

Laparoscopic gastrojejunostomy and endoscopic biliary stent placement for palliation of incurable gastric outlet obstruction with cholestasis

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Abstract

Background: For patients with incurable malignant gastric outlet obstruction and cholestasis, laparoscopic gastrojejunostomy combined with endoscopic biliary stent placement seems to offer a minimally invasive palliation.

Methods: We retrospectively analyzed the data of 16 patients submitted to laparoscopic gastrojejunostomy. Laparoscopic gastroenterostomy was performed as an antecolic, side-to-side gastrojejunostomy with enteroenterostomy. In 12 patients cholestasis was relieved preoperatively by stent placement via endoscopy ($n = 6$, 37.5%), percutaneous access ($n = 5$, 31%) or bilioenteric anastomosis ($n = 1$, 6.25%). One patient needed a percutaneous Yamakawa prosthesis postoperatively.

Results: Mean operative time was 126 min. There were no intraoperative complications. In one patient conversion to open surgery became necessary because of extensive adhesions. The only postoperative complication was bleeding from a trocar site requiring reintervention; there was no mortality. Median postoperative hospital stay was 7 days. Delayed gastric emptying was observed in 3 (18.7%) patients. Median survival was 87 days after the operation. All patients died from their primary disease but could maintain oral intake during the remaining survival time.

Conclusions: We conclude that laparoscopic gastrojejunostomy and endoscopic or percutaneous biliary stenting provide a good functional result while impairing the quality of life only to a minimal extent.

Key words: Gastric outlet obstruction — Laparoscopic gastrojejunostomy — Endoscopic biliary stent replacement

struction also present with cholestasis due to compression or infiltration of the distal common bile duct. A few decades ago, the only therapeutic possibility for palliation and relief from symptoms was gastroenterostomy and bilioenteric anastomosis via laparotomy [28]. This operation mostly provided satisfying functional results but is quite invasive. It is related to a considerable period of hospitalization and to pain, discomfort, and possible complications that can accompany laparotomy. In the last few years, endoscopic and percutaneous techniques [1, 9] for introduction of biliary wallstents have been developed by gastroenterologists [10] in search of less-invasive palliation modalities of cholestasis.

In the surgical field, the effort to reduce operative trauma resulted in development of minor access or laparoscopic operations. While laparoscopic surgery for malignant disease with curative intention is still discussed controversially [7, 8] palliative laparoscopic procedures are of special benefit for the patient who in general has a very short life expectancy. The advantages of laparoscopic surgery, i.e., reduced pain, a fast recovery, and short hospital stay, allow the surgical procedure to interfere as little as possible with quality of life. If an obstruction is found to be located in the esophagus or cephalad part of the stomach, laparoscopic placement of a feeding catheter into the stomach or jejunum is a minimally invasive alternative for those patients in which endoscopy is not possible because the stenosis cannot be passed with the endoscope [11, 15, 22]. If obstruction occurs in the distal third of the stomach or the duodenum, laparoscopic gastroenterostomy can assure rapid relief of symptoms and allow the patient to be discharged within a few days under oral nutrition [2, 12, 13, 18, 23, 29].

Our current policy is to submit patients with malignant, incurable cholestasis and gastric outlet obstruction to endoscopic placement of a biliary stent for relief from jaundice, followed by laparoscopic gastroenterostomy to allow further oral nutrition.

Most patients with incurable, malignant gastric outlet ob-

Patients and methods

The data on 16 patients who were submitted to laparoscopic gastroenterostomy at the Surgical Department of the Technical University, Munich, between 1993 and 1995 were retrospectively analyzed. The outcome variables assessed included operative time and intraoperative complications, procedure-related morbidity and mortality, postoperative hospital stay, overall survival, and the ability to sustain oral nutrition during the survival period. A follow-up to determine survival after the operative procedure could be obtained in all patients.

