



Innovation in Surgical Technique

Intragastric Laparoscopic Surgery: An Option for Gastric Lesions not Resectable by Endoscopy[☆]



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A B S T R A C T

Gastric mucosal and submucosal lesions can be resected by endoscopy, laparoscopy or open surgery. Operative methods have varied depending on the location, endophytic growth and size of the lesion.

Interest in minimally invasive surgery has increased and many surgeons are attempting laparoscopic approaches, especially in lesions of the stomach near the esophagogastric junction not amendable to endoscopic removal, because conventional surgery can produce stenosis and distort the postoperative anatomy, and increase morbimortality.

We report our experience with laparoscopic intragastric surgery in 3 consecutive patients, with no complications.

Laparoscopic intragastric surgery extends the surgeons' armamentarium to resect complex gastric lesions, while offering patients the benefits of minimal access surgery.

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Cirugía laparoscópica intragástrica: una opción en lesiones gástricas no resecables endoscópicamente

R E S U M E N

Las lesiones mucosas y submucosas gástricas pueden abordarse por vía endoscópica, laparoscópica o por cirugía abierta. El tamaño, la localización y el tipo de crecimiento son determinantes a la hora de la elección de la técnica.

El interés en la cirugía mínimamente invasiva ha llevado a desarrollar nuevos abordajes para suplir las dificultades de la laparoscopia tradicional, como puede ser el caso de la resección de lesiones próximas a la unión esofagogástrica no resecables endoscópicamente, donde la cirugía convencional puede producir estenosis o deformidades posoperatorias y aumento de la morbimortalidad.

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Presentamos nuestra experiencia en el abordaje de este tipo de lesiones mediante cirugía laparoscópica intragástrica en 3 pacientes consecutivos, con resultado satisfactorio.

Este tipo de intervención supone un abordaje más en el arsenal de la cirugía mínimamente invasiva, que puede proporcionar ventajas frente a la cirugía tradicional.

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Introduction

Small size gastric mucosal and submucosal lesions can be removed endoscopically, laparoscopically or with an open approach. The choice of technique depends on the size, location and growth type of the lesion. Developments made in minimally invasive surgery and technological advances have led us to explore new approaches to overcome the difficulties found in traditional laparoscopy.

Possible indications for these new techniques would be gastric lesions that, due to their location, size or thickness, are not resectable by endoscopy, as well as those that require extensive gastrotomies or those that are located in a complicated region, such as the oesophagogastric junction (OGJ).

Surgical Technique

Below, we review our experience with an intragastric laparoscopic approach in 3 consecutive patients. All the patients were informed about the details of the procedure they were to undergo, as well as the fact that they would be the first cases.

Indication for the procedure was determined by the presence of gastric, mucosal or submucosal lesions that were noncancerous, proximal to the OGJ and endoscopically unresectable.

In all the cases, prior to the placement of 3 trocars in the peritoneal cavity, another 3 trocars with balloons were inserted in the interior of the stomach in the area of the gastric body. Once the lesion was located, the submucosa was infiltrated with adrenalin and resected, including the entire thickness of the wall, with an ultrasonic scalpel. The wall defect was closed with a manual suture in 2 planes, and the specimen was extracted through one of the gastrotomies.

One of the disadvantages of this procedure is the loss of "gastroperitoneum" when the gastric wall is opened. In the case of lesions situated on the posterior gastric side, there was no gas leak to the peritoneal cavity because the lesion was located in the retroperitoneal gastric portion. On the contrary, when the serosa was opened in an intraperitoneal area and the stomach collapsed from the pressure of the pneumoperitoneum, we were able to recover the gastric distension by opening one of the trocars located in the peritoneal cavity (not one of the intragastric ones) and increasing the gas flow into the stomach.

Patient 1

A 77-year-old woman underwent oesophagogastrroduodenoscopy (OGD), which had detected a submucosal lesion measuring 3.5 cm in the gastric fundus (Fig. 1A and B).

Intragastric resection was carried out with 3 trocars following the previously described technique. The histology study confirmed it as a gastrointestinal stromal tumour (GIST) measuring 4 cm×2.2 cm×1.5 cm that was well differentiated, very low risk and had free margins (pT2). The patient was discharged on the 5th day post-op with no complications.

