



and Other Interventional Techniques

Malignant gastrointestinal obstruction: endoscopic stenting versus surgical palliation

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Abstract

Background: Malignant gastrointestinal obstruction is a secondary complication of cancers in an advanced state. Treatment has consisted of gastrojejunostomy. However, the endoscopic placement of metallic stents has provided positive results. This study aimed to compare the efficiency of both therapeutic options.

Methods: A total of 41 patients with gastrointestinal obstruction caused by inoperable neoplasm were treated endoscopically with enteral stent (24 patients) or gastrojejunostomy (17 patients).

Results: In the endoscopic group (EG) 24 patients (100%) achieved efficient gastric emptying, as compared with 82.3% in the surgical group (SG). The difference was not significant. The average time for initiating oral food tolerance was 2.4 days for the EG and 5 days for the SG ($p < 0.001$). The average inpatient time was 7.1 days for the EG and 11.5 days for the SG ($p < 0.001$). Mortality at 30 days was lower in the EG (16.6%) than in the SG (29.4%) ($p < 0.05$). The survival time was 20 weeks for the EG and 21.6 weeks for the SG. The difference was not significant. The rate of complications was 4% in the (EG) and 17.6% in the (SG), with the difference was not significant.

Conclusion: Endoscopic treatment of malignant gastrointestinal obstruction provides an adequate palliation of the symptoms. It is less invasive, avoids the morbidity associated with open gastrojejunostomy, and achieves a faster start to oral food and a shorter hospital stay, leading to a higher quality of life.

Key words: Enteral stent — Gastrojejunostomy — Malignant gastrointestinal obstruction — Palliative treatment — Pancreatic cancer

Patients with advanced and inoperable neoplasm that leads to gastrointestinal obstruction need a palliative treatment that allows the best quality of life. Traditionally, this treatment has been performed through open gastrojejunostomy that has been associated with considerable morbidity in a weakened group of patients with a short life expectancy [15, 17]. Over the past 10 years, various series have demonstrated the efficiency and safety of endoscopic treatment for these patients though the placement of metallic stents [3, 5, 6, 11, 14]. However, very few studies have yet compared the results obtained using endoscopic palliative treatment with those achieved using surgical treatment [2, 7–10, 18–20]. Among these few studies, only two have been controlled, but with very few patients included [7, 8]. This study aimed to compare the efficiency of endoscopic treatment (enteral stent) with that of surgical treatment (open gastrojejunostomy).

Patients and methods

A nonrandomized controlled study compared all the patients admitted to the digestive system ward who had malignant gastrointestinal obstruction between July 1999, and September 2004 with the patients who entered the surgical service exhibiting the same pathology during the study period.

Endoscopic group

A total of 26 self-expandable metallic stents were placed in 24 patients with inoperable malignant gastrointestinal obstruction. The explorations were performed through controlled sedation in 8 patients, by an endoscopist using midazolam and in 16 patients by an anesthesiologist using propofol. The therapeutic duodenoscope Olympus (4.2 mm) was used along with autoexpandable metallic stents (enteral Wallstent; Boston, SC, USA) sizes 22 × 60 mm ($n = 14$) and 22 × 90 mm ($n = 12$). The stents were placed using the endoscope therapeutic canal over a metal guide (0.035 in.) under endoscopic and fluoroscopic control (Fig. 1a and b). The stents were chosen to achieve a separation between their extremities and the stenosis by at least 2 cm once expanded [4, 5]. Previous dilation of the stenosis was not performed. A prospective

