojejunostomy, raising concerns about impaired gastric motility<sup>1</sup> and bleeding from the tumour,<sup>2,3</sup> as well as suggesting that palliation is poor and survival short.<sup>4,5</sup> Some even go as far as suggesting that gastrojejunostomy should not be performed for irresectable gastric cancer at all.<sup>6</sup> Newer approaches to the problem, including stenting<sup>7,8</sup> and laparoscopic techniques for gastric bypass surgery,<sup>5,9</sup> have been proposed. There have also been reports of reviving the Devine gastric partitioning procedure.<sup>1-3</sup> The purpose of this study was to investigate the utility of performing a gastrojejunostomy for palliation of gastric outlet obstruction in irresectable gastric cancer.

## Patients and methods

Between 1 January 1996 and 31 May 2003, 370 patients with gastric carcinoma were assessed in a unit with a special interest in the disease at Groote Schuur Hospital, and their characteristics were recorded prospectively on a database. Two hundred and twenty-nine of these underwent surgery,

118 with apparent curative intent. At surgical exploration 42 patients were found to have irresectable disease not amenable to surgical palliation, and underwent a laparotomy only. Sixty-nine (19% overall, 30% of operations) had a gastrojejunostomy performed for gastric outlet obstruction, where resection was not possible (62 patients), or where there was extensive metastatic disease (4 patients) or severe co-morbidity (1 patient). Records were incomplete for 2 patients, therefore 67 patients were included in this study.

The remaining 141 patients did not undergo surgery as they had metastatic disease with symptoms that were not amenable to surgical palliation, or were unfit for surgery. Patients were judged to have gastric outlet obstruction on the basis of multiple criteria: the vomiting of old undigested food (56 patients), if endoscopically there was retained food or it was not possible to enter the duodenum past the tumour, and if contrast was delayed or retained, the stomach being dilated on the barium meal (67 patients). The patient characteristics are given in Table I.

Nasogastric tubes were placed pre-operatively and patients were encouraged to drink an electrolyte solution for several days to achieve lavage. Intravenous rehydration and maintenance fluids were used, but parenteral nutrition was not employed. All gastrojejunostomies were performed via midline laparotomy incision, and no laparoscopic procedures were performed. All anastomoses were hand sewn, and a side-to-side entero-enterostomy was routinely constructed between the afferent and efferent loops with the intention of reducing bile reflux into the stomach. Statistical analyses were performed using the Statistica 6 software package, the survival analysis being by the Kaplan-Meier method, and comparative survival analysis by log-rank testing. In addition to calculating overall survival, we made a survival comparison between patients with and without metastases.

## Results

The median hospital stay was 7 (range 4 - 91) days, and 60 of the 67 patients were discharged from hospital able to eat a normal diet.

There were 19 postoperative complications in 17 patients. These included intravenous line sepsis ( $N = 4$ ), renal failure ( $N = 3$ ), and 1 each of stroke, myocardial infarct, renal failure, pneumonia, urinary retention and wound dehiscence.

TABLE I. PATIENT CHARACTERISTICS (N)

Patients	67
Age (yrs) (median, range)	60 (23 - 88)
<b>Symptoms</b>	
Vomiting undigested old food	56
Pain	43
Weight loss	47
Symptomatic anaemia	5
Haematemesis/ melaena	13
<b>Co-morbidity</b>	
Diabetes	11
Hypertension	11
Tuberculosis (previous or active)	6
Chronic obstructive pulmonary disease	4
Ischaemic heart disease	4
AIDS	1
Renal impairment	1
<b>Distant metastases (M1)</b>	
Liver	17
Peritoneum	38
Lung	2
Virchow-Troisier node	1
<b>Local invasion</b>	
Pancreas	33
Liver or bile duct	13
Duodenum	15
Base of mesocolon	8
Abdominal wall	2

Complications relating to the gastrojejunostomy included poor function (N = 6), and a leak (N = 1).

The 6 patients with poorly functioning gastrojejunostomies had persistent postoperative vomiting. Two of these resolved spontaneously after 12 and 14 days; 2 were never able to tolerate solid food and were discharged on a fluid diet; a further 2 underwent revisional surgery (1 of these had 2 revisions, was discharged with a feeding enterostomy unable to take food by mouth, and died 10 weeks later, and the other recovered well after his second operation and survived a further 7 months). One patient developed an anastomotic leak and enterocutaneous fistula. This was treated conservatively, the fistula closed spontaneously, and he died at home 2½ months after surgery.