There were nine men and seven women with a mean age of 66.5 years (range 37–87). In all patients indication for the gastrointestinal bypass was given by gastric outlet obstruction due to incurable malignant disease. The primary disease was pancreatic carcinoma ($n = 7$), gallbladder carcinoma ($n = 4$), distal gastric carcinoma ($n = 2$), Klatskin tumor ($n = 1$), carcinoma of the papilla ($n = 1$), and intraabdominal lymph node metastasis from a bronchial carcinoma ($n = 1$). Inoperability of the pancreatic tumors was assessed by endoscopy with endoluminal ultrasound, ERCP, CT scan, angiography, and MRI. Workup of the other patients did not include angiography and MRI. Biopsies were obtained whenever possible. Impaired gastric emptying was ascertained clinically as well as radiologically and/or by endoscopy. Patients with extensive previous abdominal surgery or uncorrectable coagulopathy were not considered suitable for the laparoscopic procedure.

Because of the short life expectancy, mainly plastic stents were used for biliary palliation. When endoscopic biliary stent implantation was not possible in the presence of biliary and duodenal obstruction, a percutaneous transhepatic tube with a diameter of 14–18 Fr was inserted through the common bile duct and the duodenal stenosis with the tip reaching the duodenojejunal junction. This tube (a Yamakawa prosthesis) was blocked at the skin level, providing internal biliary drainage [16]. Whenever this was not possible, the patient was referred to open gastroenterostomy with bilioenteric bypass.

Only four patients did not present with initial cholestasis (two gastric carcinoma, one distal pancreatic carcinoma, and one gallbladder carcinoma). The other 12 patients (80%) showed biliary obstruction that was treated preoperatively by biliary stent placement via endoscopy ($n = 6$) or a percutaneous access ($n = 5$). In one patient open bilioenteric bypass had been previously performed at another institution 4 months before admission for gastroenterostomy. One patient with gallbladder carcinoma developed cholestasis on the 6th postoperative day and was treated by percutaneous placement of a Yamakawa prosthesis. During the study period, three patients had to be referred to open gastroenterostomy with bilioenteric bypass: two because of extensive previous surgery and one because of the inability to place a biliary stent endoscopically or percutaneously.

Cholestasis parameters (bilirubin, γ -GT, and alkaline phosphatase [AP]) were compared the day before endoscopic stent placement and the day before the operation to evaluate relief from biliary obstruction.

Laparoscopic gastrojejunostomy was performed as an antecolic, isoperistaltic side-to-side anastomosis with an enteroenterostomy 25 cm below the gastrojejunostomy to assure sufficient biliary drainage from the afferent loop and avoid exposure of the gastric anastomosis to bile acids. This is the procedure we are using in open surgery. The operation was performed under general anesthesia with the patient in supine position. The stomach and bladder were catheterized and antibiotic single-shot prophylaxis with 1 g ceftriaxone was given. Four trocars (three 10 mm and one 12 mm) were placed as described in Fig. 1. As the laparoscope must sometimes be moved to the upper ports for creation of the enteroenterostomy, we always use 10-mm trocars. The table was tilted in a 30° Trendelenburg position and the transverse colon and omentum were swept cephalad to identify the ligament of Treitz. From there, the first mobile jejunal loop was brought up in an antecolic way to the stomach, where it was fixed to the antrum at the anterior greater curvature with two stay sutures. The openings for insertion of the stapler jaws were made in the stomach and small bowel using electrocoagulation (Fig. 2).

