Total gastrectomy with or without abdominal drains. A prospective randomized trial

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ABSTRACT

The most common postoperative complications of total gastrectomy are esophagojejunal anastomotic leakage and subphrenic abscess. These complications are a cause of morbidity and mortality, relaparotomy, and longer postoperative stay. The use of abdominal drains is useful for the early diagnosis and management of anastomotic leaks. The aim of this study was to analyze our experience with total gastrectomy for gastric cancer in patients with and without abdominal drains, and to evaluate the results regarding postoperative morbidity, postoperative hospital stay, postoperative days for oral intake, relaparotomy and mortality. This prospective and randomized study examines the results in 60 consecutive patients (43 males and 17 females) with gastric cancer who underwent total gastrectomy in the Regional Clinical Hospital of Concepción, Chile, between 2000 and 2003. Patients were divided into two groups: group I (without drains) and group II (two drains). We found 31 patients in group I and 29 patients in group II. The mean length of postoperative stay was 12.9 days in group I and 18.8 days in group II ($p = 0.0242$, s.). Morbidity was 9.7% in group I and 37.9% in group II ($p = 0.0242$, s.). Re-explorations were more frequent in group II (24.1%) versus group I (9.7%) ($p = 0.1239$, n.s.). Postoperative days for oral intake were 9.4 in group I and 12.8 in group II ($p = 0.0514$, n.s.). Mortality was 0% in group I and 3.4% in group II ($p = 0.4833$, n.s.). In our experience, morbidity and postoperative hospital stay were statistically higher in the group of patients with abdominal drains.

Key words: Gastric cancer. Total gastrectomy. Drains.

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INTRODUCTION

The most important complications of total gastrectomy are dehiscence of the esophago-jejunal anastomosis, dehiscence of the duodenal stump, abscesses, peritonitis, and sepsis and eventually death.

These complications are an important cause of morbimortality, reoperation, and prolonged hospital stay.

Esophagojejunal anastomotic leakage is the most serious and frequent cause of relaparotomy and operative mortality (1). Its incidence decreases with surgeon experience (2-4).

The reason for abdominal drains is earlier detection of anastomotic fistula, help in its management, and avoidance of reintervention. No randomized studies comparing use of drains in total gastrectomy have been reported.

The aim of this study is to analyze our experience in a comparative randomized trial of total gastrectomies for gastric cancer, and to compare morbimortality with or without abdominal drains. In the two groups we studied sex, age, relaparotomies, morbidity, time for oral feeding, hospital stay, and mortality.

PATIENTS AND METHODS

We performed a prospective randomized trial in 60 patients with gastric cancer that underwent total gastrectomy and reconstruction of the alimentary canal with a mechanically stapled Roux-en-Y esophagojejunostomy.

All patients were operated on consecutively in the Surgical Department of Clinical Hospital at Concepción, Chile, between 2000 and 2003. There were 43 men (71.7%) and 17 women (28.3%) included. Mean age was 61 years (range 36-79). In most patients a gastrectomy with D2 lymphadenectomy was performed.

Some patients had palliative gastrectomies. In 19% of patients an additional surgery was performed, with cholecystectomy being most frequent (8.3%) (Table I).

Table I. Additional surgeries

Cholecystectomy	5	8.3%
Splenectomy	3	5.0%
Splenopancreatectomy	1	1.7%
Transverse colectomy	1	1.7%
Hydatidic cyst drainage	1	1.7%

In 33 patients (55%) the tumor was localized in the upper third (Table II).

Table II. Tumor location

Upper third	33	55.0%
Middle third	22	36.7%
Lower third	5	8.3%

In all, 34 patients had diffuse type cancer (56.7%), and 61.7% poorly differentiated tumors; 9% were early stages and most of them were Bormann III types (27.6%).

We randomized 2 groups of patients without considering general condition, tumor staging, nutritional status, or tumor localization.

Once the resection was decided we performed a total gastrectomy with D2 lymphadenectomy, except for palliative gastrectomies. A nasojejunal feeding tube was installed for early enteral nutrition in the postoperative period. A radiological contrast study was performed at the 8th postoperative day to assess anastomotic integrity.

In one group of patients (group I) no drain tubes were left. In the other group (group II) we placed two gross tubular drains at both sides of the esophagojejunal anastomosis, taken out by separate wall incisions (Fig. 1).