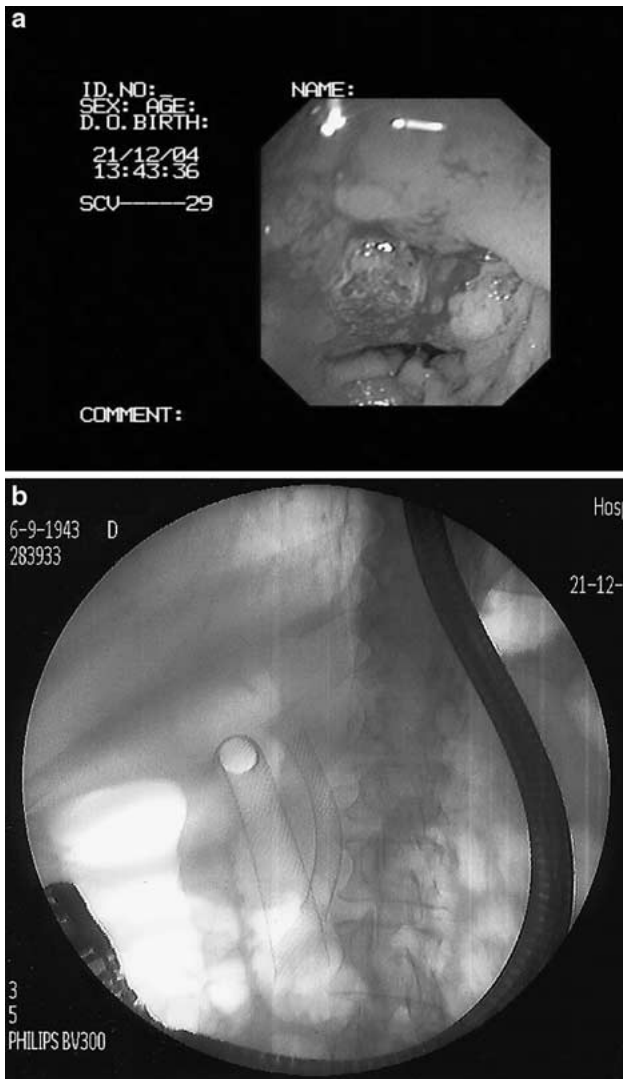


Fig. 1. **a** Duodenal obstruction caused by pancreatic cancer. **b** Enteral and biliary Wallstent in a patient with pancreatic cancer.

analysis of the patients was undertaken to assess capacity and mean time to oral intake, rate of complications, average hospital stay, and survival.

Surgical group

A cohort of 17 patients was identified who had received open gastrojejunostomy for inoperable malignant gastrointestinal obstruction, and who could be compared in terms of age and similar tumor location. A retrospective analysis was carried out from the medical records, and telephone contact in some cases, on the same data examined for the endoscopic group. The two groups then were compared.

Statistical analysis

The qualitative variables are expressed as percentages, and the quantitative variables are given as averages and ranges. The comparative percentages between the two groups were analyzed using the chi-squared test, and *p* values less than 0.05 were considered significant.

Table 1. Enteral Wallstent vs gastrojejunostomy: results

	Endoscopic	Surgical	<i>P</i> value
No of patients	24	17	
Sex	9 M 15 F	7 M 10 F	NS
Average age (years)	79.04	75.29	NS
Mortality at 30 days: <i>n</i> (%)	4 (16.6)	5 (29.4)	< 0.05
Complications: <i>n</i> (%)	1 (4)	3 (17.6)	NS
	Bronchial aspiration	Pneumonia Evisceration Infected wound	
Days to star tolerance	2.4	5	< 0.001
Clinical success: <i>n</i> (%)	24 (100)	14 (82.3)	NS
Hospital stay (days)	7.1	11.5	< 0.001
Survival (weeks)	20	21.6	NS
Location of neoplasia:			
Pancreas	13	10	
Gastric	4	5	
Duodenum	2	1	NS
Vater papilla	2	—	
Gallbladder	2	—	
Biliary tract	1	1	
Double strictures (biliary and duodenal) in pancreas cancer: <i>n</i> (%)	12 (92)	8 (80)	NS

NS, not significant

The analysis of survival was made using the Kaplan–Meier method, and the Mantel–Haenszel test was used to evaluate the differences between the two groups.

Results

There were no differences between the groups in terms of age, sex, and location of the neoplasm. The results are summarized in Table 1.

Endoscopic group

A correct collocation of 26 stents in 24 patients was achieved (100%). Two patients needed a second coaxial stent in the same session because after expansion of the first stent it was noted that the margin of one extremity to the stenosis was less than 2 cm. One patient who had been sedated with anesthesia experienced severe breathing difficulties (bronchial aspiration) toward the end of the process. This patient was controlled in the intensive care unit for 24 h, and later passed onto the ward with no after effects. The symptoms were reduced, and the possibility of an adequate ingestion (liquid or shredded diet) was achieved in all patients (100%), with oral food tolerance starting after an average of 2.4 days (range, 1–5 days). The average hospital stay was 7.1 days (range, 2–30 days), and the average survival period was 20 weeks. Mortality related to the interventions was 0, and the mortality rate at 30 days was 16.6%. At the time of this study, all deceased patients (*n* = 24) had died due to the evolution of their illness, without clinical enteral obstruction.