A 30-mm Endo-GIA stapler (USSC, Norwalk, CT) was introduced through the 12-mm trocar in the right middle abdomen. The jaws of the instrument were inserted in the stomach and small bowel (Fig. 3). Care had to be taken to place the stapler on the antimesenteric side in the small bowel to avoid bleeding into the anastomosis. Two subsequent applications of the 30-mm stapler were necessary to ensure a sufficiently wide diameter of the gastroenterostomy. Alternatively, a 60-mm stapling device may be used, the handling of which may be cumbersome due to instrument length. The nasogastric tube was placed in the afferent loop below the anastomosis under laparoscopic control. The remaining opening was closed by manual

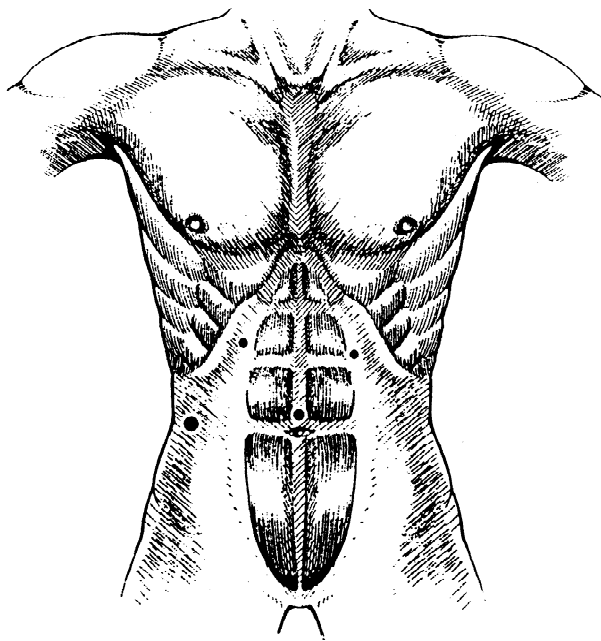


Fig. 1. Trocar placement for laparoscopic gastroenterostomy.

suture (Fig. 4). The same technique was used for the enteroenterostomy, where one application of the 30-mm Endo-Gia usually provided a sufficiently wide anastomosis. Leakage of both anastomoses was excluded at the end of the procedure by instillation of methylene blue via the nasogastric tube under laparoscopic control.

A Robinson drain may be left at the anastomosis. A liquid diet was started on the 3rd postoperative day and progressively increased to normal oral nutrition. Radiographic control of the anastomosis with water-soluble contrast medium was performed on the 4th postoperative day to assess patency and exclude leakage.

Results

Median interval between biliary stent placement and gastroenterostomy was 70 days (3–630). In eight patients biliary stenting was performed during the same hospital stay as gastroenterostomy. Preoperative relief from cholestasis is reflected in a decrease of bilirubin, γ -GT, and AP as shown in Table 1.

Mean operative time was 126 min (70–210). No major intraoperative complications were noted. In one patient, conversion to laparotomy became necessary due to technical difficulties caused by severe adhesions; the further postoperative course of this patient was uneventful.

The Robinson drain was left in place for a mean of 4.7 days (2–8). There was no postoperative mortality. One patient (6.25%) required operative reintervention for postoperative hemorrhage from a trocar incision. Postoperative radiographic control of the anastomosis showed delayed gastric emptying (DLE) in three patients (18.75%) due to swelling and edema of the anastomotic region. Clinically, the signs of DLE were only mild in these patients who all could be discharged under oral nutrition. There was no anastomotic leakage or intraabdominal abscess.

Median postoperative hospital stay was 7 days (3–32). At follow-up, median survival was revealed to be 87 days (31–259). There was no readmission for complications related to stent placement or the operative procedure. All

