EUS-guided mucosectomy for gastrointestinal cancer

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ABSTRACT

Introduction: the only way of improving prognosis and survival in gastrointestinal cancer is early diagnosis, with intramucosal localization as confirmed by endoscopic ultrasonography (EUS) or 20-MHz miniprobes (MPs) (T1) being most appropriate. Endoscopic mucosal resection (EMR) has proven effective in the treatment of this sort of lesions.

Patients and method: in a group (18 cases) with 15 cases of superficial gastrointestinal cancer and 3 cases of severe gastric dysplasia, 9 cases (3 esophageal, 4 gastric, 2 rectal) underwent a classic EMR following EUS or a 7.5- and 20-MHz miniprobe exploration.

Results: ultrasonographic studies showed a T1 in all but one esophageal case (Tis), and in both gastric dysplasias, with no changed layer structure being demonstrated in the latter (T0).

No complications arose with classic EMR, and all 9 patients are alive and free from local or metastatic recurrence, except for one esophageal case, which recurred distally to the esophageal lesion (metachronous).

Conclusions: echoendoscopically-assisted EMR is a safe, effective technique in the endoscopic management of superficial gastrointestinal (esophageal, gastric, colorectal) cancer. Recurrence most likely depends upon cancer multiplicity.

Key words: Superficial cancer (early cancer). Endoscopic ultrasonography. High-frequency miniprobes. Mucosectomy or endoscopic mucosal resection.

INTRODUCTION

Gastrointestinal (esophageal, gastric, colorectal) cancer is classified according to layer involvement as superficial (early cancer), infiltrating, and then advanced cancer. In the management of gastrointestinal cancer, the only way of improving prognosis and survival is by identifying it early in its course, the most suitable stage being intramucosal localization before the development of nodal metastases. Superficial neoplasms are lesions with scant endoscopic expression, and nearly always behave with no symptoms.

Superficial esophageal cancer is defined as that confined to the mucosal and submucosal layers. Following endoscopic diagnosis using colorings or otherwise, as well as biopsies, radial 20-MHz EUS or the use of 20-MHz or higher power transendoscopic miniprobes is attempted (1) in order to classify lesions as mucosal (m1, m2, m3) or submucosal (sm1, sm2, sm3). Submucosal invasion entails a 50% risk for adenopathies, and a 5-year survival of around 60%.

Mucosectomy or endoscopic mucosal resection (EMR) is only indicated for T1 mucosal cancers, while esophagectomy is restrained to submucosal lesions (T1sm), as 4% of such lesions have lymphatic involvement. Nevertheless, patients with submucosal T1 lesions who refuse to undergo surgery or have a seriously high surgical risk may be eligible for EMR.

Makuuchi et al. (2), in a series of 255 lesions, obtained a local recurrence rate of 2.4%, with only one death from esophageal cancer after 6 months. Oyama et al. (3) reported 3.1%, and Nomura et al. (4), 4%. Shimizu et al. (5) obtained results similar to those reported by Makuuchi et al. (2).

In superficial gastric cancer, EMR may be an alternative to radical surgery when lesions are well-differentiated, intestinal-type adenocarcinomas with no ulcers, confined to the mucosa (risk of adenopathies is lower

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than 3%, but goes up to 25% when there is submucosal involvement), and smaller than 20 mm in size. On average, 86% of patients achieve full resection (6).

Kida et al. (7) discuss a series of 246 EMRs with a radical resection rate of 68.3%, and a tumor recurrence rate of 2.8%, in the absence of tumor-related mortality and with few complications (7-9).

Superficial colorectal cancer is defined as the tumor invading 20% of the submucosal layer at most (10), without protrusion. Using a 15-MHz MP mucosal involvement may be told apart from sm1 and sm2-3 in 86% of cases (11). In addition to colorings (chromoscopy) and biopsies, magnification endoscopy is also indicated.

The risk for adenopathies is lower than 2% when the mucosal layer is involved, and reaches 15% when the submucosa is also affected.

Lesions smaller than 5 mm may be excised using biopsy forceps, polypectomy snares or mucosectomy; those greater than 5 mm using mucosectomy, up to 10 mm when depressed or 20 mm when flat-elevated, provided the submucosa has not been invaded.

