

# Cooperative Endoscopic Laparoscopy: a new alternative for management of early gastric cancer

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## Abstract

Usually early gastric cancer is treated by submucosal resection, but for a case in which the lesion is very large, is located in a very difficult place for resection, or has a very aggressive histological pattern, a gastrectomy is indicated. This procedure is too mutilating and results in poor patient quality of life. For these cases cooperative endoscopic laparoscopy may be a new alternative for management of the condition. This series of cases presents our hospital's experience with this technique and shows the variables faced with the procedure so that it can be applied elsewhere in our country.

## Keywords

Early gastric cancer, laparoscopy, endoscopy, submucosal dissection.

## INTRODUCTION

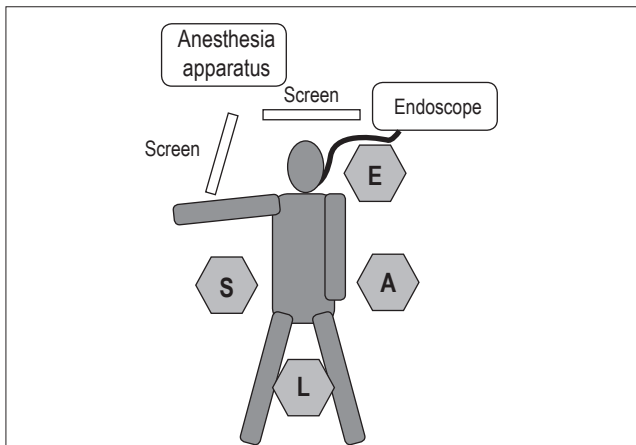
Advanced gastric cancer is the malignancy with the highest mortality rate in our environment, hence the importance of detecting it during its early stages during which survival rates are very high (1). Traditionally, treatment with the intent to heal early gastric cancer is surgical, but approximately 15 years ago endoscopic submucosal dissection (ESD) began to be accepted as the current treatment of choice (2). However, the first treatment causes mutilation and results in poor patient quality of life. Also, ESD, is expensive and the learning curve is steep, moreover, since it is not widely available, other alternatives such as combinations of surgery and endoscopy are often resorted to (3). Cooperative surgery combining laparoscopic and endoscopic techniques is a method which can be used to manage sub epithelial lesions. It consists of locating the lesion through endoscopy and then resecting it through laparoscopy. Many studies have been published about the utility of this technique for subepithelial lesions. It has been suggested for management of early gastric cancer, and has

had positive results in the small number of cases published (4-6). Several techniques have been described including laparoscopic and endoscopic cooperative surgery (LECS), non-exposed endoscopic wall-inversion surgery (NEWS), combination of laparoscopic and endoscopic approaches to neoplasia with a non-exposure technique (CLEAN-NET), and EFTR (endoscopic full-thickness resection).

## SURGICAL PROCESS

With the patient under general anesthesia (Figure 1) the endoscope is introduced. The lesion is located in the gastric mucosa under direct endoscopic view. A two mm margin around the tumor is then marked with a pointed papillotome. This process can partially dissect and free the lesion. The surgeon then performs the laparoscopy and identifies the site of the lesion in the external face of the stomach with the help of endoscopy. There are two important variations in the technique at this point: a gastrostomy can be performed to trap the lesion with the LECS technique (Figure 2), or the stomach can remain closed and the CLEAN-

NET technique can be used. In this case the point of the papillotome is placed in the center of the serous membrane to remove the lesion. In both techniques, the next step is stapling the lesion under direct endoscopic view. This ensures that the entire lesion has been resected and that the margins of the cut are adequate. Finally, the endoscope is used to verify that there are no perforations and the stomach opening is adequate to avoid stenosis.