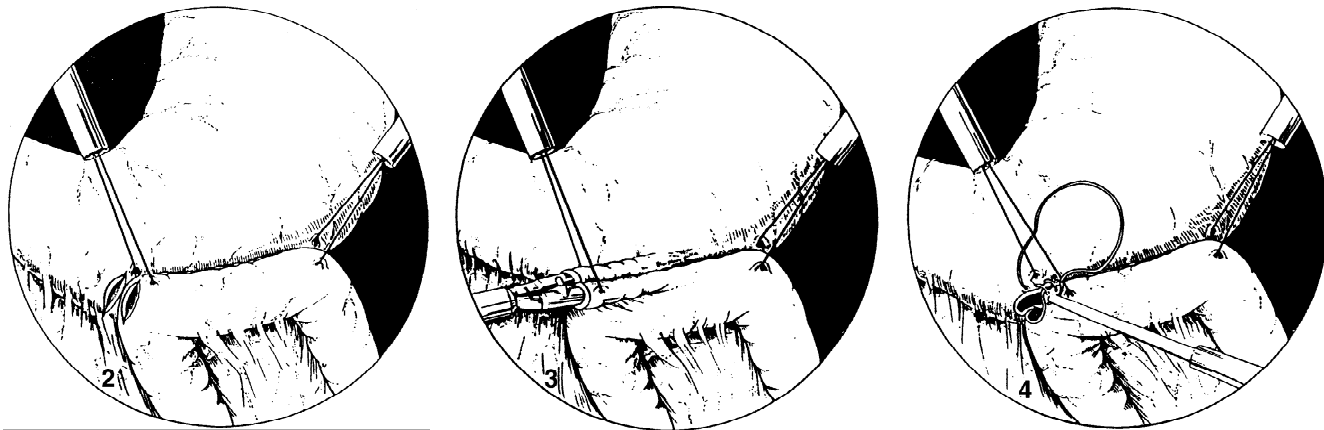


Fig. 2. The jejunum is fixed to the greater curvature with stay sutures and openings for insertion of stapler jaws are created using electrocoagulation.

Fig. 3. Stapler jaws are placed in stomach and small bowel.

Fig. 4. Closure of opening left after stapler removal of manual suture.

patients had died from their underlying disease and had been able to sustain oral nutrition for the whole surviving period.

Discussion

Patients with incurable malignant disease presenting with biliary obstruction and/or impaired gastric emptying have a very poor prognosis [3, 5, 19]. The only therapeutic objective is rapid relief from symptoms with as little interference with the quality of life as possible. In the last decades, surgical palliation with bilioenteric bypass and gastroenterostomy has been the method of choice for patients presenting with both symptoms [3, 14, 27].

Although providing quite satisfactory results, open gastroenterostomy has been associated with delayed gastric emptying in up to 16% [3]. It also carries the risk and discomfort of a laparotomy. The mortality of this operation ranges between 8% and 17%; the morbidity is around 25%, with a rate of reintervention of 8% [3, 14]. Survival is between 130 and 200 days [3, 14].

Whether to perform a gastric bypass "in principle," i.e., in all patients undergoing bilioenteric anastomosis regardless of whether they present the clinical symptoms of gastric outlet obstruction or not, or to add gastroenterostomy "of necessity" only in patients with impaired gastric emptying has been discussed by many authors [3, 14, 20, 27]. Neuberger et al. state that after biliary bypass only in 474 patients, secondary reoperation for gastric obstruction was necessary in 12% and carried a 25% mortality while complication rates after combined biliary and gastric bypass were not significantly higher than after biliary bypass alone; they therefore advocate adding gastric bypass in principle. Sarr et al., find similar results with 13% reoperation. Other authors [3, 26] found morbidity after prophylactic bypass to be increased and therefore do not recommend it.

Since reduction of the operative trauma has gained considerable importance with the introduction of laparoscopic surgery, indications for this technique have been expanded. As gastroenterostomy only requires reconstruction, the problem of organ retrieval from the abdominal cavity did

Table 1. Decrease of cholestasis parameter after placement of a biliary stent (mean values)

Cholestasis parameter	Before stent	After stent
Total bilirubin (mg/dl)	15.1 (2.9–35.6)	5.6 (1.0–7.5)
γ -GT (U/l)	574 (311–1,670)	250 (31–588)
AP (U/l)	1,093 (430–2,250)	401 (154–658)

not arise. While laparoscopic surgery for curative purposes in abdominal malignancies is still in discussion, the value of laparoscopy as a palliative procedure is generally recognized. Therefore, several authors have started to perform gastroenterostomy routinely via laparoscopic access [2, 12, 13, 18, 23, 29].

