—Case Reports—

Argon Plasma Coagulation for a Patient with Locoregional Failure after Definitive Chemoradiotherapy for Esophageal Carcinoma: A Case Report

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Abstract

Patients who undergo definitive chemoradiotherapy (CRT) face a risk of residual resistant disease or disease recurrence at the primary site; therefore, salvage treatment may be required. An optimum strategy to minimize these risks clearly needs to be established. Argon plasma coagulation (APC) is a safe and convenient procedure now applied widely for therapeutic endoscopy. In this report we describe the successful use of APC over 6 years for the treatment of recurrent esophageal cancer after CRT. A 61-year-old Japanese man underwent CRT for a thoracic esophageal cancer. Pathological examination before CRT revealed a well-differentiated squamous cell carcinoma. Locoregional failure was observed 2 years after CRT, and an initial APC treatment was performed. The patient has now undergone APC ablation 7 times with no postoperative complications. No metastasis to lymph nodes or to other organs has been detected during the last 6 years. The usefulness of APC as a salvage treatment for locoregional failure after definitive CRT has not been established. In our experience, salvage APC is the best treatment option for some patients.
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Key words: argon plasma coagulation, esophageal carcinoma, salvage treatment

Introduction

Argon plasma coagulation (APC) is a safe and convenient technique used to induce tissue damage by noncontact electrocoagulation. APC is now widely used for therapeutic endoscopy[1]. Yusoff et al. have described the usefulness of APC for treating gastric antral vascular ectasia in a report on the medium-term outcome after APC ablation[2]. APC has also been successfully used to treat Barrett's esophagus and Barrett's adenocarcinoma in situ[3–5].

Endoscopic mucosal resection (EMR) has recently become the standard treatment for mucosal cancers of the stomach, colon, and esophagus. The enormous surgical stress of operations for esophageal cancer can increase the risk of postoperative complications. Because it is less invasive than conventional surgery, EMR is being increasingly used to treat esophageal cancers confined to the lamina propria mucosae without metastasis. Moreover, the prognosis after EMR is equivalent to that after open resection in patients with mucosal cancers of the esophagus[6,7]. Endoscopic submucosal dissection (ESD) is gaining

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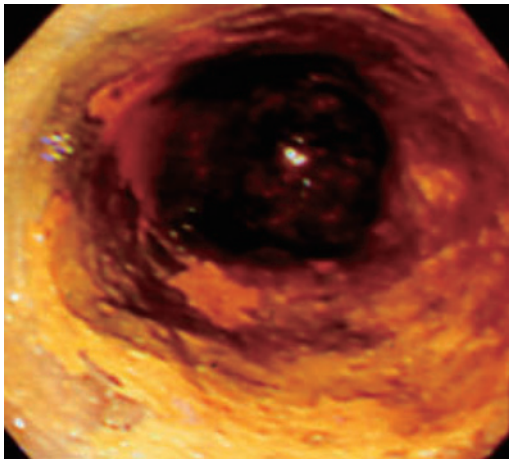

Fig. 1 Endoscopic findings before the first APC treatment

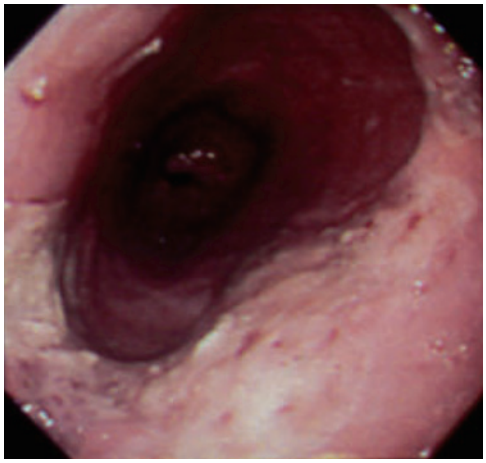

Fig. 2 Endoscopic findings of the ablated lesion on the sixth postoperative day

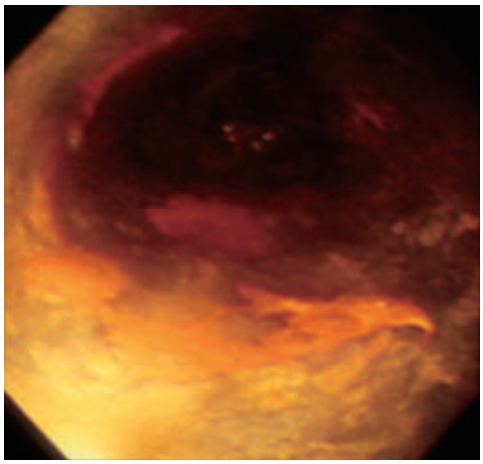

Fig. 3 Endoscopic findings 6 months after the first APC treatment

acceptance among endoscopists for its therapeutic efficacy, especially in Japan[8,9]. Both EMR and ESD are technically challenging, however, as they entail risks of bleeding, perforation, and residual cancer. Bleeding is the most common of these complications, especially among patients with hemorrhagic diathesis and esophageal varices associated with liver cirrhosis. In light of the risk of bleeding, our group usually selects APC, an treatment with a lower risk of bleeding, for patients with superficial esophageal cancers who are poor candidates for EMR or ESD.

Definitive chemoradiotherapy (CRT) without planned resection is one of the available treatments for advanced esophageal cancer. Patients who undergo definitive CRT may require salvage treatment for locoregional failure, however, as they face a risk of residual resistant disease or disease recurrence at the primary site. Although salvage treatment is sometimes required for locoregional failure, no optimal strategy has been established.

Herein we describe the use of APC over 6 years for the treatment of a patient with esophageal cancer who had locoregional failure after definitive CRT.