Fig. 1.- Drain placement.
Colocación del drenaje.

Fig. 2.- Groups of patients.
Grupos de pacientes.

In all cases a circular stapled anastomosis calibrated to 25 mm was performed.

In group II drains were kept in place until the radiological study on the 8th postoperative day.

For statistical analysis we used an independent variable test based on the Chi-square distribution with Yates correction, and Fisher's exact probability test.

RESULTS

Morbidity was present in 14 of 60 patients (23.3%): three esophagojejunal anastomotic leakages (5%), two subphrenic abscesses (3.3%), two duodenal fistulas (3.3%), and two jejunal necroses (3.3%). There was one postoperative death (1.7%).

There were 31 patients in group I (without drains) and 29 patients in group II (two drains) (Table III, Fig. 2).

Table III. Group clinical features

	Group I (no drains)	Group II (2 drains)
<i>n</i>	31	29
<i>Age</i>		
Mean	61.2 years	60.6 years
Range	42 - 79	36 - 78
<i>Sex</i>		
Male	22	22
Females	9	7
<i>Tumor location</i>		
C zone	14	19
M zone	14	8
A zone	3	2
<i>Depth of invasion</i>		
Mucosal	1	0
Submucosal	4	1
Muscular	3	3
Subserosal	10	7
Serosal	11	14
Extraserosal	2	4
<i>Other surgeries</i>		
Cholecystectomy	3	2
Splenectomy	1	1
Hydatidic cyst drainage	1	1
Pancreatosplenectomy	0	1
Transverse colectomy	0	1

Most tumors were diffuse and poorly differentiated (Table IV).

Complications were less frequent in patients without abdominal drains (9.7 vs. 37.9%). This has statistical significance (independent variable test with Chi-square distribution and Yates' correction, p : 0.0226). One patient in this group had an esophago-jejunal anastomosis leakage (3.2%). One patient with splenectomy developed a pancreatic fistula (Table V).

Table IV. Pathological findings

	Group I (no drains)	Group II (2 drains)
<i>Vascular invasion</i>		
Yes	21	22
No	10	7
<i>Lauren</i>		
Diffuse	17	17
Intestinal	14	12
<i>Broders</i>		
Well differentiated	4	3
Moderately differentiated	10	6
Poorly differentiated	16	17
Undifferentiated	1	3
<i>Borrmann</i>		
Early	5	1
I	2	3
II	6	4
III	11	5
IV	5	8
V	2	8

Table V. Complications

	Group I (no drains)	Group II (2 drains)	<i>p</i>
Total	3/31 (9.7%)	11/29 (37.9%)	0.0226 (s)
Pneumonia	-	1/29 (3.4%)	0.4833 (ns)
Ileum perforation	-	1/29 (3.4%)	0.4833 (ns)
Jejunal necrosis	1/31 (3.2%)	1/29 (3.4%)	0.7373 (ns)
Esophago-jejunal leakage	1/31 (3.2%)	2/29 (6.9%)	0.4746 (ns)
Duodenal fistula	-	2/29 (6.9%)	0.2294 (ns)
Pancreatic fistula	-	1/29 (3.4%)	0.4833 (ns)
Subphrenic abscess	-	2/29 (6.9%)	0.2294 (ns)
Bilioperitoneum	-	1/29 (3.4%)	0.4833 (ns)
Evisceration	1/31 (3.2%)	-	0.5167 (ns)

Total (Group I: 9.7% - Group II: 37.9%)

Chi-square test with Yates' correction: p -value = 0.0226 (significant difference)

—Pneumonia

Fisher's test: p -value = 0.4833 (no significant difference).

—Ileum perforation

Fisher's test: p -value = 0.4833 (no significant difference).

—Jejunal necrosis

Fisher's test: p -value = 0.7373 (no significant difference).

—Esophago-jejunal leakage

Fisher's test: p -value = 0.4746 (no significant difference).

—Duodenal fistula

Fisher's test: p -value = 0.2294 (no significant difference).

—Pancreatic fistula

Fisher's test: p -value = 0.4833 (no significant difference).

—Subphrenic abscess

Fisher's test: p -value = 0.2294 (no significant difference).

—Bilio-peritoneum

Fisher's test: p -value = 0.4833 (no significant difference).