Endoscopic therapy is considered curative when the following is met: well differentiated, no lymphatic or venous invasion, and invasion not beyond the superficial submucosal layer (sm1).

PATIENTS AND METHOD

In the last few years the teams at Barcelona and A Coruña have diagnosed 15 cases of superficial cancer (5 esophageal, 8 gastric, 2 rectal) from 8 to 30 mm in size;

and three severe gastric dysplasias in patients from 45 to 86 years of age (X: 76 yrs), 12 males and 6 females, using EMR for 9 cases (3 esophageal, 4 gastric, 2 rectal), all of them following 7.5- and 20-MHz EUS. The rest were treated with radical surgery or argon gas.

Two cases of degenerated Barrett's esophagus, which also underwent mucosectomy, were not included.

EUS was performed using Olympus GF-UM 130 and 160, 7.5- and 20-MHz radial echoendoscopes, and Fuji radial and linear 20-MHz miniprobcs. We are also currently using Olympus UM-DP12-25R and 20-25R miniprobcs, fitted with DPR.

The current TNM classification was used.

EMR technique: associated with submucosal injection, suction, and polypectomy.

Regardless of patient demographic data, all variables related to lesion endoscopic and echoendoscopic characteristics were included in the study.

The statistical analysis was performed using the SPSS 11.5 for Windows software package.

RESULTS

Ultrasonographic studies using EUS or MPs demonstrated a T1 neoplasm (mucosal involvement; mucosal and submucosal involvement, only one case) in all but one cases; the exception was an esophageal tumor where no changes could be seen in layer structure (T0). The same happened for dysplasia cases (T0) (Figs. 1-3).

EMR had no complications. All nine patients are alive and free of local or metastatic recurrence after at least 6 to 24 months' follow-up; one (esophageal) case, however, re-

Fig. 1.- A: Endoscopic appearance of a superficial esophageal cancer.
A: Aspecto endoscópico de neoplasia maligna de esófago superficial.

Fig. 1.- B: Normal ultrasonographic appearance (T0) using 7.5- and 20-MHz EUS.
B: Aspecto ecográfico normal (T0) con USE de 7,5 y 20 MHz.

Fig. 2.- A: Endoscopic appearance of a superficial gastric cancer.
A: *Aspecto endoscópico de neoplasia maligna gástrica superficial.*

lapsed distally to the index lesion (metachronous?), and was managed with radiotherapy and chemotherapy.

DISCUSSION

Of the many local therapies for superficial cancer only EMR allows to obtain a resection piece for complete histopathologic examination, which in turn allows complete cure to be ensured. The same is true for uncertain lesions, adenomas, and submucosal tumors.

Local recurrence in superficial esophageal cancer amounts to 2-4% (2-5). One of our three such patients had a recurrence that was distal to the index esophageal lesion. Local recurrence seems to depend upon esophageal cancer multiplicity, and reaches 40 *versus* 4% for single lesions (4).

Shimizu et al. (5) diagnosed 14.6% of metachronous cancer lesions following EMR in sites more than 1 cm distal to the previous scar.

Survival is usually 95% at 5 years.

Local recurrence is also 2-4-2.8% according to the most extensive series—in superficial gastric cancer (7). Survival is also very high at 5 years. Complications (pain, bleeding, perforation) are few, below 10% (8).

Local recurrence in superficial colorectal cancer is very low (12).

Virtual diagnoses, the newer endoscopic diagnostic methods, and the use of echoendoscopy (13,14) will all increase the early identification of superficial gastrointestinal cancer; EMR will thus be increasingly common (15), and will improve survival in this type of cancer (16,17).

EUS is essential for the stratification of patients with gastrointestinal (esophageal, gastric, colorectal) cancer, and the selection for EMR of those with T0 and T1 lesions.

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Fig. 2.- B: A 20-MHz miniprobe exploring this same patient.
B: Minisonda de 20 MHz realizando la exploración del mismo caso.

Fig. 3.- A: Gastric T1N0 using 7.5-MHz EUS.
A: T1N0 gástrico con USE de 7,5 MHz.

Fig. 3.- B: Gastric T1N0 using 20-MHz EUS.
B: T1N0 gástrico con USE de 20 MHz.

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