Novel treatment (new drug/intervention; established drug/procedure in new situation)

Recurrent oesophageal intramucosal squamous carcinoma treated by endoscopic mucosal resection and subsequent radiofrequency ablation using HALO system

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Summary

The method of radiofrequency ablation (RFA) is currently used for the treatment of high-grade dysplasia in Barrett's oesophagus. It has theoretical potential also for the use in squamous epithelial neoplasias. The authors present a case report of an early diagnosis of squamous cancer in a high-risk patient, its endoscopic treatment and follow-up, and successful RFA of recurrent neoplasia. RFA can expand our therapeutic possibilities for the management of recurrent neoplastic lesions after endoscopic treatment of squamous oesophageal cancer.

BACKGROUND

Most European countries have low incidence of oesophageal squamous carcinoma (less than 2 cases/100 000 inhabitants/year). The majority of patients are diagnosed at advanced stage. Endoscopic diagnosis of early cancer is infrequent, but it can be improved with chromoendoscopy with Lugol

solution. Lugol staining should be performed especially within a group of patients with a higher risk of squamous cell neoplasia. When diagnosed early, squamous carcinoma can be curatively treated with endoscopic resection.¹

The method of radiofrequency ablation (RFA) is currently used for the treatment of high-grade dysplasia in Barrett's

Figure 1 Status after endoscopic resection with band-and-cut method—two endoclips put on the margin of the resected area.

Figure 2 Follow-up endoscopy—scar after endoscopic resection.

oesophagus. It has theoretical potential also for the use in squamous epithelial neoplasias.

CASE PRESENTATION

A 39-year-old man with a personal history of heavy alcohol abuse and smoking was evaluated because of intermittent abdominal pain. Based on the symptoms and history of the patient (high-risk group for oesophageal neoplasia), oesophagogastroscope with Lugol staining was indicated (Olympus GIFQ145, Olympus Corporation, Tokyo, Japan).

INVESTIGATIONS

Endoscopic examination revealed a flat, red, lesion involving one-third of the circumference (type IIb according to The Paris classification) in the distal oesophagus; the lesion was Lugol-negative after staining and a typical ‘pink colour’ sign was observed. Multiple biopsies were taken. Histologically squamous carcinoma was described. On subsequent endosonographic examination with a miniprobe (Olympus UM-S30-25R) the lesion was only confined to the mucosa. No pathological lymphatic nodes were observed on radial endoscopic ultrasound or on CT scan.

TREATMENT

Based on the local staging and the patient’s preference (strict denial of surgery), endoscopic mucosal resection (EMR) was indicated for final staging and treatment (figure 1). EMR band-and-cut (Duette™ Multi-Band Mucosectomy, Cook Medical, Bloomington, IN, USA) with two bands was performed and histological examination confirmed early squamous cell cancer limited to the mucosa (m3). According to

the final staging (T1m3N0M0), no adjuvant oncological treatment was given.

Follow-up endoscopy after 1 month showed a scar after endoscopic resection without residual tumour (figure 2). The patient was then followed-up endoscopically with narrow band imaging (Olympus GIFH180) and Lugol staining, Lugol-negative areas with size less than 10 mm proximal to the scar were found after 6 and 12 months and were treated with another two resections band-and-cut. Pathological examination showed low-grade intraepithelial neoplasia in both resected specimens. Another follow-up endoscopy after 18 months with trimodal imaging and Lugol staining (Olympus GIF FQ260Z) showed two Lugol-negative areas in the distal oesophagus 15×15 mm proximal to the scars and biopsy confirmed high-grade intraepithelial neoplasia (figure 3).

Since the patient refused surgical resection and another endoscopic resection could be very difficult due to fibrotic changes, RFA using the HALO system (Barrx Medical, Sunnyvale, CA, USA) as a ‘rescue’ method was indicated. After Lugol staining and marking of the lesion margins with argon plasma coagulation (figure 4), RFA using the HALO 90 system in a standard way used for Barrett’s oesophagus (energy setting 12 J/cm², double application of energy in two passes and cleaning of the ablation zone in between) was carried out without any complications (figure 5 and 6).

OUTCOME AND FOLLOW-UP

Follow-up chromoendoscopy after 8 weeks did not show any unstained lesion (figure 7) and multiple biopsies displayed squamous cell epithelium without any dysplastic changes.

