Role of gastric bypass in patients with unresectable advanced carcinoma of stomach

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Abstract

Context Role of bypass as a palliative surgery for advanced gastric cancer remains controversial.

Aims To determine the role of bypass in advanced gastric cancer in comparison to resection as gold standard.

Design Hospital-based retrospective outcome as study.

Methods Patients were divided into three groups: group I (gastric resection), group II (bypass) and group III (exploratory laparotomy alone). The three groups were analysed for palliation of symptoms, operative morbidity and mortality and survival.

Statistical analysis used Chi-square, Fischer, One-way Anova, Unpaired-t, Kaplan-Meier analysis.

Results In-hospital morbidity was 19.38% (19 patients) for the entire study group. Bypass group had a lower morbidity rate as compared to the resection group ($p=0.029$). In-hospital mortality rate was 6.12% (6 patients) for the entire study group. Mortality rates did not differ between the groups.

Patient satisfaction with palliation of symptoms was similar between gastric bypass and resection. Gastric resection group had significantly better survival ($p=0.002$) compared to the nonresective procedures. However, gastric bypass did not confer any survival benefit over exploratory laparotomy ($p=0.501$).

Conclusions Gastric bypass can be done when resection is not possible as it palliates symptoms on par with resection and is associated with low operative morbidity though it does not improve the survival outlook of patients.

Keywords Stomach · Cancer · Palliation

Keymessage Bypass has a definite role as a palliative procedure in patients with advanced carcinoma of stomach as it offers palliation on par with resection and at a significantly lower morbidity though it doesn't confer any survival advantage.

Introduction

Palliative surgery is an essential component of advanced gastric cancer management. However, much controversy exists about the role of gastric bypass as a palliative procedure with some studies favouring resection [1, 2], and others, bypass [3]. Poor survival rates [2] and high operative morbidity and mortality [4] do not justify bypass in this group of patients.

While assessing palliative procedures, aspects like post-operative complications, patient's symptom relief, post-operative quality of life should be considered in addition to survival outlook [5, 6].

Hence the present study was undertaken to assess the role of gastric bypass in advanced gastric cancer with reference to resection as the gold standard.

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Subjects and methods

This study was a retrospective cohort study conducted on all patients of advanced carcinoma of stomach who were treated in our institute, over a period of two years, from March 2003 to February 2005. The patients were divided into three groups – Group I (gastric resection), Group II (gastric Bypass) and Group III (exploratory laparotomy or laparoscopy alone).

Gastrectomy was done by Billroth II procedure. Stomach was mobilised by opening the greater and lesser curvatures and dividing the gastro epiploic and right and left gastric arteries. The duodenum was transected and closed using staples or sutures. Tumour was resected leaving five cm margin. Retro colic gastrojejunostomy was done. Resection of less than 2/3rds of the stomach was termed partial gastrectomy, resection of more than 2/3rds was termed sub total gastrectomy and removal of the entire stomach, total gastrectomy. Gastrojejunostomy was done by an antecolic, iso-peristaltic fashion to the greater curvature of the stomach in the most dependent tumour free area in four layers.

The case records in the form of in-patient case sheets were retrieved from Medical Records Department of our institute by first author. Letters were sent to recall the patients for follow up subsequently. A self addressed post card also was sent to all the patients along with the call letter to facilitate replies. If the patient has died, their next of kin were requested to provide the date of death. Based on the data so obtained, survival analysis was done by Kaplan-Meier analysis.

At the time of follow up, patients were assessed for complications of surgery. Patient's satisfaction with palliation of symptoms (vomiting, abdominal pain, upper gastrointestinal bleed, anorexia, weight loss) provided by the surgery was assessed.

The data was analysed using Chi-square, Fischer, One way Anova, Unpaired-t and Kaplan-Meier analysis.

Results

During the study period a total of 140 patients of carcinoma stomach were operated, of whom records were available for 98 patients, who formed the study group. There were 32 patients (32.7%) in the resection group, 44 patients (44.9%) in the bypass group and 22 patients (22.4%) in the exploratory laparotomy group.

The mean age of our study group was 52.8 ± 10.9 years (Range: 23–73). There was no significant difference in the age distribution of the three groups ($p=0.144$). Thirty-one patients (31.63%) were women and 67 patients (68.37%) were men. The gender distribution among the three groups was significantly different with men being more in bypass group compared to the other two groups ($p=0.031$ and 0.019 vs Groups I and III respectively).