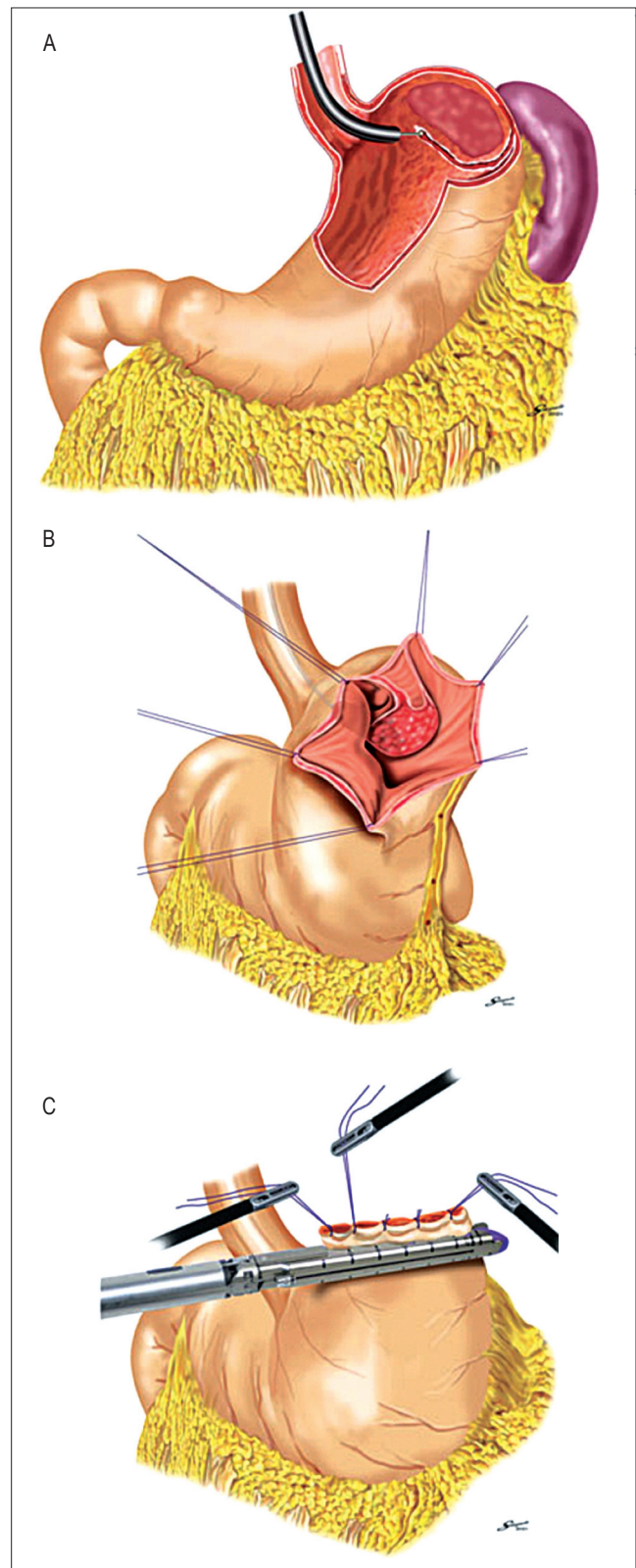


**Figure 1.** Staff positioning in the surgical room to perform LECS - S: surgeon, E: gastroenterologist, A: assistant, L: laparoscopist.

Next, we present the experience at the Hospital El Tunal with four patients: three men and one woman. Their average age was 64.7 years. Three tumors were located in the distal stomach and one in the proximal stomach. There were two Type I lesions (Figures 3 and 4) and two Type III ulcerated lesions (Figures 5 and 6). All lesions were early (within the upper third of the submucosa: SM1). Two lesions were resected using the LECS technique, and the other two were resected using the CLEAN-NET technique (Figures 7, 8 and 9). All patients were discharged 48 hours after procedures were performed.

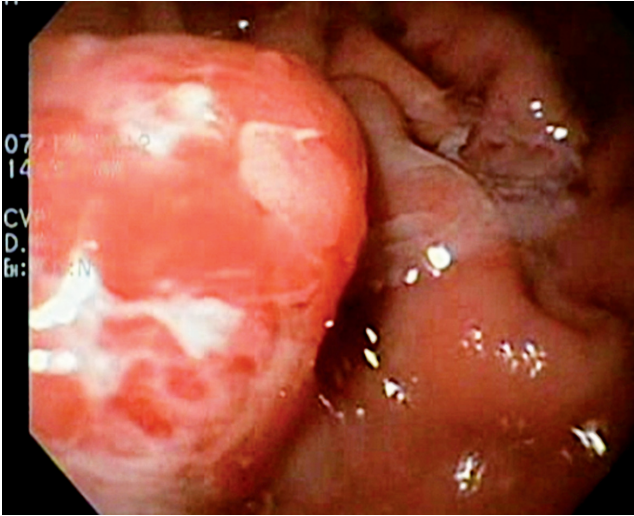
## DISCUSSION

As endoscopies are performed more and more frequently to assess dyspepsia, and as the incidence of gastric cancer increases in our environment, it is probable that more gastric cancer cases will be detected early. Since surgery has been abandoned as the method of choice due to the rate of morbidities and the resulting poor quality of patient life, we have to be prepared to treat these patients in some other way. Although endoscopic treatment through ESD is the ideal treatment for these patients, this technique is very demanding, requires the use of multiple accessories, is expensive, and is not widely available (7). This means that other cheaper and more frequently available alternatives need to be found.

