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Laparoscopic wedge resection for benign gastric tumors

M. Röthlin,[1] O. Schöb[2]

[1] Department of Surgery, Klinik für Viszeralchirurgie, Universitätsspital, Rämistrasse 100, CH-8091 Zürich, Switzerland
[2] Surgical Clinic, Spital Limmattal, CH-8952 Zürich, Switzerland

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Abstract
Background: Both laparoscopic wedge resection and formal laparoscopic resection are used in the treatment of benign and malignant gastric diseases.
Methods: We performed totally laparoscopic wedge resection using stapling devices and three or four trocars. *Patients:* Four patients were treated with this technique. All four suffered from gastrointestinal stromal tumors (GIST), and one presented with an additional gastric adenoma. Two were morbidly obese, and two had additional operations performed at the same time. Two patients were admitted for acute upper GI bleeding.
Results: All of the tumors were removed successfully. Operating time ranged from 135 to 215 min. Oral feeding commenced on days 2–4. Postoperative hospital stay ranged from 5 to 11 days.
Conclusion: Laparoscopic wedge resection of benign gastric tumors is a safe, reliable method that should be further investigated and used on a broader scale.

Key words: Gastrointestinal stromal tumor — Gastric adenoma — Laparoscopic wedge resection — Gastric resection

Benign gastric tumors are rare. They account for only 5% of all resected gastric tumors, and in the case of gastrointestinal stromal tumors (GIST), they represent only 1% of all tumors. Because GIST is generally a benign condition, a formal gastrectomy is not necessary, as long as the tumor can be resected locally without causing stenosis of the gastric lumen. Local excision of these tumors via the laparoscopic approach was first described in 1992 [6]. Since then, only a few case reports and small series have been published [1, 3, 5, 7, 8]. At the Department of Surgery of Zürich University Hospital, we recently operated on a small series of four patients suffering from five benign tumors, which are the subject of this report.

Correspondence to: M. Röthlin

Case reports

Case 1

A 48-year-old woman (BMI, 22) was referred to our unit with the diagnosis of an intramural tumor 4–5 cm in diameter of the small curvature of the stomach that had been bleeding profusely. The bleeding had been stopped by endoscopic sclerotherapy.

At operation, the tumor was found to originate from the anterior wall of the stomach close to the small curvature. Using a stapling device for excision would have resulted in the creation of a severe "hourglass" stomach. We therefore employed a four-trocar technique and open excision of the tumor by electrocautery. The resulting defect in the gastric wall was sutured intracorporeally using two layers of running 4/0 PDS sutures. A jejunal feeding tube was placed orally for early enteric feeding. The tumor was removed through the trocar incision in the right pararectal position. A drain was placed close to the suture line and pulled out through the 5-mm trocar site in the left subcostal position. The operating time (cut–suture time) was 135 min.

Oral feeding was commenced on the 2nd postoperative day. Pain medication consisted of 42 mg of nicomorphine in 2 days and 12 g of paracetamol. The patient left the hospital on the 5th postoperative day.

Case 2

A 74-year-old man (BMI, 35) was referred to our unit in hypovolemic shock caused by Forrest Ia bleeding of a 4-cm intramural tumor of the small curvature. We attempted to stop the bleeding by endoscopic means, but the results were inadequate. The patient was then transferred to our ICU for

transfusion therapy and correction of his coagulopathy (with the continuous use of NSAR). The bleeding was consequently stemmed, and the patient's coexisting diseases—i.e., diabetes mellitus and cardiac insufficiency—were treated before he underwent laparoscopic resection 2 days later.

A four-trocar technique, placing the trocars in a diamond arrangement, was employed. The tumor was found to occupy the entire small curvature from the cardia to the angle of the stomach. It was positioned slightly on the posterior aspect of the stomach. The smaller omentum was incised at the angle, and all the blood vessels and the vagal nerve were divided between clips. The tumor was partially mobilized by transsecting the stomach with a stapling device (Endo-GIA 35; Ethicon, Spreitenbach, Switzerland). The tumor was then lifted with a grasper, and the dense adhesions to the retroperitoneum were divided. The left gastric artery was isolated and divided with a vascular stapler (Endo-GIA 30, Ethicon) where it entered the tumor. Subsequently, the small curvature was cleared from vessels above the tumor, and a 48-French bougie was placed in the esophagus. The stomach was then transsected with the stapler along the tumor. The tumor was removed through the trocar site in the right upper quadrant with an endo-bag (Ethicon). A drain was placed near the suture line through a separate incision. Operating time was 195 min.

Oral feeding was started on postoperative day 4, but it progressed slowly due to delayed gastric emptying. However, no dilatation of the pylorus was required. Pain medication consisted of 60 mg of nicomorphine and 7.5 g of paracetamol. The patient was discharged on postoperative day 11.

