Holmium laser enucleation of an esophageal leiomyoma in endoscopic tunnel technique

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INTRODUCTION

Esophageal leiomyomas are the most common benign tumors of the esophagus. Depending on the size and location, they can become symptomatic in patients. Common symptoms are dysphagia, retrosternal discomfort or chest pain, heartburn, and occasionally regurgitation. In the past few years, submucosal tunnel endoscopic resection has become a safe and feasible technique for treating esophageal submucosal tumors.[1] The holmium laser is commonly used in endourologic and bile duct procedures.[2] We report our experience with using the holmium laser for enucleation of a symptomatic esophageal leiomyoma.

DESCRIPTION OF TECHNOLOGY

The holmium:yttrium-aluminum-garnet laser (Sphinx LISA Laser, Kaltenburg-Lindau, Germany) is a pulsed laser, emitting light at about 2100 nm.[3] The laser energy enables coagulation and tissue cutting in a single device. It has been shown to produce significant tissue coagulation up to a depth of 3 to 4 mm and to lower the incidence of perioperative blood loss in holmium laser enucleation of the prostate in urology.[4,5] There are various advantages of its use in interventional endoscopy: the low penetration depth of 400 μm allows precise preparation and prevents injury to deeper layers. Furthermore, the energy can be transmitted down optical fibers, allowing use inside the working channel of flexible endoscopes.[6]

VIDEO DESCRIPTION AND CASE REPORT

We report a 76-year-old patient who presented with dysphagia and postprandial pain. An initial ambulatory gastroscopy revealed a mass effect caused by a midesophageal submucosal tumor. A thoracic CT scan showed a tumor with a diameter of about 2.5 cm and malignant aspect.

For further diagnostics, endoscopic ultrasonography and FNA of the tumor were performed. A tumor originating from the muscularis propria could be seen. Histopathologic analysis confirmed the benign diagnosis of a leiomyoma and led to the decision to perform an endoscopic resection in the tunnel technique.

We planned to fragment the tumor within the tunnel to facilitate extraction and therefore chose a holmium laser

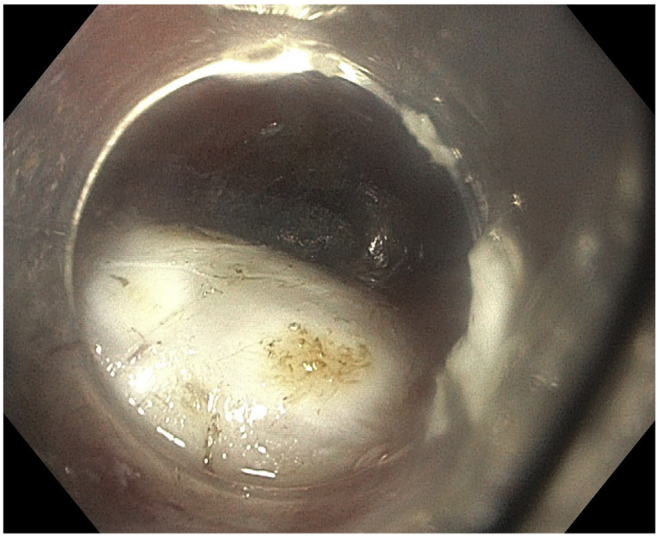

Figure 1. First appearance of the leiomyoma after submucosal preparation.

Figure 2. Preparation of the tumor using a holmium laser fiber.

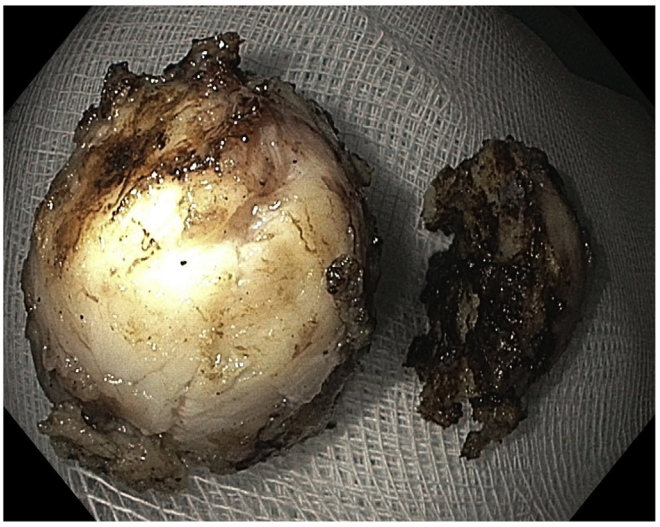

Figure 3. The extracted parts of the leiomyoma.

for resection. The holmium laser simplifies this step enormously, allowing rapid fragmentation within the tunnel with minimal risk of mucosal damage.

The fragmentation of solid tumors with a monopolar device can be difficult because of the low electric conductivity of the tissue. The laser energy separates layers by tearing them apart and allows rapid fragmentation within the tunnel. The holmium laser has already been shown to have several advantages over conventional resection during resection of urological tumors.[7]

In the first step, about 3 cm on the oral side of the tumor, an injection into the submucosal layer of the esophageal wall was performed. An endoscopic submucosal dissection knife (Triangle knife J, Olympus, Tokyo, Japan) was used to gain entrance into the submucosal layer (HF Settings: EndoCut Q, Cut interval 4, Cut duration 2; Generator: Erbe VIO 3, Tubingen, Germany). After that, the endoscope was slowly and progressively advanced, while preparing a submucosal tunnel in the direction of the leiomyoma (Spray Coag Effect 3.5).

Reaching the leiomyoma, initially superficial preparation of the tumor was performed using the Triangle knife (Fig. 1). Further resection of the tumor was carried out using a holmium laser fiber (Sphinx LISA Laser, Katlenburg-Lindau, Germany) introduced through the working channel. The procedure was carried out with the following holmium laser settings: 2 J pulse energy, 30 Hz pulse frequency, and 750 µs pulse length, generating a cumulative laser energy power of 60 W. Under continuous irrigation using sterile NaCl 0.9% solution, the tumor was exposed precisely (Fig. 2).

The tumor size did not enable an en bloc resection through the tunnel. Therefore, the benign tumor was fragmented into 2 parts using the holmium laser. The tumor parts were extracted using conventional endoscopic forceps and an endoscopic anchor.

Macroscopically, the tumor could be extracted in its entirety (Fig. 3). Histopathologically, the R-classification could not conclusively be clarified, assessing a fragmented tumor. Finally, the resected area was inspected and the superficial closure of the mucosal aperture was performed using endoscopic clips in a row. The postoperative recovery was free of adverse events, and the histopathologic findings confirmed the tumor was benign.

TAKE-HOME MESSAGE

Holmium laser enucleation is a safe and feasible technique for the endoscopic resection of benign esophageal tumors. It enables meticulous preparation with minimal damage to surrounding structures and facilitates fragmentation of large tumors if necessary (Video 1, available online at www.giejournal.org).

DISCLOSURE

Dr Miernik is advisor to Richard Wolf GmbH (Knittlingen, Germany) as well as Lisa Laser OHG (Katlenburg-Lindau, Germany). All other authors disclosed no financial relationships.

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