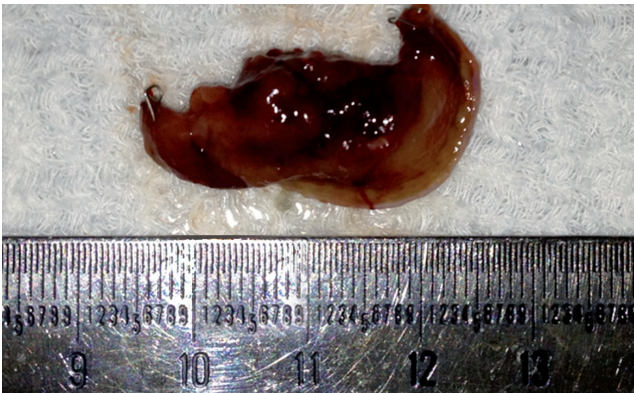


**Figure 2.** LECS technique - A: Endoscopist marks the lesion. B: Gastrostomy is performed by the surgeon, and the lesion is partially liberated. D: The lesion is resected and stapled.

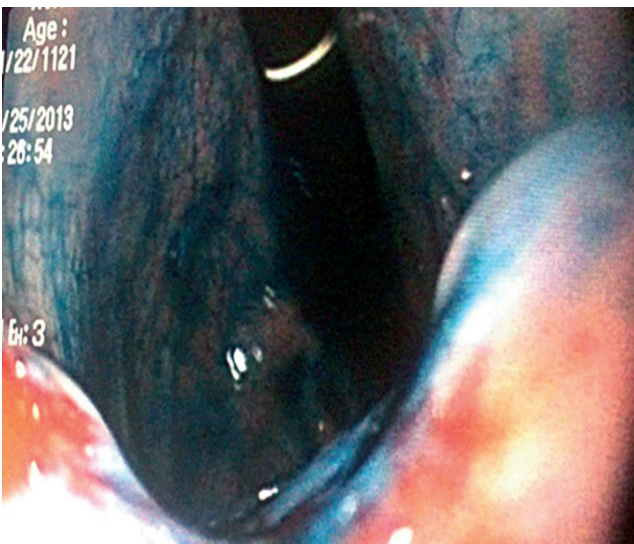




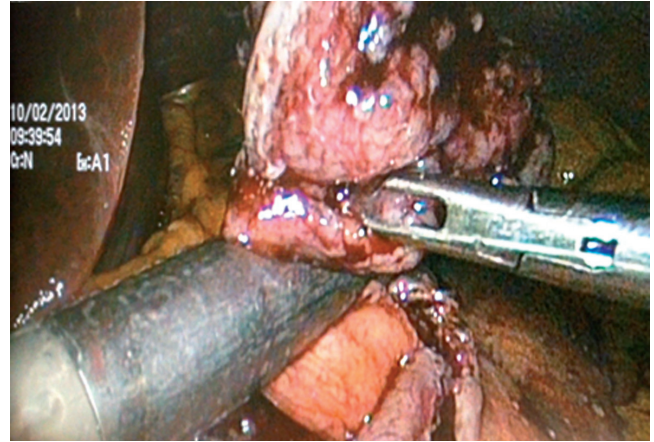
**Figure 3.** Observe the raised Type I gastric lesion in the proximal stomach that was reported as a well differentiated adenocarcinoma.



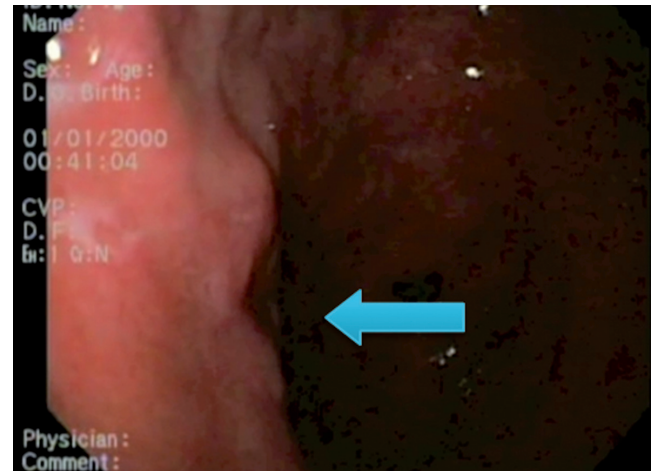
**Figure 4.** The lesion was completely resected transmurally.