Figure 3 Follow-up endoscopy with Lugol staining after 18 months—Lugol-negative areas proximal to the scars after endoscopic resections, histologically high-grade intraepithelial neoplasia.

Figure 4 Marking of the margins of the lesion with argon plasma coagulation.

Figure 5 Status after the first set of HALO 90 treatment (HALO electrode in the upper part of the picture) and after whipping of the white coagulum with the flat part of the electrode.

Figure 6 Status after the second set of HALO 90 treatment.

Figure 7 Follow-up endoscopy with Lugol staining 8 weeks after radiofrequency ablation—no Lugol-negative areas evident.

DISCUSSION

Since the majority of squamous oesophageal cancers diagnosed in our country are advanced, endoscopic detection of early squamous cancer remains a challenge for our endoscopists. It is partly due to lower incidence of squamous cell cancer that in Asian countries or France and also because of infrequent use of Lugol staining during oesophagoscopy.^{2,3} Lugol oesophageal staining is recommended for use in the high-risk groups of patients (family history of oesophageal squamous cancer, head and neck cancer, achalasia, tylosis, Plummer–Vinson syndrome and heavy smokers and alcohol abusers).^{1,4} Due to the reaction of iodine with glycogen in epithelial squamous cells, the mucosa is stained to brown colour. The areas of inflammation or dysplasia contain no glycogen and stays undyed—Lugol-negative. The typical neoplastic lesion—Lugol-negative area—turns pink after approximately 2 min and this ‘pink colour sign’ has 95% specificity for neoplasia.⁵ In our centre, we use Lugol staining routinely for the patients with a history of head and neck cancer and in heavy smokers and alcoholics. Lugol staining was indispensable for detection of primary and metachronic neoplasias in our patient.

The oesophageal squamous cancer can be classified as early, involving mucosa or submucosa, or advanced involving muscularis propria, adventitia or surrounding structures. Endoscopic treatment for early squamous cancer is accepted in T1m1-m2 stages that carry no risk of lymphatic metastases. In cases of deep submucosal invasion (T1sm2-sm3), the risk of lymphatic metastases is up to 44% and surgery is preferred.^{6,7} Another treatment option is curative radiotherapy. In borderline cases (T1m3-sm1) the treatment should be chosen individually with complex evaluation of

the patient’s condition and preferences. Since our patient strictly refused possible surgical treatment we have decided to treat him endoscopically. Even after successful endoscopic treatment there is a considerable risk of local recurrences and metachronic neoplastic lesions.⁸ Intensive endoscopic surveillance with routine use of Lugol staining is necessary.⁹ We have treated endoscopically two low-grade intraepithelial neoplastic lesions close to primary tumour within the first year of follow-up.

RFA uses high-frequency electromagnetic energy for thermic destruction of pathological tissues. At present, the HALO 360 system is used for circumferential lesions and the HALO 90 system is used for small focal lesions.¹⁰ The ablative energy penetrates the depth of 1000 µm so that mucosa, lamina propria mucosae and lamina muscularis mucosae are destroyed.¹¹ The major indication for the HALO method is Barrett’s oesophagus with high-grade dysplasia; the use of RFA for low-grade dysplasia Barrett’s oesophagus is now reviewed in current running studies.^{12–14} The mechanism of RFA offers certain potential for the treatment of flat neoplastic changes in squamous epithelium of the oesophagus. The first case report of 13 patients treated in Amsterdam was published in 2008 and a prospective cohort study with 60 patients is now running in Beijing and Feicheng.^{15,16}

We have used RFA as a ‘rescue’ method for the treatment of the flat recurrent high-grade intraepithelial neoplasia after repeated EMR of early squamous cell carcinoma. Scarring after preceding EMRs inclined us to use the HALO 90 system for expected better tissue contact. Because of a considerable risk of recurrent neoplasia, intensive surveillance using chromoendoscopy is necessary.

Learning points

- ▶ Lugol oesophageal staining is recommended for use in high-risk groups of patients.
- ▶ RFA can expand our therapeutic possibilities for the management of recurrent neoplastic lesions after endoscopic treatment of squamous oesophageal cancer.
- ▶ Long-term follow-up studies to evaluate its efficacy and safety profile are needed.

Competing interests None.

Patient consent Obtained.

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