Patient 2

In a 71-year-old woman, OGD identified a 7-cm polyp with lateral growth that was vegetative and situated in the infracardiac region. Biopsy was compatible with a hyperplastic polyp with low-grade dysplasia (Fig. 1C). Intragastric resection was performed of a polypoid lesion measuring 10 cm×5 cm×3 cm. The histology study confirmed a hyperplastic polyp with foci of low-grade dysplasia and free surgical margins. The patient was discharged on the 7th day post-op without incident.

Patient 3

OGD diagnosed an infracardiac semi-pedunculated lesion in a 70-year-old male that measured 3 cm and was probably submucosal in origin (Fig. 1D). Intragastric resection was done of the submucosal tumour and the histopathology defined it as a 4 cm GIST with free margins and moderate risk (pT2) (Fig. 2). The patient was discharged on the 5th post-op day without complications.

Discussion

Since its initial description by Ohashi in 1995,¹ intragastric laparoscopic surgery has provided an additional option for the approach of gastric lesions, both mucosal as well as submucosal, which are not endoscopically resectable.

In the case of endophytic lesions proximal to the OGJ or located at the posterior side of the stomach, it may be necessary to resect this junction, which can have long-term digestive consequences due to stenosis or postoperative deformities. In addition, these procedures are associated with considerably increased morbidity and mortality, even in expert hands.² The location and type of growth observed on OGD are fundamental for establishing surgical indication.²⁻⁴

In our opinion, this is most useful in 2 situations: (1) lesions that are proximal to the OGJ, whose excision by laparotomy or conventional laparoscopy would necessitate extensive gastrotomy very close to this junction, or may even require resection; (2) lesions with submucosal growth in the upper part of the posterior side of the stomach, which would equally require extensive gastrotomy.



Fig. 1 – (A and B) Oesophagogastroduodenoscopy (patient 1): submucosal lesion in gastric fundus compatible with GIST; (C) OGD (patient 2): predominantly exophytic polyp in the infracardiac region; (D) OGD (patient 3): infracardiac lesion of probable mucosal origin.

Size can be a limitation in this type of intervention when extracting the surgical specimen through the incision in the stomach, but this is basically due to the possible deformity of the OGJ after closure of a large defect. In our series, the largest

surgical specimen was 10 cm, which corresponded with a polyp that was extracted by widening one of the gastrotomies and the skin incision. This increased the surgical time and may increase the morbidity related with the technique,

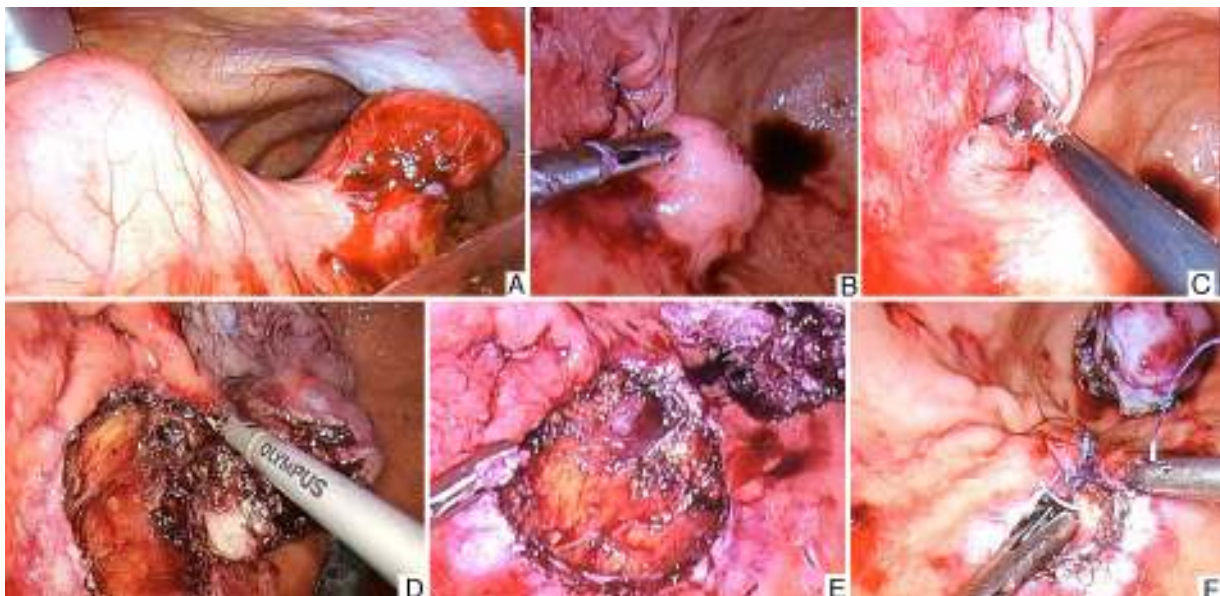


Fig. 2 – Surgical intervention of patient 3: (A) placement of intragastric trocars; (B) image of the lesion; (C) identification of the OGJ; (D) resection with harmonic scalpel of the lesion; (E) full-thickness defect after exeresis; (F) defect closure.