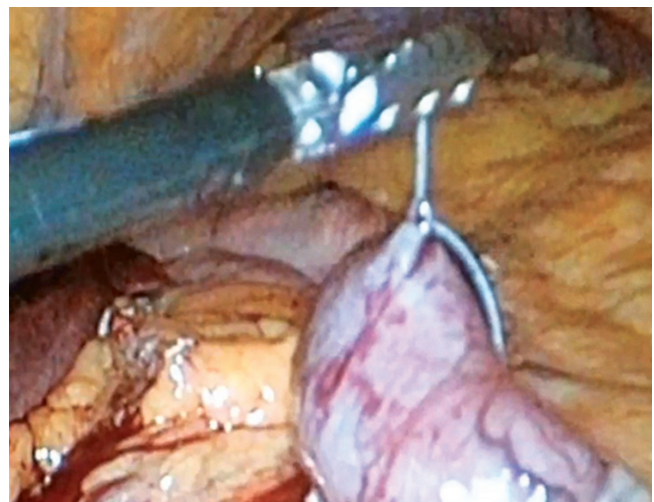
**Figure 5.** Lesion in Type III incision.



**Figure 6.** Gastrostomy is performed. The lesion is inverted before being freed, resected, and stapled.

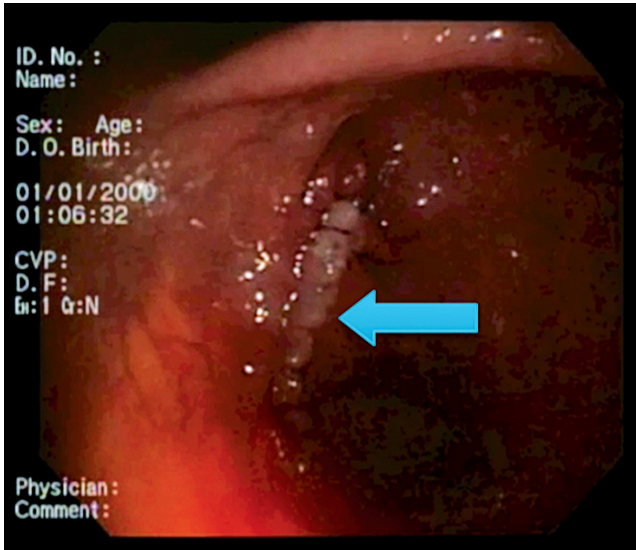


**Figure 7.** Anterior wall with raised lesion in the center of a depression that was reported as a moderately differentiated adenocarcinoma.