Most of the patients had more than one symptom at presentation, the commonest being vomiting followed by abdominal pain, loss of weight, anorexia and upper gastrointestinal bleed. The three groups did not differ with respect to their presenting symptoms (Fig. 1). Epigastric mass was palpated in 38.8% (38 patients) of the patients and epigastric tenderness was present in 22.5% (22 patients) of patients. Seven patients had left supra clavicular node enlargement at the time of presentation. The study groups did not differ with respect to the presenting signs. It was also observed that the presence of any of these symptoms or signs was not associated with a lower resectable rate.

The mean haemoglobin for the entire study group was 9.36 ± 2.06 gm/dl (Range: 4–14), and mean serum total protein was 6.4 ± 0.84 gm/dl (Range: 3.7–8), with mean serum albumin being 3.36 ± 0.62 gm/dl (Range: 0.6–4.7). There was no statistically significant difference between the three study groups.

The most common location of the tumour was in the antrum (78/98; 79.6%) followed by body (8/98; 8.2%), diffuse (8/98; 8.2%) and cardia (4/98; 4.1%).

The intraoperative findings are shown in Table 1. Resection group had lower rate of intra-abdominal dissemination and infiltration into adjacent organs when compared to the other two groups. Exploratory laparotomy group had a higher rate of peritoneal deposits over the bypass group and a higher rate of free fluid with respect to the other two groups (Table 2).

Of the 32 patients who underwent gastric resection, 14 (43.75%) underwent partial gastrectomy, 17 (53.13%) underwent subtotal gastrectomy and 1 (3.12%) underwent total gastrectomy. One patient who underwent Devine's gastric exclusion was included under the bypass group.

At follow up, palliation was satisfactory in nine out of 11 patients (81.8%) who had abdominal pain, 10 of the 15 patients (66.7%) with vomiting, 100% of the patients with

Fig. 1 Presenting symptoms

upper gastrointestinal (UGI) bleed, 3 of the 6 patients with weight loss and two of the six patients with anorexia. There was no significant difference in patient satisfaction with palliation of symptoms between the two groups (vomiting, $p=0.56$; anorexia, $p=0.67$; weight loss $p=0.5$; abdominal pain, $p=0.272$) (Table 3).

In the entire study group 19 patients (19.38%) developed postoperative complications during their stay in the hospital. Nine patients (28.125%) were from resection group, four (9.1%) from bypass group and six (31.8%) from exploratory laparotomy group. The bypass group had significantly lower rate of complications as compared to the resection group ($p=0.03$; $df=1$; 95% CI=1.08–14.14). There was no statistically significant difference between the morbidity rates of resection and exploratory laparotomy groups ($p=0.945$; $df=1$; 95% CI=0.31–3.51) or between gastric bypass and exploratory laparotomy groups ($p=0.052$; $df=1$; 95% CI=0.066–1.072). The most common compli-

Fig. 2 Kaplan-Meier survival curves

Table 1 Intraoperative findings

Finding	I. Gastric resection (n=32)	II. Gastric bypass (n=44)	III. Exploratory laparotomy (n=22)	All (n=98)	P values
Serosal spread	10 (31.2)	39 (88.6)	17 (77.3)	66 (67.3)	0
Adherent to pancreas	2 (6.3)	26 (59.1)	9 (40.9)	37 (37.8)	0
Adherent to adjacent organ(s)	5 (15.6)	35 (79.5)	13 (59.1)	53 (54.1)	0
Liver secondaries	0 (0)	11 (25)	6 (27.3)	17 (17.3)	0.007
Peritoneal deposits	0 (0)	8 (18.2)	10 (45.5)	18 (18.4)	0
Pelvic deposits	0 (0)	7 (15.9)	4 (18.18)	13 (13.26)	0.048
Omental deposits	1 (3.1)	10 (22.8)	10 (45.5)	21 (21.4)	0.001
Free fluid	3 (9.4)	5 (11.4)	7 (31.8)	15 (15.3)	0.049

Table 2 Analysis of intraoperative findings (p values)

	Group I vs Group II	Group I vs Group III	Group II vs Group III
Serosal spread	0	0.001	0.225
Adherent to pancreas	0	0.002	0.163
Adherent to adjacent organ(s)	0	0.001	0.079
Liver secondaries	0.002	0.002	0.842
Peritoneal deposits	0.011	0	0.019
Pelvic deposits	0.018	0.012	0.815
Omental deposits	0.016	0	0.058
Free fluid	0.78	0.038	0.042