although it is still probably lower than the morbidity associated with conventional OGJ surgery.

The advantage in intragastric surgery is obtained with a distended stomach, which allows the surgeon to manoeuvre close to the lesion with relative ease and to conduct gastrotomies far from the OGJ, although accessing it easily. The technique with several intragastric trocars, as described in our series, provides good visualisation and optimal triangulation of the instruments, which facilitates suturing for closure of the defect.

Other techniques have been reported for the intragastric approach, such as single-port³ (whose main limitation is the lack of triangulation, which makes the technique more difficult) or intragastric stapling² (which is a rapid technique that minimises the risk of gastric perforation associated with resection using electronic instruments). The latter technique requires special care to achieve free resection margins, which is an essential point in GIST and in tumours of uncertain benign nature, which is practically impossible to achieve proximal to the OGJ.

In order to achieve optimal access of the OGJ, the trocars should be situated in accordance with the principles of general laparoscopy where, when compressed with a hand, the abdominal wall is in contact with the anterior gastric wall, and at least 3 cm apart.⁵ After exeresis of the lesion, the suture of the defect versus the absence of closure described in the initial technique¹ has demonstrated faster healing of the mucosa and a decrease in postoperative use of proton pump inhibitors.⁶

There is some controversy about the need for OGD during intragastric resection, since some published articles consider it necessary to locate the lesion, insert ports, assist intragastric resection, extract the specimen through the mouth and test the resection area.⁴ In our case series, this was not necessary because the lesions were clearly identified during the operation and the extraction of the specimens was done through one of the gastrotomies used for the insertion of the trocars.

Therefore, the intragastric laparoscopic approach provides for the excision of mucosal or submucosal lesions, either benign or premalignant, that are not endoscopically resectable. This type of resection is another approach in the arsenal of

minimally invasive surgery that can provide advantages over traditional laparoscopy, such as avoiding resection of the OGJ in proximal lesions as well as extensive gastric resections in posterior gastric wall lesions, and diminished morbidity associated with these procedures.²

We put forth our initial surgical experience with this innovative technique in 3 consecutive cases that were satisfactorily resolved by taking advantage of the benefits of minimally invasive surgery. However, more extensive studies would be necessary to compare it with conventional surgical procedures and assess possible limitations for its indications, especially in terms of size. These studies can be difficult to conduct due to the low prevalence of this type of lesions.

Conflict of Interests

The authors have no conflict of interests to declare.

REFERENCES

1. Ohashi S. Laparoscopic intraluminal (intragastric) surgery for early gastric cancer. A new concept in laparoscopic surgery. *Surg Endosc.* 1995;9:169-71.
2. Conrad C, Nedelcu M, Ogiso S, Aloia TA, Vauthey JN, Gayet B. Techniques of intragastric laparoscopic surgery. *Surg Endosc.* 2015;29:202-6.
3. Choi CI, Lee SH, Hwang SH, Kim DH, Jeon TY, Kim DH, et al. Single-incision intragastric resection for upper and mid gastric submucosal tumors: a case-series study. *Ann Surg Treat Res.* 2014;87:304-10.
4. Tagaya N, Tatsuoka T, Kubota Y, Takegami M, Sugmata N, Saito K, et al. Intragastric surgery using laparoscopy and oral endoscopy for gastric submucosal tumors. *World J Gastrointest Endosc.* 2015;7:53-8.
5. Choi. Laparoscopy in the management of gastric submucosal tumors. *Surg Endosc.* 2000;14:741-5.
6. Yumiba T, Ito T, Ikushima H, Taniguchi E, Inoue Y, Nishida T, et al. Effect of mucosal suture on the healing of mucosal defect in laparoscopic intragastric surgery. *Gastric Cancer.* 2003;6:96-9.