There were 4 postoperative deaths. A patient with metastatic disease died 2 weeks postoperatively with ongoing high nasogastric losses, and the remaining deaths were due to a cerebrovascular accident, a myocardial infarct, and acute renal failure. Thirteen patients required later admissions (for a median of 4 days) for blood transfusions after upper gastrointestinal tract bleeding. The median survival was 9.1 months (3 days - 20 months) (Fig. 1). Eight patients survived longer than 1 year. There was no significant difference in survival between those patients with metastases and those without (p = 0.11) (Fig. 2).

## Discussion

There is wide variation in the reported frequency of use, the attendant complications, and the survival with gastrojejunostomy for irresectable gastric cancer. We performed the procedure in 19% of all cases, these cases all having overt gastric outlet obstruction. The reported frequency of use varies from 2% of patients undergoing surgery<sup>4</sup> to 19% of all admis-

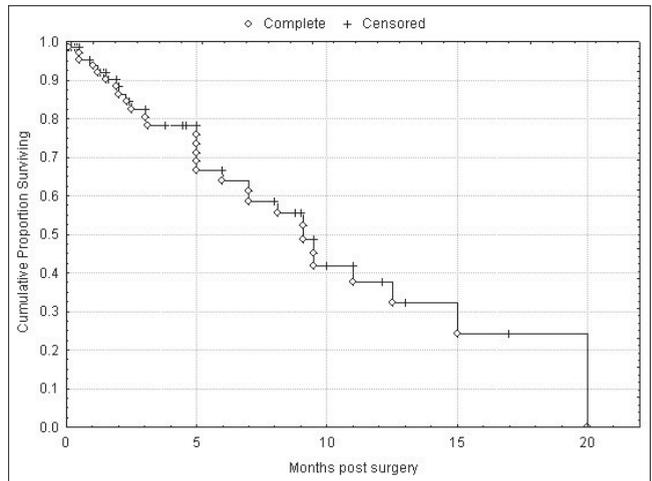


Fig. 1. Overall survival after gastrojejunostomy for incurable gastric adenocarcinoma.

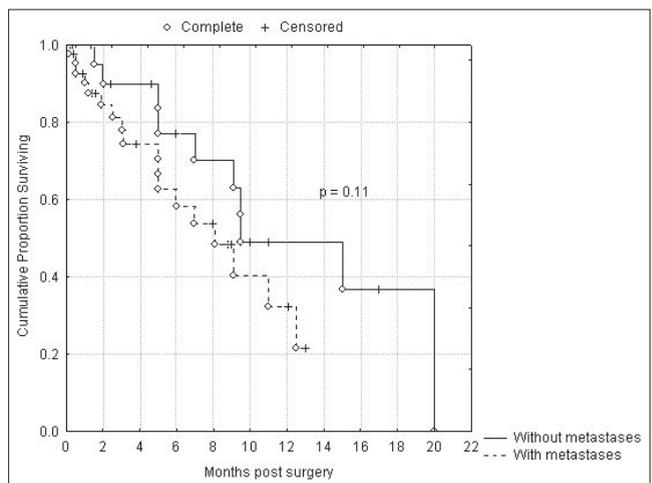


Fig. 2. Survival after gastrojejunostomy with or without macroscopically evident metastases.

sions for gastric carcinoma.<sup>10</sup> These proportions may be confounded by the use of ‘prophylactic’ gastrojejunostomy, which could have inflated its use in some series. These differences in usage may also reflect surgical attitudes, approaches, and timing of intervention, rather than variation in disease factors such as the stage of malignancy.

One of the stated objections to gastrojejunostomy in this setting is the incapacitating bile reflux it may cause,<sup>1,3</sup> or the fact that the tumour, which remains *in situ*, may bleed.<sup>1-3</sup> However, we have found that an entero-enterostomy between afferent and efferent jejunal limbs prevented reflux, an observation consistent with the findings of others.<sup>11</sup> The gastrojejunostomy may also diminish the risk of afferent loop obstruction when subsequent tumour growth may obstruct the anastomosis. Kaminishi and colleagues<sup>2</sup> found that 2 of 13 patients underwent fatal haemorrhage. Thirteen (19%) of our patients bled and this was easily remediable by transfusion, which was occasionally repeated. The objection of gastric dysmotility is not a major one, and is questionable. Only 6 (9%) of our patients had postoperative drainage problems, and these were usually mechanical in nature, some of which were transient or correctable.

