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Endoscopic submucosal dissection with a Water-jet Hybrid-knife in a patient with metachronous gastric cancer – case report and review of literature

Endoskopowa dyssekcja podśluzówkowa za pomocą noża wodnego u pacjenta z metachronicznym wczesnym rakiem żołądka – opis przypadku i przegląd piśmiennictwa

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ESD, endoskopowa dyssekcja podśluzówkowa, metachroniczny rak wczesny żołądka

STRESZCZENIE

Endoskopowa dyssekcja podśluzówkowa (ESD) jest zaawansowaną metodą endoskopowego usuwania wczesnych zmian nowotworowych przelyku, żołądka czy odbytnicy. ESD polega na odwarstwieniu dyssekcji resekowanego obszaru od warstwy mięśniowej ściany przewodu pokarmowego, a następnie wycięciu za pomocą noża endoskopowego. Na rynku dostępnych jest kilkanaście typów noży endoskopowych. Jednym z nich jest nóż wodny Water-jet Hybride-knife, który zdobywa coraz szersze grono zwolenników w codziennej praktyce klinicznej. Dzięki kompilacji kilku funkcji w znaczący sposób ułatwia przeprowadzenie poszczególnych etapów dyssekcji podśluzówkowej, przez co skraca czas operacji oraz ogranicza możliwość wystąpienia powikłań po zabiegu ESD.

Celem pracy jest przedstawienie przypadku 63-letniej chorej poddanej zabiegowi ESDH z powodu metachronicznego wczesnego raka żołądka oraz przybliżenie zasad działania noża wodnego Water-jet Hybride-knife.

Endoskopowa dyssekcja podśluzówkowa za pomocą noża wodnego jest kolejnym krokiem w rozwoju endoskopii. Jako wielofunkcyjna sonda umożliwia przeprowadzenie wszystkich etapów dyssekcji bez wymiany narzędzi endoskopowych. Szczególne zastosowanie znalazła w zabiegach ESD wczesnych zmian nowotworowych żołądka.

INTRODUCTION

Metachronous gastric cancer (MGC) develops in a group of patients who underwent endoscopic submucosal dissection (ESD) or endoscopic resection (ER) of early staged gastric cancer (EGC) (1). According to Japanese literature MGCs develop in the range of 1.8 to 12.8% after endoscopic treatment (2). Especially severe corpus intestinal metaplasia, persistent *Helicobacter pylori* infection and a family history of gastric cancer are independent risk factors for metachronous gastric neoplasm (1).

Endoscopic methods of gastrointestinal neoplasms treatment have been used for more than 40 years when in 1984 Tada introduced a new method called Endoscopic Mucosal Resection (EMR) (3). The first Endoscopic Submucosal Dissection (ESD) was performed in Japan by Kawamoto in 1997 (3). ESD with the Water-jet Hybrid-knife (ESDH) is

a relatively novel endoscopic method of treatment of early cancers in alimentary tract (4, 5). It can also be applied in metachronous early staged cancers. ESDH allows to perform all four steps of endoscopic dissection: marking, elevation, incision/dissection and coagulation without the need to use other endoscopic tools, which translates into a shorter time of procedure. In this study we present the case of a 63 years old woman with metachronous gastric adenocarcinoma successfully treated with ESDH.

CASE REPORT

A female, 63 years old patient with pathologic confirmed G1 well-differentiated tubular adenocarcinoma of the stomach was admitted to the Department to undergo specialized treatment of early metachronous gastric carcinoma. The lesion was detected during a follow-up gastrofiberscopy

20 months after the previous ESD performed due to primary early tubular intramucosal adenocarcinoma of the stomach. Endoscopic procedure was carried out with the GIF-Q180 Olympus gastrovideoscope. A slightly protruding lesion of 10 x 30 mm of irregular granular appearing surface structure (type 0-IIa) was detected in the area of the greater curvature of the prepyloric antrum of the stomach (fig. 1). The endoscopic ultrasound (EUS) was performed with the Olympus GIF-UCT 180 revealed no infiltration of the muscle layer of the stomach. There were no lymph node metastasis based on abdominal CT. The patient was scheduled for ESDH. The procedure was performed under general anesthesia. All steps of the endoscopic dissection were performed with the Water-jet Hybrid-knife I-type under visualisation of the Olympus EVIS EXERA II GIF-H180 gastrovideoscope. All steps of the ESDH procedure was performed. At the beginning range of the lesion was marked with a coagulation (fig. 2). The mucosa-submucosa and muscle layers were separated with a 0.9% saline solution with diluted methylene blue (fig. 3). Next, the lesion was extracted in a single piece (fig. 4). Resection was radical endoscopically. In the exposed area a clip was fixed to maintain homeostasis (fig. 5). Before the procedure the patient received antibiotic prophylaxis (cefazolinum a 1 g *i.v.*) and proton pump inhibitor after (omeprazolom a 40 mg *i.v.*). Time of the procedure was 55 minutes. Pathological examination revealed tubular G1 adenocarcinoma, with erosion. Malignant infiltration was limited to the muscular layer of the mucosa. The procedure was macroscopically and microscopically radical (R0). Postoperatively, the patient tested negativ for *Helicobacter pylori* (HP) infection. The follow-up endoscopy was performed 3, 12 and 30 months after the procedure. Only a scar tissue was visible and the remaining defect was covered with normal epithelium (fig. 6). Biopsy specimens were collected. No cancer cells were found in follow up pathology. The patient is still remaining outpatient Department care.