Surgical treatment of biliary obstruction with bilioenteric anastomosis was the only alternative until the development of endoscopic stent techniques. For open biliary bypass, Rooij et al. have published a postoperative mortality of 5.3%, a complication rate of 18.4%, reinterventions in 5.2%, and a mean survival of 244 days. Redmond et al. noted a mortality of 2%, morbidity of 35%, and reinterventions in 2% of patients. Neuberger et al. have observed a mortality of 27%, a procedure-related morbidity of 13%, a reintervention rate of 12%, and a mean survival of 279 in a study including 474 patients with bilioenteric bypass.

Endoscopic or percutaneous biliary stenting offers several advantages over surgical biliary bypass. Usually it will be performed via endoscopic retrograde cholangiography (ERC). Whenever passage of the endoscope through the pylorus and proximal duodenum is not possible because of tumor compression and infiltration, a percutaneous access under radiological control is attempted. It does not require general anesthesia and is not as invasive as a laparotomy, but the method is also associated with certain risks. Even though the self-expandable metal wallstents seem to obstruct less than previously described polyethylene stents [9], the rate of recurrent jaundice is ranging from 5% [9, 24] to 24% [6]. This complication can mostly be treated by re-endoscopy. When the endoscopic approach fails due to duodenal obstruction, insertion of a percutaneous transhepatic tube (Yamakawa prosthesis) bridging the biliary and duo-

denal obstruction provides an effective internal biliary drainage [17]. Complication rates of biliary stenting are between 15% [21] and 31% [6]. The procedure-related mortality rate is 1–4% [10, 24]. This compares favorably with open surgical biliary bypass, especially when survival is expected to be less than 6 months [25].

In an attempt to achieve optimal palliation with minimal discomfort and risk for the patient, we have adopted the strategy of submitting patients with malignant gastric outlet obstruction and cholestasis to biliary stenting followed by laparoscopic gastroenterostomy. Our experience showed that preoperative biliary stenting provided fast relief from jaundice. The operative time was somewhat longer than it would have been in open surgery but, at slightly more than 2 h it is still acceptable. There was no intraoperative complication: Conversion to laparotomy was not to be considered a complication but rather a decision assuring safety for the patient because of the technical difficulty. The procedure-related morbidity requiring reintervention was 6.6% being a postoperative hemorrhage from a trocar incision. The mild delayed gastric emptying observed in three patients (18.75%) occurred with a similar frequency to that described for open surgery. The follow-up showed that gastrointestinal passage remained unhampered for the rest of the survival period in all patients.

As laparoscopic biliodigestive anastomosis is feasible but technically extremely demanding [12], the patients presenting with cholestasis due to obstruction of the common bile duct in whom preoperative endoscopic placement of a stent is not possible should be referred to open surgery. Also, patients with portal hypertension and coagulation disorders are not very suitable candidates for the laparoscopic procedure. Previous abdominal surgery is a relative contraindication. In any case, the surgeon must have sufficient experience in laparoscopy, especially with laparoscopic suturing techniques.

Even though our actual experience is still limited, our preliminary results seem to demonstrate that our therapeutic policy, which consists in preoperative biliary stenting and consecutive laparoscopic gastroenterostomy, achieves results that are at least equal to those of conventional surgery. At the same time, the patient has the benefit of the laparoscopic procedure, which, as has been proven for other operations [4], is associated with less pain and a shorter recovery time. This is of major importance since life expectancy is very short for these patients. It will hopefully be confirmed by further studies including a larger number of patients. Within these limits, laparoscopic gastrojejunostomy for palliation of impaired gastric emptying seems to be the method of choice in the hands of an experienced laparoscopic surgeon.

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