**Figure 8.** The surgeon lifts the resected piece which allows its retraction.

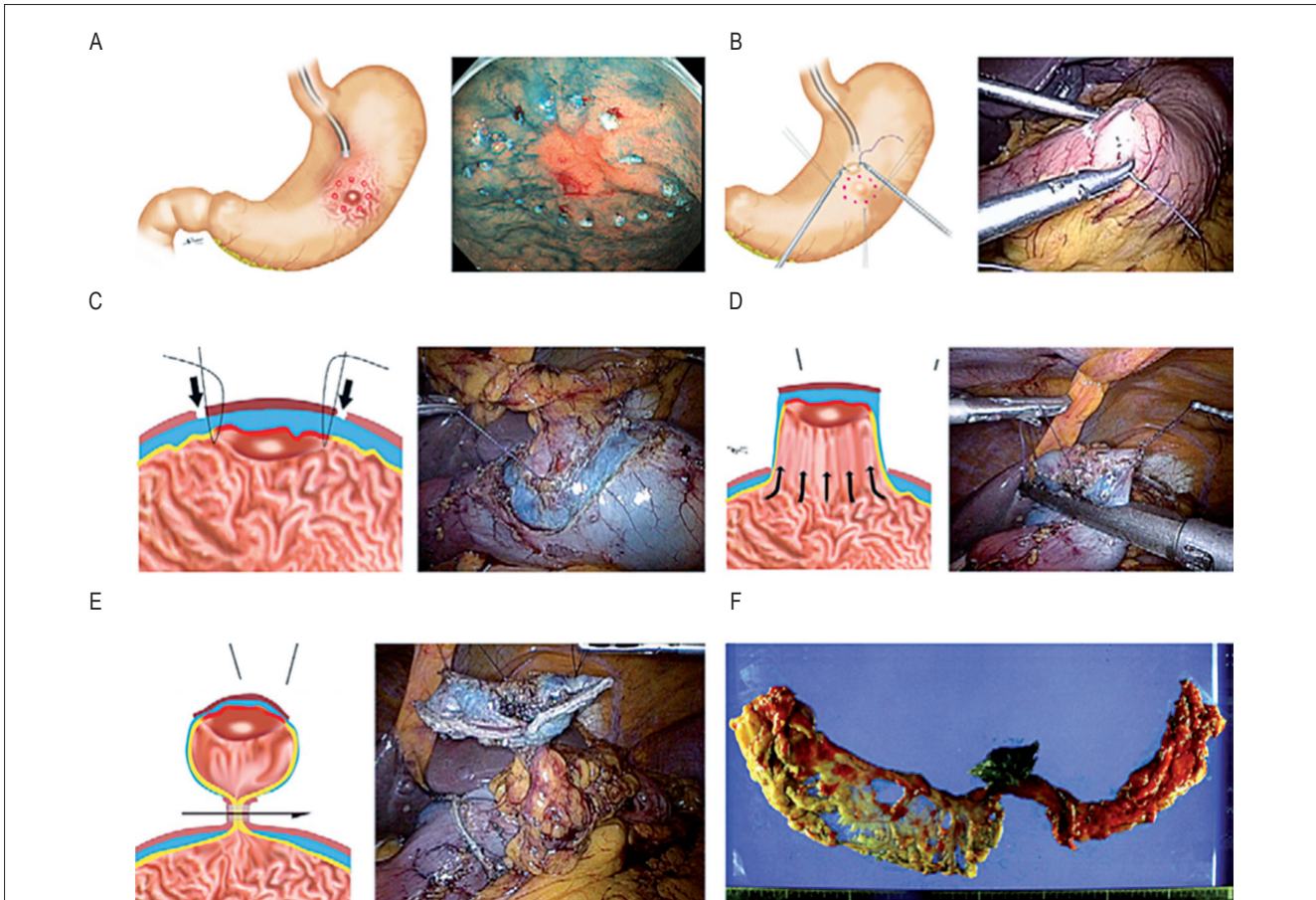




**Figure 9.** Simultaneous to resection, the completely resected lesion is seen endoscopically to have no perforations. The arrow points to the suture line.

LECS is one such technique: it is easier to perform, cheaper and can be performed in most health institutions (8).

This study shows our experience with four patients who were successfully treated with both of the variations of this technique. These patients did not present any complications and were discharged 48 hours following the procedures. Two patients were treated with the LECS technique in which the surgeon opened the gastric cavity to remove the lesion after it had been previously located by endoscopy. The tumors were inverted and removed and the incisions stapled. This technique has a potential risk in that tumor cells can fall into the peritoneal cavity. This makes the closed technique used in the other two cases useful. In one of these cases the lesion was marked by endoscopy, then a suture was placed and retracted by the surgeon who then stapled the incision guided by endoscopy. In the other case, the CLEAN-NET technique was used. When the lesion is too big, the serous and submucosal membranes are dissected by the surgeon in order to resect as little gastric tissue as possible when retracting the lesion (Figure 10) (9).



**Figure 10.** Description of the CLEAN-NET technique - A: Endoscopically locate the lesion and mark it. B: Locate the lesion laparoscopically. C: Dissect the serous and submucosal layers laparoscopically. D: Retract the lesion and staple the incision. E: Lesion cut. F: Completely resected lesion with nodes (Figure taken from the reference).

The main advantages of LECS over the ESD techniques is that it can be used for lesions located in any part of the stomach and does not take as long to perform (Table 1).

**Table 1.** The table compares the advantages and disadvantages of the endoscopic technique alone (ESD) with the cooperative technique (LECS).

| Variable             | ESD            | LECS         |
|----------------------|----------------|--------------|
| Anesthesia           | Local          | General      |
| Place                | Endoscopy room | Surgery room |
| Operators            | One            | Four         |
| Technical difficulty | Difficult      | Moderate     |
| Operation time       | 3-4 hours      | 2-3 hours    |
| Morbidity            | Frequent       | Rare         |
| Stomach deformation  | Mild           | Mild         |

In conclusion, the different LECS techniques are interesting alternatives for treatment of early gastric cancer. Rather than condemning patients to mutilating surgery such as total or partial gastrectomies when ESD is not possible or available, other gastroenterology groups should take advantage of LECs techniques and the patient benefits they offer and begin to implement these techniques.

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