Fig. 2. Marking range of the resection

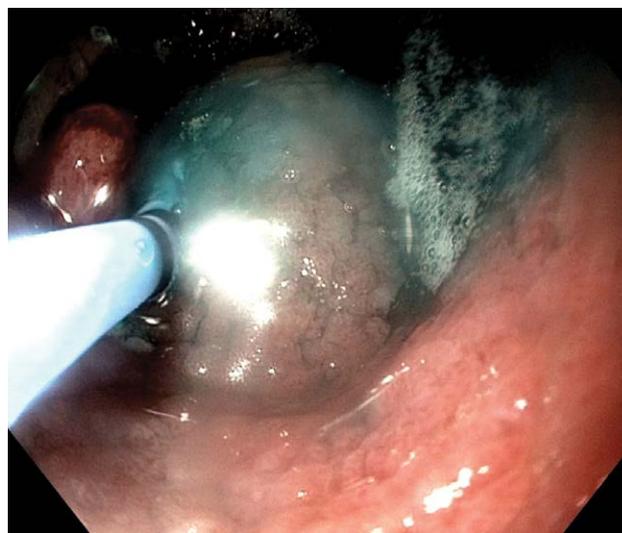


Fig. 3. Elevation of the neoplastic gastric lesion

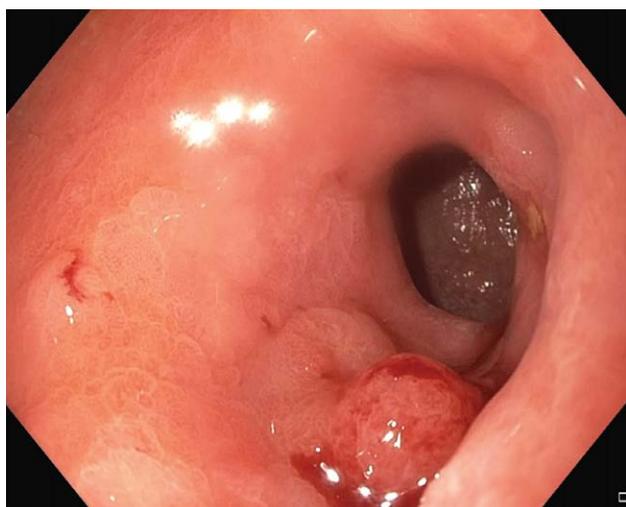


Fig. 1. Endoscopic view of metachronous early gastric cancer (type 0-IIa)