Table 3 Patient's satisfaction with palliation of symptoms at follow up

Sl. No.	Symptom	Number of satisfied patients		p value
		I. Gastric resection	II. Gastric bypass	
1.	Abdominal pain	7/8	2/3	0.272
2.	UGI bleed	5/5	3/3	-
3.	Vomiting	7/10	3/5	0.56
4.	Loss of weight	3/5	0/1	0.5
5.	Anorexia	2/5	0/1	0.67

cation was wound infection (9.18%) followed by wound dehiscence (7.14%) and increased discharge from the drain (5.10%) (Table 4).

Age, gender, UGI endoscopy location and type, haemoglobin, serum albumin, serum total protein and omental deposits were not found to be associated with in-hospital morbidity.

The in-hospital mortality rate for the resection group was 12.5% (4 out of 32), as compared to 4.5% (2 out of 44) for bypass group and nil for exploratory laparotomy group. The difference between the three groups was not found to be statistically significant ($p=0.232$). Factors associated with mortality were not assessed due to the very low mortality rates.

Of the 92 patients who were sent post cards, follow up data could be obtained from 42 patients. Of the 42, 27 had sent back the self addressed post card stating the date of death and 15 came for follow up. Of the 27 who died, 14 underwent gastric bypass, six underwent resection and seven underwent exploratory laparotomy alone. Of the 15 patients who came for follow up, 10 underwent resection and five underwent bypass. The mean interval between date of operation and the date of examination was 430 days for the resected patients as compared to 200 days for the bypass patients.

At follow up, four patients in the resection group had symptoms of dumping syndrome. Other complications were vomiting (4 patients), incisional hernia (1 patient) and suture granuloma (1 patient). There was no significant dif-

ference between the two groups with respect to follow up complications ($p = 0.699$).

Survival analysis of the 42 followed up patients was done by Kaplan-Meier analysis. By log rank test it was found that gastric resection group had better survival as compared to bypass ($p=0.005$) and exploratory laparotomy alone groups ($p=0.002$). However there was no difference between bypass and laparotomy alone groups ($p = 0.501$). Mean and median survival times and survival rates at one year are shown in Table 5. Kaplan-Meier curves for these groups are depicted in Fig. 2.

Discussion

Clinical features of more advanced disease i.e. vomiting due to gastric outlet obstruction (90%) and epigastric mass (39%) were much more common in our study compared to previous reports [2, 7]. This was further corroborated by the intra op finding of infiltration of adjacent organs in more than half the patients and evidence of abdominal disseminated disease in 32.6% of patients.

In our study, palliation offered by the surgery in the 15 followed up patients was satisfactory with patient's satisfaction rates being 100% for UGI bleed, 81.8% for abdominal pain, 66.7% for vomiting. However, patient's satisfaction with palliation of symptoms did not differ significantly between the resection and bypass groups. We can therefore conclude that palliation of symptoms is equally

Table 4 In-hospital morbidity

Sl. No.	Complication	I. Gastric resection (n=32)	II. Gastric bypass (n=44)	III. Exploratory laparotomy (n=22)	All (n=98)
1.	Wound dehiscence	2	1	4	7 (7.14)
2.	Wound infection	2	1	6*	9 (9.18)
4.	Bilio purulent discharge from drain	5	0	0	5 (5.10)
5.	Others†	2	3	0	5 (5.10)
6.	Total number of patients with complications (%)	9 (28.13%)	4 (9.1%)†	6 (31.8%)	19 (19.38%)

Note:

*P values: Group I vs III : 0.004 Group II vs III : 0.041

†P Value : Group I vs II : 0.029

‡Others include Pneumonia, Undiagnosed fever, Vomiting, Intussusception.

Table 5 Survival analysis (in days)

Surgery class	Mean survival time		Median survival time		% Survival at 1 year
	Estimate	95% Confidence interval	Estimate	95% Confidence interval	
Gastrectomy	296	246 - 346	.*	.	55.6
Gastrojejunostomy	176	121 - 231	151	121 - 176	0
Lap and closure	115	35 - 196	62	35 - 115	14.3
Overall	214	174 - 254	246	214 - 174	-

Note: *Estimate of median survival is not given as the median value itself is censored.

good in resection and bypass groups. This is in contrast to the studies done earlier which have shown that resection provides better palliation of symptoms compared to gastroenterostomy [2].