In our series, biliary obstruction developed in 18 patients (75%). Biliary drainage was required by 12 of the 13 patients (92%) with pancreatic cancer. In five

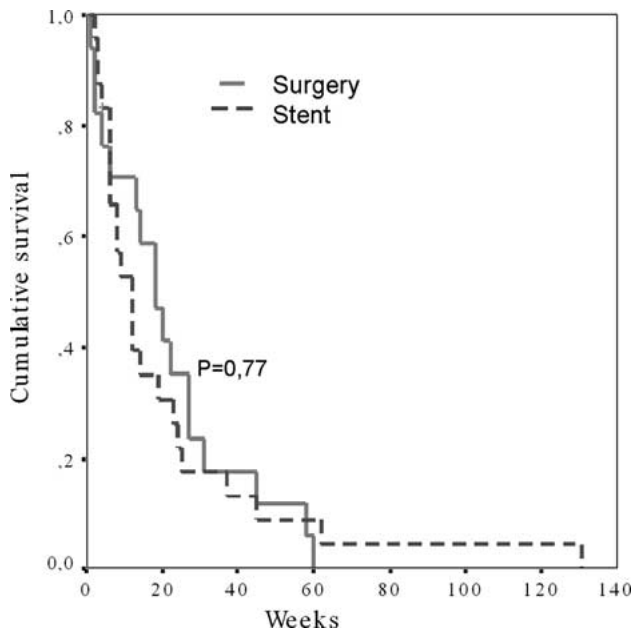


Fig. 2. Accumulated survival time (average for endoscopic and surgical group: 20 and 21.6 weeks, respectively).

cases (41.6%), this was before gastroduodenal stenosis. In six cases (50%), it occurred concomitantly, and in one case (8.3%) it occurred after the appearance of the stenosis.

Surgical group

An adequate gastric emptying was achieved for 14 patients (82.3%). Three patients (17.6%) experienced complications including pneumonia ($n = 1$), defect in the abdominal wall treated with a new surgical procedure ($n = 1$), and wound infection (*Escherichia coli*) ($n = 1$). The average start of tolerance was after 5 days (range, 3–9 days). The average hospital stay was 11.5 days (range 6–22 days), and the average survival time was 21.6 weeks. The mortality rate at 30 days was 29.4%.

Biliary obstruction developed in 10 patients (59%). Biliary drainage was required by 80% of the patients with pancreatic cancer.

Statistical analysis

There were no significant differences between the two groups in terms of age, sex, or location of the neoplasm; nor were there significant differences in mortality, morbidity, adequate gastric emptying, or survival (Table 1 and Fig. 2). Endoscopic treatment was more effective than surgical treatment, with the difference reaching statistical significance in two aspects: the start of food tolerance and the average hospital stay.

Although the survival rate was similar in the two groups, the early mortality (30-day) rate was higher in the surgical group (29.4% vs 16.6%; $p = 0.042$). This fact is reflected in Fig. 3, where it can be seen that

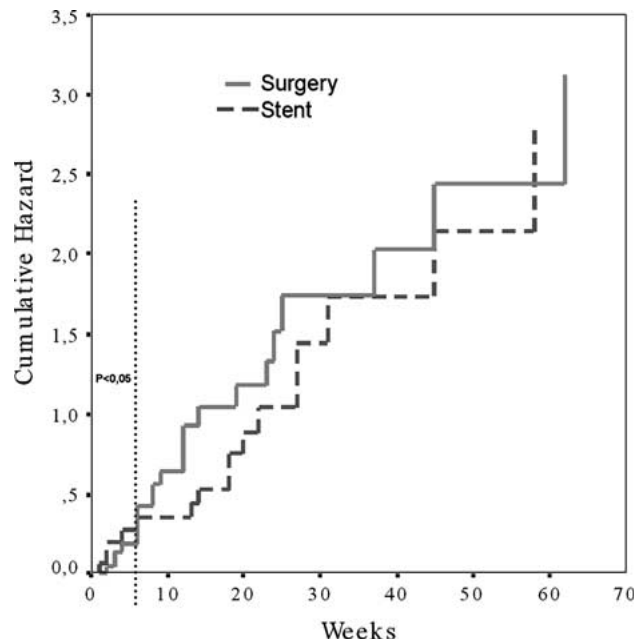


Fig. 3. Accumulated mortality risk in the two groups.

during the first weeks, the accumulated risk was greater in the surgical group. This difference, however, disappeared in the later weeks.

Discussion

Malignant gastrointestinal obstruction usually is caused by advanced pancreatic, gastric, duodenal, and biliary cancers [13]. Pancreatic cancer is the most frequent, estimated at 17% to 30% of all patients at this stage of the illness [16]. The traditional palliative treatment for these patients has been open gastrojejunostomy. However, the high rate of associated morbidity and mortality (10%) [15, 17], has led to the study of alternative treatments aimed at improving these results and the quality of life for the patients.

Our group was one of the first to contribute its experience to the literature based on palliative treatment as an alternative to surgery for malignant gastrointestinal obstruction, through the insertion of enteral Wallstents [5]. Our results were consistent with those published by other groups, including the ease of Wallstents placement through a therapeutic endoscopic canal, the low rate of complications, the high rate of patients achieving a precocious start of ingestion, and the short hospital stay. Also, the technique is not very invasive. It is well tolerated by the patients and avoids inconveniences such as general anesthesia, nasogastric tube, laparotomy, parental nutrition, and bed rest. Following this line, we decided to compare our results with the gold standard treatment (gastrojejunostomy), taking into account that it is very difficult to carry out a controlled study with a sufficient number of patients to allow definitive conclusions. Because of this, the only solution was to perform comparative studies with no previous randomization.

