

Endoscopic Submucosal Dissection of Superficial Digestive Tumors after Evaluation Through Magnification Chromoendoscopy and Endoscopic Ultrasound with Miniprobes. Report of three cases

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Abstract

Magnification chromoendoscopy (MCE) and miniprobes are able to select the tumors suitable for curative endoscopic treatment. Endoscopic submucosal dissection (ESD) is a new endoscopic technique that has a higher complete resection rate and a very low recurrence rate. We present three cases of superficial epithelial digestive tumors that were first evaluated with MCE and miniprobes before being treated by ESD. A complete one-fragment resection was performed with no major complications in all cases.

Key words

Magnification chromoendoscopy – endoscopic ultrasound – submucosal dissection – high-grade dysplasia.

Introduction

The endoscopic submucosal dissection (ESD) is considered the best treatment for high grade dysplasia or early digestive cancers. The risk of lymph node invasion increases with the in-depth invasion of the neoplasia [1-3]. Tumors limited to the mucosa (m1, m2) or one third of submucosa (sm1) can be resected endoscopically because of the low risk of lymph node invasion. Deep invasion of submucosa (sm2, sm3) requires surgical treatment. For deep mucosa (m3) or superficial submucosal invasion (sm1), the choice between endoscopic or surgical treatment depends on the location of the neoplasia, type of cancer, macroscopic endoscopic aspect, patient's performance status and last but not least, on the endoscopist's experience. Magnification chromoendoscopy (MCE) permits better detection and diagnosis of dysplastic or malignant lesions and is able

to make a gross assessment of the depth of invasion [4]. Submucosal invasion can be better evaluated with 12 or 20 MHz endoscopic ultrasound miniprobes.

Case 1

Patient P.M., 60 years old, had a total colonoscopy for chronic diarrhea. An elevated non-polypoid superficial tumor, 80 mm in diameter, classified as laterally-spreading tumor (LST) sub-type IIa (Fig. 1) was detected in the lower rectum. Magnification chromoendoscopy classified the lesion as type IIIc (adenoma) according to Kudo classification. The 12 MHz EUS mini-probe showed a minimal interruption of the muscularis mucosae, without evidence of perirectal lymph nodes, staging the lesion as T1m3N0. The histopathological examination showed a villous adenoma with high-grade dysplasia (HGD). A first chromoendoscopy with 0.4% indigocarmine was performed to visualise the margins of the tumor, after markings with coagulation points from 2-3 mm, at approximately 2-3 mm from these margins, were performed with a needle-knife (Olympus). Dissection was performed with a special knife called a hook-knife and an IT knife (Olympus) after injection of mixed solution with saline, diluted adrenalin and methylene blue into the submucosa (Fig. 2). The solution was re-injected in the submucosa as the dissection progressed. The submucosal lesion was completely dissected in one fragment. The duration of the procedure was 120 minutes; no immediate complications were noted (Fig. 3). Margins of the resected specimen were macroscopically free of tumor. The resected tumor had a 70mm/60mm diameter (Fig. 4). Histopathological examination showed villous adenoma with HGD with tumor margins of at least 2 mm. No vascular or lymphatic invasion was detected. Follow up at 3, 6 and 12 months was free of endoscopic or histological recurrence.

Case 2

Patient C.A., 56 years old, having alcoholic cirrhosis class Child B, underwent an upper digestive endoscopy to assess a moderate iron deficiency anemia. Grade II esophageal

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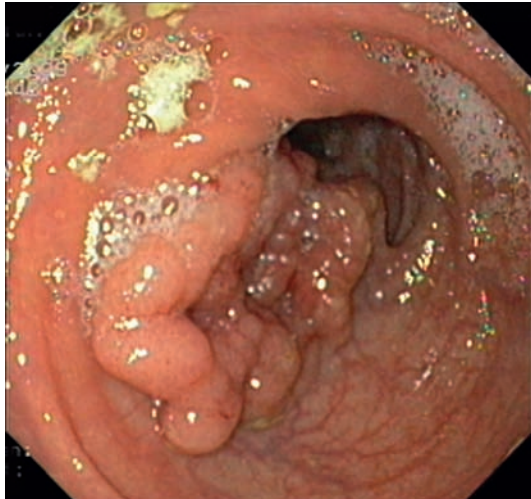


Fig 1. Case 1. Standard endoscopy, large LST sub-type IIa located in rectum.