We have therefore shown that gastrojejunostomy for gastric outlet obstruction due to irresectable lesions may provide significant palliation. Most patients were admitted with

TABLE II. REPORTED RESULTS OF PALLIATIVE GASTROJEJUNOSTOMIES IN GASTRIC CANCER

Author	Patients (N)	Morbidity (N (%))	Mortality (N (%))	Median survival (months)	Comment
<b>Crookes et al.<sup>10</sup></b>	<b>39</b>	<b>Not stated</b>	<b>Not stated</b>	<b>12</b>	
<b>Kaminishi et al.<sup>2</sup></b>	<b>13 conventional</b>	<b>Not stated</b>	<b>Not stated</b>	<b>5.8</b>	
	<b>8 stomach partitioning</b>			<b>13.4</b>	
<b>Kwok et al.<sup>1</sup></b>	<b>20</b>	<b>4 (20)</b>	<b>Nil</b>	<b>1.5 - 16</b>	<b>Devine exclusion procedure</b>
<b>Kwon et al.<sup>3</sup></b>	<b>18 conventional</b>	<b>Not stated</b>	<b>Nil</b>	<b>5</b>	<b>Two groups different – more metastases in CGJ group</b>
	<b>17 stomach partitioning</b>			<b>7</b>	
<b>Ouchi et al.<sup>4</sup></b>	<b>15</b>	<b>Not stated</b>	<b>Not stated</b>	<b>4</b>	
<b>Bozzetti et al.<sup>12</sup></b>	<b>65</b>	<b>Not stated</b>	<b>Not stated</b>	<b>3.5</b>	<b>Survival includes other bypasses, e.g. oesophagogastrostomies</b>
<b>Ekbom<sup>13</sup></b>	<b>20</b>	<b>4 (20)</b>	<b>5 (25)</b>	<b>6.2</b>	
<b>ReMine<sup>14</sup></b>	<b>98</b>	<b>Not stated</b>	<b>3 (3)</b>	<b>1/3 &lt; 3 mo., 1/3 3 – 6 mo., 1/3 &gt; 6 mo.</b>	<b>Metastases did not affect survival</b>
<b>Choi et al.<sup>15</sup></b>	<b>21</b>	<b>Not stated</b>	<b>2 (10)</b>	<b>3</b>	<b>Survival after partial gastrectomy 5.5 months</b>
<b>Choi<sup>5</sup></b>	<b>38 open</b>	<b>8 (21)</b>	<b>3 (8)</b>	<b>Not stated</b>	
	<b>30 laparoscopic</b>	<b>3 (10)</b>	<b>2 (7)</b>		

CGJ = conventional gastrojejunostomy.

intractable vomiting and dehydration, and these features were relieved, allowing early discharge.

Further, we suggest that the procedure might prolong life. The majority of patients were approaching a terminal state with inability to eat and dehydration, but postoperatively had a worthwhile mean survival rate of 9 months. The reported survival rates (summarised in Table II) vary considerably, ranging from a median of 3 months<sup>15</sup> to 12 months.<sup>10</sup> Our survival rate compares well with the median palliative survival of 8.3 months for patients undergoing, not bypass, but palliative resection at the Memorial Sloan Kettering Cancer Center.<sup>16</sup> Most survival comparisons of palliative gastrojejunostomy and palliative gastrectomy show the superiority of the latter. However, these comparisons are confounded by the disease stage being the determinant (irresectable compared with resectable), and do not diminish the role of gastrojejunostomy in irresectable disease. Even in the presence of macroscopically obvious metastases, the procedure had great value in that the extremely distressing symptom of vomiting was relieved in the majority of patients. In addition, survival was the same with or without metastases, indicating that the major survival determinant was the local disease, and that metastases did not contraindicate surgery. We therefore believe that palliative gastrojejunostomy remains an extremely useful procedure in patients with irresectable gastric cancer with gastric outlet obstruction.

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