Table 2. Publisher studies that compare endoscopic treatment (E) with gastrojejunostomy (G)

	Pac no E/G	Technical success (%) E/G	Clinical success (%) E/G	Tolerance start (days) E/G	Hospital stay (days) E/G	Complications (%) E/G	30-day mortality (%) E/G	Survival (days) E/G	Costs (\$ E/G
Webb 2000 [18] R	10/10		80/60		1.6/7.8 ^a ↔				5970/13.445 ^a
Yim 2001 [20] R	12/15	93.5/—	80.6/—		4/14 ^a ↔	7/—	8/—	94/92	9.921/28.173 ^a
Wong 2002 [19] R	6/17	100/—	100/—		4/15 ^a »	16/41	0/18	110/64	
Johnson 2004 [8] P/E R/G	21/15	100/86.6	100/81		7.3/14.7 ^b »		28/26	76/99	7.215/10.190 ^a
Fiori 2004 [7] P, Random	9/9	100/100	100/90	2.1/6.3 ^a	3.1/10 ^a ↔	11/11	0/0		
Maetani 2004 [9] R	20/19	100/100	80/84	1/9 ^a	15/30 »	40/31.6	25/15.8	54/79	
Mittal 2004 [10] R	16/16			1/7.5 ^a	2/10 ^a ↔	0/31 ^a		56/119	5.736/13.256
Del Piano 2005 [2] R	24/23	96/100	92/56 ^a	1/—	3/24 ^a ↔	17/61 ^a	0/30 ^a	96/70 ^a	
Current study 2005 P/E R/G	24/17	100/100	100/82.3	2.4/5 ^a	7.1/11.5 ^a ↔	4/17.6	16.6/29.4 ^a	140/151	

↔ mean of days in hospital from income to discharge; » mean of days in hospital from treatment to discharge; —, data not supplied; R, retrospective study; P, prospective study; P/E, data obtained and evaluated prospectively in the endoscopic group; R/G, data obtained and evaluated retrospectively in the gastrojejunostomy group; Random, randomised study; \$, cost in dollars

^a Statistical significant

Pac: Number of patients

In our experience, the patients treated with enteral stent experienced palliation of their symptoms. They had adequate ingestion until their death in all cases, with only one complication, which was solved in 24 h. In the surgical group, the symptoms were not palliated; nor was an adequate ingestion possible for all the patients, and complications were more common. In the endoscopic group, the mean time to oral intake and the hospital stay were shorter than in the surgical group, with the difference reaching statistical significance. These results are consistent with those found in the occasional comparative studies of both techniques that have been published, as shown in Table 2. Although costs were not evaluated in this study, in the four comparative studies that examine on this area (Table 2), the endoscopic treatment had a lower cost, with the difference reaching statistical significance in three of the four studies.

The survival time was similar in the two groups, approximately 20 weeks (Fig. 2). This result shows that the two groups were comparable statistically. Figure 3 shows that patients treated with open gastrojejunostomy have a higher mortality rate in the first 5 weeks after treatment, and that the morbi-mortality of the surgical treatment is more patent at this early stage.

As our results show, most of the patients with pancreatic cancer in whom secondary duodenal obstruction developed also will experience, concomitantly, a stenosis in the biliary tract. This evolution also is shown by other authors [1, 2]. Therefore, if a patient with these characteristics has not previously received biliary drainage, it seems prudent to evaluate the biliary tract during the hospital stay for gastrointestinal obstruction.

Laparoscopic gastrojejunostomy is another alternative therapy that has demonstrated, in some studies, reductions in morbidity, mortality, and hospital stay [12]. However, the rate of conversion to open surgery can reach 20%, and a certain level of experience is necessary to achieve good results. A small comparative retrospective study showing the advantages of endoscopic treatment using stent placement rather than open and laparoscopic gastrojejunostomy has concluded that laparoscopic gastrojejunostomy may not be superior to the open gastrojejunostomy for the palliative treatment of malignant gastrointestinal obstruction [10]. More studies experience and patient preference seem to be a good basis for choosing the optimum treatment.

In conclusion, endoscopic treatment of malignant gastrointestinal obstruction through the placement of metallic stents leads to an adequate reduction of the symptoms. It is less invasive, avoids the morbidity associated with open gastrojejunostomy, achieves a faster oral intake, involves a shorter hospital stay, and leads to a higher quality of life.

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