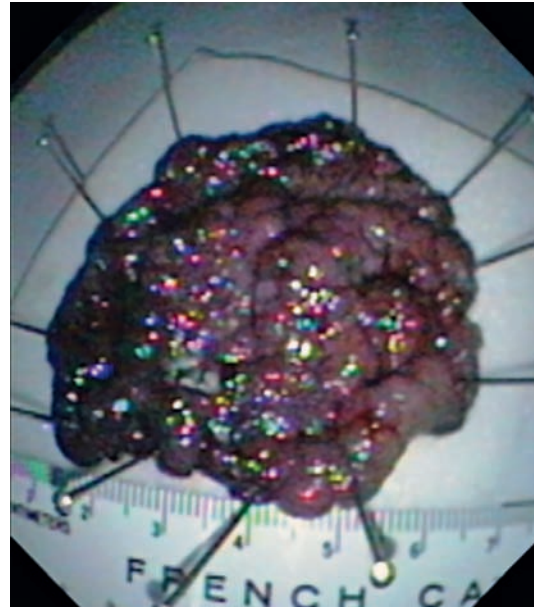


Fig 4. Case 1. The resected piece.

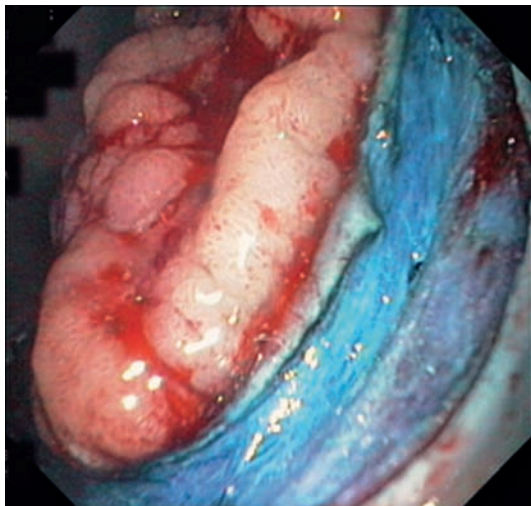


Fig 2. Endoscopic submucosal dissection.

varices without red spots and an elevated non-polypoid superficial tumor formation of approximately 20-30mm in diameter, classified as type 0 sub-type IIa was noticed at the antrum level. Histopathology showed a well-differentiated intramucosal adenocarcinoma. The chromoendoscopy with indigocarmine 0.4% further evidenced a central ulceration of this lesion, re-classifying it as sub-type IIa+IIc, as well as two more close elevated non-polypoid lesions, of 12mm respectively 4 mm in diameter. Magnification chromoendoscopy showed an irregular microstructural pattern with total irregular microvascularization (type IV carcinoma pattern according to Tanaka S classification) (Fig. 5). Examination with 12 MHz miniprobes did not show perigastric lymph nodes, invasion in the muscularis mucosae or the submucosa; the lesion was staged as Tm1-2N0. Unlike in the case with the submucosal dissection, a transparent cap

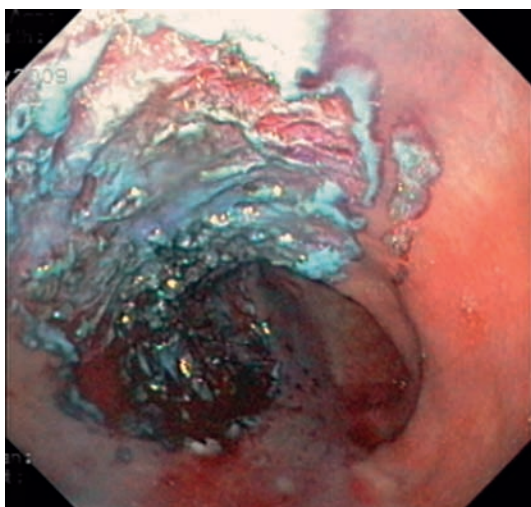


Fig 3. Endoscopic dissection with complete resection in one fragment.