Case Report

A 61-year-old Japanese man underwent CRT for thoracic esophageal cancer in June 1999 at another hospital. The other hospital described the initially observed tumor as a 0–IIc lesion in the middle thoracic esophagus, with no metastasis to lymph nodes in the mediastinum or abdomen. Pathological studies revealed a well-differentiated squamous cell carcinoma, and the clinical diagnosis was as follows: Mt, 0–IIc, T1b, No, M0, stage I (Japanese Society for Esophageal Diseases). Open surgery is associated with the possible complications of liver cirrhosis (Child-Pugh A) and esophageal varices (postoperative esophageal transection), and EMR was ruled out by the spread of the tumor beyond the muscularis propria. Thus, definitive CRT was selected for treatment. The patient received a total radiation dose of 60 Gy, with the administration of fluorouracil, leucovorin, and cisplatin at the hospital. Complete

remission was obtained. Two years after treatment, an endoscopic examination revealed local recurrence at the primary lesion. APC was chosen because of its high safety and effectiveness and because of the high risk of complications associated with surgery and EMR.

We were asked to treat the patient at our hospital. Ablation was performed with an APC probe (ERBE APC probe; ERBE Elektromedizin, Tübingen, Germany), a high-frequency electrosurgical generator (ICC200. ERBE), and an argon delivery unit (APC 300, ERBE). The first APC treatment was performed in June 2001 for the wide ablation of 0–IIb, 0–IIc (**Fig. 1**) lesions in the middle thoracic esophagus. The APC was performed at 60 W with an argon gas flow of 2.0 L/min. The patient was discharged from the hospital without complications 1 week after the treatment. **Figure 2** shows the endoscopic findings of the ablated lesion on the sixth postoperative day. A large ulcer was observed but was shallow without apparent bleeding. A second APC treatment was performed for local recurrence 6 months after the first APC treatment. Because the shape of the area unstained by iodine was the same as that observed at the first APC treatment (**Fig. 3**), we suspected that the first treatment had not been powerful enough to ablate all of the malignant cells. We thus performed the second APC treatment more aggressively to ensure adequate ablation. Endoscopic findings 6 days after the treatment showed a deep, wide ulcer, but no complications were observed postoperatively. After the last APC treatment, this lesion has remained in complete remission for 4 years. To date, the patient has undergone 7 APC procedures (3 for first lesion, 4 for other lesions) to ablate superficial cancers detected by routine examination and of severe dysplasias detected with histological examination. We performed the treatments before the tumors had the opportunity to enlarge. No metastasis to lymph nodes or to other organ has been detected during the past 6 years.

Discussion

Although the usefulness of APC for therapeutic endoscopy is widely accepted in light of its safety and facility[1,3–5], APC has not been adopted as a standard therapy for malignant disease, including squamous cell carcinoma of the esophagus. The procedure is thought to have several disadvantages compared with EMR or ESD. Most significantly, histological examinations of depth, invasion of lymphatic vessels and blood vessels, and surgical margins are impossible, because specimens cannot be removed with APC. It is also difficult to confirm whether ablation is sufficient during APC. In light of these disadvantages, APC is suitable only for patients unable to undergo standard therapies.

The principal goal of APC in the treatment of superficial esophageal cancer is sufficient ablation of cancer tissues. In the present case the first APC treatment may have been inadequate, because the shape of the recurrence observed on endoscopy was identical to that observed before ablation. Studies of freshly resected esophageal specimens have shown that APC rarely causes deep tissue destruction or subsequent perforation[10]. This is consistent with a clinical report describing a low incidence of perforation[11]. Sufficient ablation should be performed to confirm the effects of APC.

Although definitive CRT is a beneficial nonoperative strategy for esophageal cancer, locoregional failure still occurs in 40% to 60% of patients with recurrent locoregional disease[12]. Salvage treatment may be necessary for these cases, although an optimal strategy has not been established. Surgery involves high risk, as the patients have been exposed to radiation treatment at higher doses many months earlier. Swisher et al. have reported increased morbidity and a higher rate of hospitalization after salvage esophagectomy[13]. Furthermore, there is no second-line chemotherapy with curative intent. Hattori et al., on the other hand, have used salvage EMR for patients with locoregional failure after definitive CRT[14]. Their patients had a 3-year survival rate of 57% after salvage EMR, and nearly half of them were alive and disease-free in the second postoperative year. Hattori's group have also managed to perform EMR safely, with no serious complications, such as bleeding and perforation. Their criteria for salvage

EMR are as follows: (1) no deep ulceration; (2) clinically defined N0 or M0 disease; (3) definite or suspected cancerous mass limited to the submucosa (T1); and (4) an expectation that complete resection could be achieved with EMR[9]. Although no criteria for APC have been established for superficial cancer of the esophagus, criteria (1) to (3) for EMR are deemed applicable, as APC can ablate the submucosal layer as completely as can EMR, with equivalent therapeutic efficacy[10]. In our patient we observed locoregional failure 2 years after definitive CRT. We chose repeated APC as a salvage treatment, as the complications of liver cirrhosis and esophageal varices are elevated with EMR. No metastasis to lymph nodes or to other organs has been detected during the past 6 years.

We suspect that several institutions have already introduced APC for the treatment of locoregional failure after definitive CRT, in light of its greater safety and convenience compared with EMR, ESD, and open surgical treatment. However, our PubMed search of the literature has yielded no earlier studies or case reports of the outcome and efficacy of the procedure. Patients rarely undergo salvage APC, and many institutions select other treatments for locoregional failure. In our experience, however, salvage APC is likely to be the most appropriate treatment for some patients. It will be necessary to evaluate the long-term results of salvage APC, as it may be an effective endoscopic approach for the management of locoregional failure after definitive CRT.

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