—Evisceration

Fisher's test: p -value = 0.5167 (no significant difference).

The number of reoperations was also less frequent in the group without abdominal drains (9.7 vs. 24.1%), but without statistical significance (Fisher's test: p = 0.1239) (Table VI).

Table VI. Reinterventions

	Group I (no drains)	Group II (2 drains)	p
Total	3/31 (9.7%)	7/29 (24.1%)	0.1239 (ns)
1 reintervention	1/31 (3.2%)	5/29 (17.2%)	0.0830 (ns)
2 reinterventions	2/31 (6.4%)	1/29 (3.4%)	0.5254 (ns)
3 reinterventions	0	1/29 (3.4%)	0.4833 (ns)

The timing for oral feeding was earlier in the group without abdominal drains but not statistically significant (average difference test based on normal distribution: $p=0.0514$) (Table VII).

Table VII. Oral feeding

	Group I (no drains)	Group II (2 drains)	p
Mean	9.4 days	12.8 days	0.0514 (ns)
Standard deviation	6.5 days	9.3 days	
Range	7 - 44 days	7 - 42 days	

Postoperative hospital stay was shorter in the group without drains (12.9 vs. 18.8%) which was statistically significant (average difference test based on normal distribution: $p = 0.0242$) (Table VIII).

Table VIII. Postoperative hospital stay

	Group I (no drains)	Group II (2 drains)	p
Mean	12.9 days	18.8 days	0.0242 (s)
Standard deviation	10.1	12.8	
Range	9 - 64 days	10 - 55 days	

The only deceased patient was in the group with abdominal drains. The cause of death was jejunal necrosis due to microembolization of the mesenteric vessels (Table IX).

Table IX. Mortality

Group I (no drains)	Group II (2 drains)	p
0	1/29 (3.4%)	0.4833 (ns)

Average difference test based on normal distribution: $p=0.4833$ (not significant).

DISCUSSION

One of the most feared and frequent complications of total gastrectomy is anastomotic leakage at the esophago-jejunal anastomosis. Mostly two large drain tubes are placed at both sides of the anastomosis in order to control and manage anastomotic leakage, which may be subclinical or cause death.

There is only one prospective report in the literature comparing postoperative outcome in patients with or without drains after total gastrectomy. In our country, despite some exceptions, drains are systematically used around esophageal anastomoses. Also in our country two different classifications of anastomotic fistula have been proposed and are of great value for the management, outcome, and prognosis of patients (5,6).

Traditionally in both national and international experiences the placement of 2, 3 or even 4 drains in the peritoneal cavity is well known, and the incidence of anastomosis fistula and subphrenic abscess have been decreasing as surgical teams become more experienced in the various centers throughout the country, and due to the increasingly common use of stapled anastomosis (5-14).

This problem has been discussed in national scientific meetings, and it seems that only the group from Concepción, Chile, does not routinely use abdominal drains in these patients, which has always been a matter of controversy among surgeons.

In this prospective and randomized trial comparing two groups of patients with gastric cancer who were treated with the same surgical approach we found that patients without abdominal drains (31 patients) had less morbidity (9.7 vs. 37.9%) and a shorter hospital stay (12.9 vs. 18.8 days). This had statistical significance ($p = 0.0226$ and $p = 0.0242$). The group of patients with abdominal drains (29 patients) had a higher incidence of reoperations (29.1 vs. 9.7%), delayed oral feeding (12.8 vs. 9.4 days), and higher operative mortality (4.4 vs. 0%) even though these differences were not statistically significant.

Abdominal drains did not help lower the number of reoperations –when used, the number of reoperations was higher, although without statistical significance ($p = 0.1239$).

Drains are not a substitute for careful surgical technique. In the literature we may find both supporters of drains and many opponents, who consider their use unnecessary and sometimes even dangerous (15-17).

In this trial in 60 patients we had an operative mortality of 1.7% (one patient), and this was in the group of patients with drains.

With our results we cannot recommend the use of drains in patients with total gastrectomies for gastric cancer, as in the group with drains complications and hospital stay were higher.

CONCLUSIONS

We conclude, that in our experience, operative morbidity and hospital stay are significantly higher in the group of patients with total gastrectomy and the use of abdominal drains; therefore, we think that a routinely use of drains is not warranted.

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