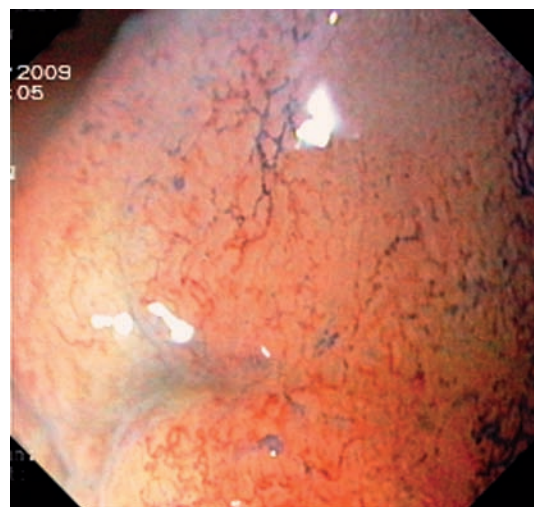


Fig 5. Case 2. MCE: irregular microstructural pattern, type IV and irregular microvascularization.

attached to the tip of the endoscope was occasionally used. The lesion was resected in one single fragment, removed, then fixed with pins on a porous material. The entire lesion was resected in a single fragment in 140 minutes. The histopathological examination showed a well differentiated intramucosal adenocarcinoma, with free resection margins. During the resection, bleeding was stopped in three occasions with the coagulation forceps. The patient was put on a high dose PPI for 8 weeks. After 3 months follow up he showed no endoscopic or histological relapse.

Case 3

Patient R.E., 56 years old, was admitted to the hospital for lower gastrointestinal bleedings. The colonoscopy showed a sessile polyp of 30 mm in diameter, situated in the lower rectum, 2 cm from the anal margin. Magnification chromoendoscopy classified the lesion as type IV according to Kudo classification. The miniprbes did not show invasion of the muscular mucosa or the submucosa, staging the lesion as Tm1-2N0 (Fig. 6). Submucosal dissection was performed, part of it in retroversion in the rectum, to be able to remove the part close to the anus. The ESD was complete, in a single fragment and lasted for 80 minutes. Histopathology showed an adenoma with HGD, having free resection margins. During the resection, the hemorrhage was minimal and it stopped once the dissection was continued. Three and six months after the procedure the patient showed no endoscopic or histological relapse.

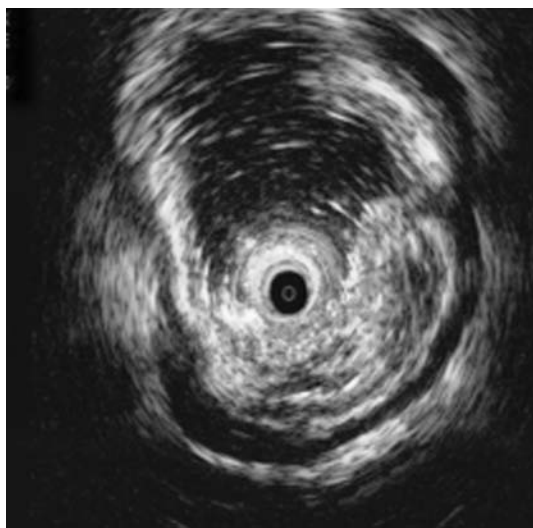


Fig 6. Case 3. Endoscopic ultrasound with miniprbes 20MHz: T1m1-2N0 stage.