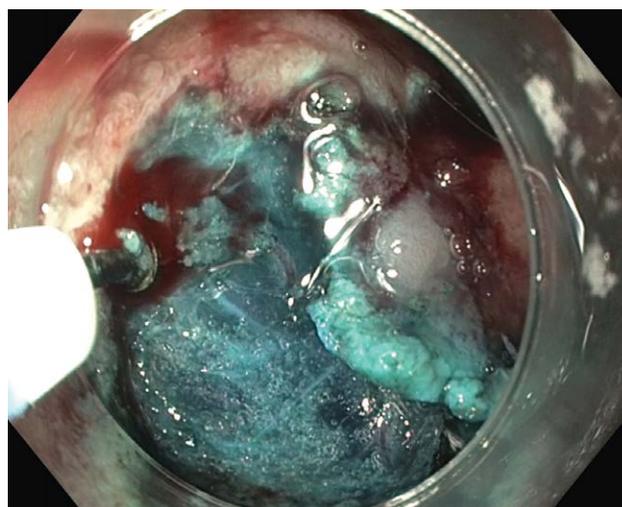


Fig. 4. Incision and dissection using the Water-Jet Hybrid-knife



Fig. 5. Endoscopic view after ESDH with endoclip



Fig. 6. 30 month follow-up after ESDH

DISCUSSION

ESDH is another step in improving the technique, applied in the treatment of early gastrointestinal neoplasms. The advantages of ESDH as compared to the conventional ESD is “needleless” selective elevation of the tissue, precise dissection and preparation of tissues. The Water-jet Hybrid-knife allows to perform four steps of endoscopic dissection: marking, elevation, incision/dissection and coagulation without the need to use other endoscopic tools. It translates into a shorter time of procedure and reduces the risk of complications (5). The time of the procedure was 55 minutes. Another positive point of this method is a lower risk of bleeding thanks to better bleeding control, decreased tissue trauma and reduced risk of perforation. Bleeding after ESDH appear more often in the stomach than in the esophagus or the colon. It can be controlled by placing endoclips, hemostatic clamps, using hot biopsy forceps or an argon plasma coagulation (APC). Perforation or late perforation is more

often observed in the colon than in the esophagus or the stomach. Disadvantages are relatively high costs of the equipment and long learning curve.

According to the technical aspect of the procedure, the water-jet pressure is up to 80 bar with the optimal pressure during the procedure of approximately 30-50 bar (6). The fluid accumulates in the collagenous fibers of the submucosa. The accumulating fluid – typically a 0.9% saline solution with diluted methylene blue and epinephrine – creates a submucosal cushion by elevating the lesion. It allows a safe resection margin and minimizes the risk of perforation. It has been confirmed that the saline solution has the best accumulation properties observed in the submucosa. The solution also protects the mucosa against thermal damage. It exerts pressure on blood vessels, which controls bleeding. No elevation of the lesion suggests the possibility of penetrating the malignant infiltration deeper than the submucosa – the muscular layer (6, 7). Yamamoto confirmed that a 0.4% sodium hyaluronate solution has better accumulation properties observed in the submucosa. The injection fluid MucoUp, Seikagaku Corp, Tokyo, Japan creates a long-lasting mucosal protrusion that may last more than 1 hour. It be used in a traditional needle injection only (5, 8).

In our case the ESDH was chosen to determine efficiency and effectiveness of dissection comparing with a previous conventional ESD. In accordance with the guidelines of the Japanese Gastric Cancer Association (JGCA) the current indications for endoscopic resection of early gastric cancer are:

- well-differentiated mucosal adenocarcinoma (pT1a) irrespective of its size and localization, without ulceration UL (-),
- well-differentiated mucosal carcinoma (pT1a) with ulceration UL (+) < 30 mm,
- poorly-differentiated mucosal carcinoma (pT1a) without ulceration UL (-) < 20 mm, and
- well-differentiated tumor confined to the mucosa (M) or submucosa (SM1 < 500 mm) (pT1b) < 30 mm (5, 8, 9).

ESDH is mainly applied to T1 cancer with lesion less than 30 mm diameter, with no lymph nodes involvement based on endoscopic ultrasonography (EUS) or other images (8). The endoscopic ultrasound (EUS) was performed with the Olympus GIF-UCT 180. According to EUS in our case metachronic gastric cancer was limited to mucosa and submucosa tissue with out infiltration to the lamina muscularis propria and no lymph nodes involvement. The risk of lymph node metastases correlates with the depth of tumor invasion (M, SM1, SM2), histological type of the tumor and lymphatic or vascular invasion. That is extremely important to determine the type of tumor preoperatively and properly qualify the patient for endoscopic treatment (10). Gotoda et al. in the group of 5265 patients who underwent gastrectomy with lymphadenectomy due to early gastric cancer, found that in the case of the tumor limited to the

mucosa (M) lymph nodes metastases were observed in 2.7% of the patients and in the case of the tumor infiltrating submucosa (SM1) the number increased to 18.6% (8, 11, 12). De-la-Peña et al. introduced report of Water-jet Hybrid-knife ESD in the treatment of gastric lesions. They included 29 consecutive patients with early gastric neoplasia that met the expanded criteria and the en-bloc resection, R0 rates were 90% (13). The series from Australia, incorporating all

of esophageal, gastric (antral, body and fundus), duodenal and colorectal ESD. The en bloc and R0 resection rates of 80 and 60% are not quite as good as the respective 77-92% and 73-100% in other Western series (14). Summarizing among many endoscopic tools the Water-jet Hybrid-knife in the hands of the appropriate endoscopic surgeon is an excellent tool in the treatment of early neoplastic lesions of the digestive system.

**CONFLICT OF INTEREST
KONFLIKT INTERESÓW**

None
Brak konfliktu interesów

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