In our study, in-hospital morbidity rate for the entire study group was 19.38% which is similar to the rates obtained in other studies. Gastrojejunostomy group had significantly less number of complications as compared to the resection group. Though the morbidity rate in the resection group was higher than in the bypass group, none of the complications was life threatening. In our study, no factor was found to be associated with in-hospital morbidity.

In hospital mortality rate in our study was 6.12%, which is similar to the postoperative mortality rates of 6 to 10%, found in other studies [8]. The difference between the three groups was not found to be statistically significant ($p=0.945$).

Mean survival time in our study was 10 months for the resection group and six months for the bypass group as against the survival times of 12–18 months for resection in various studies [2, 9] and five months for bypass [10]. The lower survival time of the resection group in our study could be because of the more advanced stage of the disease with which our patients presented.

In our study, survival of patients in the resection group was significantly better compared with the other two groups (bypass and laparotomy alone). There was also no survival difference between those who underwent bypass and those who underwent exploratory laparotomy alone. This is similar to the study by Medina-Franco H, et al [2].

It is to be pointed out that, in patients undergoing gastric bypass or exploratory laparotomy alone, the tumour progresses to a stage beyond which surgical resection is possible. This by itself could partly explain the better survival outlook of resection patients and hence it cannot be determined whether the better survival outlook of the resection group patients is due to the surgical procedure as such or due to the better patients selected.

Hence we conclude that gastric bypass, though not conferring any survival advantage provides palliation of symptoms on par with resection and is associated with a significantly low postoperative morbidity rate. Hence, it can be done as a palliative procedure in those who prove unfit for resection.

There are a few inherent weaknesses in our study. Ours being a retrospective study, the study groups could not be

standardised. The follow up rate was quite low with only 15 people (16.3%) turning up for follow up which is also the experience of other retrospective studies in this region. More research is required to correlate the palliation, morbidity, mortality and survival advantage with stage of tumour and recurrence of tumour.

References

1. Doglietto GB, Pacelli F, Caprino P, Alfieri S, Carriero C, Malerba M et al (1999) Palliative surgery for far advanced gastric cancer: a retrospective study on 305 consecutive patients. *Am Surg* 65:352–355
2. Medina-Franco H, Contreras-Saldivar A, Ramos-De La Medina A, Palacios-Sanchez P, Cortes-Gonzalez R, Ugarte JA (2004) Surgery for stage IV gastric cancer. *Am J Surg* 187: 543–546
3. Lo NN, Kee SG, Nambiar R (1991) Palliative gastrojejunostomy for advanced carcinoma of the stomach. *Ann Acad Med Singapore* 20:356–358
4. Berrospi F, Ruiz E, Morante C, Celis J, Montalbelti JA (1995) Morbidity and mortality related to gastroenteroanastomosis in advanced gastric cancer. *Rev Gastroenterol Peru* 15:43–48
5. Miner TJ, Brennan MF, Jaques DP (2004) A prospective, symptom related, outcomes analysis of 1022 palliative procedures for advanced cancer. *Ann Surg* 240: 719–726
6. McCahill LE, Krouse R, Chu D, Juarez G, Uman GC, Ferrell B et al (2002) Indications and use of palliative surgery—results of Society of Surgical Oncology survey. *Ann Surg Oncol* 9:104–112
7. Stephens MR, Lewis WG, White S, Blackshaw GR, Edwards P, Barry JD, Allison MC (2005) Prognostic significance of alarm symptoms in patients with gastric cancer. *Br J Surg* 92:840–846
8. Yasuda K, Shiraishi N, Adachi Y, Inomata M, Sato K, Kitano S (2001) Risk factors for complications following resection of large gastric cancer. *Br J Surg* 88:873–877
9. Moriwaki Y, Kunisaki C, Kobayashi S, Harada H, Imai S, Kasaoka C (2004) Does the survival stress associated with palliative resection for patients with incurable gastric cancer with distant metastasis shorten their survival?. *Hepatogastroenterology* 51:872–875
10. Kikuchi S, Tsutsumi O, Kobayashi N, Tsukamoto H, Shimao H, Sakakibara Y et al (1999) Does gastrojejunostomy for unresectable cancer of the gastric antrum offer satisfactory palliation? *Hepatogastroenterology* 46:584–587