Discussion

In the stomach, MCE highlights 5 types of mucosa microstructure. Types IV (irregular) and V (absent) correspond to early gastric cancer, with a diagnostic accuracy of over 90% when compared to the histopathological examination [5]. The endoscopy with magnification

provides information regarding the cancer histological type. The irregular microstructure of type IV is predominant in differentiated cancers, as opposed to undifferentiated cancers in which type V is predominant. In Case 2, the predominant microstructure was of type IV according to the Tanaka classification, which was confirmed by the histological examination on the resection piece as a well-differentiated intramucosal adenocarcinoma. Since many MCE studies are not very accurate in the detection of the invasion, it cannot be used in staging early gastric cancer.

According to the opening aspect of colonic mucous glands on the surface, Kudo and his collaborators differentiated 5 types of structural micropattern (types I and II non-neoplastic, types III and IV adenomas, type V carcinomas), called the pit pattern [6]. The classification of lesions according to this pattern shows an 80% correlation with the histopathological examination [6]. In return, the diagnostic accuracy decreases to 50% in detecting the invasion in the submucosa. Cases 1 and 3 were classified as type III and IV, respectively, according to the Kudo classification, and were confirmed by the histopathological examination as adenomas with HGD.

The accuracy of the miniprbes in T1 staging of gastric cancer varies between 67% and 83% [7, 8]. The sensitivity is low in the detection of perigastric lymph nodes, ranging between 17% and 66% [8, 9]. The accuracy of T1 staging of the colorectal cancer, using a HF-EUS probe is of 90% [10, 11]. In all our cases, the miniprbes detected no lymph nodes. The staging with miniprbes was Tm3 in Case 1, Tm3 in Case 2 and Tm1-2 in Case 3. Cases 2 and 3 were confirmed by the histopathological examination on endoscopic resected pieces. In Case 1, the miniprbes had overstaged the lesion but with no implications in the therapeutic decision.

Once a number of endoscopic techniques and equipment were developed, ESD was possible and feasible. The principle of the method consists of the gradual dissection of the lesion with the help of the special knives. The efficiency of ESD was proven in recent studies [12-18]. Initially, ESD was used in the stomach, but then also in the esophagus and colon, with optimal results [19, 20]. The complete resection rate is of 80-90%, but with a higher risk of bleeding and perforation. Also the duration of this procedure is much longer than that of EMR [14]. The post-EMR recurrence rate is 1.7%-11% [19-22]. The single fragment endoscopic excision on lesions under 20 mm varies between 95%-100% (12-14). The lesions over 21 mm in diameter are resected in a single fragment at a rate of 79-97%. The local relapse rate is very low (0-1%) [15-18].

As the MCE, the miniprbes and the histopathological examination excluded the presence of invasion of the submucosa in all patients, the ESD was chosen as the curative treatment method.

The gastric lesion in Case 2 was larger than 20mm, with a central ulceration and the patient had a high surgical risk. The dissection was carried out in a single fragment, completely, with moderate bleeding, that was stopped with an electrocoagulation forceps. Four weeks after the ESD,

the patient showed a severe iron deficiency anemia with Hg= 6g/dl, but without active haemorrhage. We considered the anemia to be a late complication after the ESD, in the context of an existing anemia and coagulation disorders due to liver cirrhosis.

The two LSTs were larger in size and situated in the lower rectum. A curative surgical procedure would have led to definitive colostomy. Both patients opted for ESD. The dissection was time consuming but was carried out in a single fragment, completely, without incidents or accidents and with no relapse after 6 months.

In **conclusion**, the selection of patients and a correct staging prior to the ESD are extremely important. Magnification chromoendoscopy and miniprbes can select the tumors suitable for curative endoscopic treatment, especially for ESD. Endoscopic submucosal dissection has a higher complete resection rate and a very low recurrence rate, but it is time consuming and has a higher risk of complications, most of them treatable in a conservative manner [12-18].

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