Case 3

A 73-year-old woman (BMI, 23) underwent gastroscopy because of anemia. Both a broad-based adenoma and a leiomyoma of the posterior wall were diagnosed. Comorbidity consisted of coronary heart disease (NYHA III).

The patient underwent laparoscopic resection of the tumors and cholecystectomy for concomitant cholelithiasis. Due to the cholelithiasis, the trocars were positioned in the manner normally used for cholecystectomy (French technique). After removal of the gallbladder, the lesser omentum was incised, and the subserous leiomyoma was identified posterior to the cardia. The stem of the pendulant tumor was ligated with an endo-loop (Ethicon) and removed. Intraoperative endoscopy helped us to locate the adenoma on the posterior wall. The stomach was incised next to the tumor and the polyp rotated outside. A tangential excision of the gastric wall, including both tumor and gastrotomy, was performed with a stapler (Endo-GIA 35; Ethicon). The tumor was removed via an endo-bag (Ethicon). After placement of a drain in the lesser sac, the operation was terminated after 165 min.

The patient commenced oral feeding on the 2nd postoperative day. Pain medication consisted of 40 mg of tramadol and 13.5 g of paracetamol. The patient was discharged on postoperative day 7.

Case 4

A 51-year-old man (BMI, 44) was referred to our unit because of recurring biliary colic and an umbilical hernia. The patient was a longstanding alcoholic who suffered from alcohol-induced chronic pancreatitis, including the formation of pseudocysts. Preoperative gastroscopy revealed an intramural tumor of the posterior wall of the stomach measuring 4 cm in diameter.

For the operation, the standard distribution of trocars for laparoscopic cholecystectomy was used. After removal of the gallbladder, the greater omentum was incised near the great curvature of the stomach, and the lesser sac was inspected. A subserous pendulant tumor with a broad base was identified and pulled through the opening in the omentum. The base was divided with an Endo-GIA (Ethicon). After removal of the tumor through the incision at the navel via an endo-bag (Ethicon), a drain was placed behind the stomach. A hernioplasty of the umbilical hernia was performed before closure of the incisions. Operating time was 215 min.

Oral feeding was started on the 3rd postoperative day. Pain medication consisted of 120 mg of tramadol and 8 g of paracetamol. The patient left the hospital on the 7th day.

Discussion

Wedge resection with a free margin of 2–3 cm is considered adequate treatment for benign tumors and in particular for GIST of the stomach [5]. The development of endoscopic stapling devices has made laparoscopic wedge resection an interesting and desirable alternative to the conventional open approach. Several case reports and small series have demonstrated that GIST [1, 5, 6, 7], as well as other benign tumors [3, 8], can be resected in this fashion.

It might seem problematical that the nature of GIST cannot be determined intraoperatively by frozen section. A small series of patients treated for leiomyosarcoma of the stomach laparoscopically suggests that low-grade leiomyosarcomata can be treated adequately by laparoscopic wedge resection, whereas high-grade tumors are more likely to benefit from formal gastrectomy [2]. All our cases were shown to be benign in retrospect, and no further treatment was necessary.

The technique of laparoscopic wedge resection is particularly helpful in obese patients. Problems with wound infection and prolonged wound healing are mostly nonexistent, the visualization of intraabdominal structures is improved, and postoperative recovery is faster. These findings are in agreement with those of Naitoh and Gagner [7]. They suggest that use of the Dexterity sleeve might accelerate the operation and shorten the operation time, but it is by no means a necessity. The operating time is longer than that for the open technique [4] but not excessively so. In our patients, the operating time was also longer because the patients had additional operations—i.e., cholecystectomy and umbilical hernia repair—or because two tumors were removed.

The problem of postoperative delayed gastric emptying, as seen in one of our patients, has been described by others [3]. In their cases, the problem was traced to preoperative

pyloric obstruction by the tumor; in our cases, it was because we were forced to remove part of the vagal nerve with the tumor. In none of the cases was any invasive procedure necessary for the treatment of this condition. A postoperative hospital stay of 5–11 days, as seen in our cases, seems very conservative in comparison with other reports [1, 3, 5, 8], but it is similar to the results of a group from Taiwan [4]. With further experience, we can expect to shorten the postoperative hospital stay even more, even though it is already shorter than that for open surgery, as was suggested by the Taiwan group [4]. In accordance with their results, we found that a very low total dose and a short course of pain medication was sufficient and that oral intake was possible soon after laparoscopy.

In conclusion, laparoscopic wedge resection seems to be a safe, oncologically adequate technique to remove benign tumors of the stomach. This method should be investigated further because of its potential advantages in terms of reduced postoperative pain, earlier oral intake, shorter hospital stay, and improved cosmesis.

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