Low power radiofrequency ablation for symptomatic microcystic lymphatic malformation of the tongue

Nam-Gyu Ryu, Sang Kyu Park, Han-Sin Jeong*

Department of Otorhinolaryngology-Head and Neck Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, 50 Il-Won Dong, Kang-Nam Gu, Seoul, 135-710, Republic of Korea

Received 12 April 2008; received in revised form 2 August 2008; accepted 9 August 2008
Available online 26 September 2008

Keywords
Congenital malformations; Lymphangiomas; Head and neck tumor; Mouth neoplasms; Radiofrequency catheter ablation

Summary Although many head and neck surgeons agree that complete surgical excision is the treatment of choice for lymphatic malformation, the infiltrating nature of microcystic lymphatic malformations and the involvement of vital structures of the head and neck make total removal nearly impossible in most cases. Recently radiofrequency ablation was introduced for the treatment of microcystic lymphatic malformations of the oral cavity; it destroys lesion tissues at low temperature (40–70 °C) with minimal damage to adjacent structures. However, high energy (800–1200 J) and general anesthesia for radiofrequency ablation can hinder the easy and repetitive application of radiofrequency to patients. To overcome this limitation of radiofrequency ablation for microcystic lymphatic malformations, we used the same technique with a lower power (6 W, less than 100 J per site) radiofrequency ablation in an office-based setting under local anesthesia in a child with a microcystic lymphatic malformation of the whole tongue, that was associated with recurrent bleeding and swelling. The repetitive low power energy radiofrequency ablation of the microcystic lymphatic malformation of the tongue was safe and effective; it provided the patient with symptomatic relief without recurrence at follow-up. Therefore, our modification of radiofrequency ablation of the microcystic lymphatic malformations could be technically feasible and easily applicable; our result suggests that it can be a useful alternative treatment option to relieve symptoms from microcystic lymphatic malformation of the oral cavity.

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1. Introduction

Lymphatic malformations are generally classified into macrocystic or microcystic based on the size of the cyst. In the head and neck region, macrocystic lesions typically occur below the level of the mylohyoid
muscle (type I) and they respond well to sclerotherapy [1—5]. However, microcystic lesions tend to infiltrate the surrounding tissues, making resection difficult and sclerotherapy ineffective. Complete excision of microcystic lymphatic malformations is not possible without inevitable surgical morbidity [1—3,6—9]. Partial resections, carried out to avoid surgical complications, are associated with a high chance of recurrence or regrowth, resulting in the need for repeated surgery [10]. Therefore, new treatment options for microcystic lymphatic malformation are needed. The goals of new techniques would include effective volume reduction with minimal surgical morbidity, as well as the inhibition of regrowth of residual malformation without impairment of wound healing [10]. Prior studies have reported that radiofrequency ablation for microcystic lymphatic malformations is safe and effective with minimal complication [1,10—12]. The treatment outcomes with radiofrequency ablation in patients with microcystic lymphatic malformations of the oral cavity have been very promising with effective control of the associated symptoms [10]. However, in these reports, all radiofrequency ablations were performed under general anesthesia using relatively high energy (800—1200 J), making repeated application of radiofrequency ablation difficult [3,10,11].

Here, we used the same technique with a lower power (6 W, less than 100 J) radiofrequency ablation in an office-based setting under local anesthesia in a child with microcystic lymphatic malformation of the whole tongue that caused recurrent bleeding and swelling.

The repetitive application of low power radiofrequency ablation of the microcystic lymphatic malformation of the tongue was safe and effective as well as feasible and easily applicable, with an acceptable outcome. Therefore, this technique may be considered as a treatment option for the relief of symptoms in patients with microcystic lymphatic malformations of the oral cavity.

2. Case report

A 12-year-old girl with recurrent tongue swelling and bleeding presented for treatment of her tongue lesions. She reported intermittent tongue swelling from the anterior to the posterior portion of the tongue since infancy. There was no dyspnea, dysphagia or facial deformity. The family and medical history were negative for malformations. At presentation, the MRI revealed a 2.2 cm × 5.1 cm × 2.6 cm mass of the tongue that extended to both sides of the tongue intrinsic muscle on T2 weighted images (Fig. 1). The lesions did not com-

promise the pharyngeal airway. For symptomatic relief, we decided to treat her with low power radiofrequency ablation of the lesions in the outpatient clinic. Before the radiofrequency ablation, we did not use any medical management including steroids, because there was no evidence of acute exacerbation and inflammation.

The patient had two sessions of radiofrequency ablation sessions with an interval of 1 month between the sessions. During each session, 6 W (6 W × 10—15 s = 60—90 J) radiofrequency energy per one injection area (Celon Lab ENT, Celon AG Medical Instruments, Teltow, Germany) was applied to, six or seven areas at a minimum of 1.5 cm apart on the surface and a depth of 1.5 cm. During the radiofrequency ablation, local anesthesia with lidocaine infiltration into the insertion site of the
radiofrequency probe was used. The patient tolerated the radiofrequency procedure well and had only minimal discomfort during and after the treatment. The postoperative instructions included antibiotics and analgesics for 7 days and oral gargles with 0.01% benzethonium. There were no complications related to the procedure. Two months after the second session of radiofrequency ablation, a significant decrease in bleeding and a reduction of the tongue lesions were noted. Six months after the procedure, the surface of the tongue was nearly normal and the engorged vessels disappeared completely (Fig. 2). During the one-year follow-up, recurrence of her symptoms was not found.

3. Discussion

Lymphatic malformations of the face or oral cavity are difficult to control completely. Although surgical excision is the treatment of choice, the complications associated with resection of lymphatic malformations of the oral cavity and cervicofacial regions frequently include damage to the surrounding structures, infection and scarring [1—3, 6—9]. Permanent nerve paralysis has been reported in 6—76% of patients who had surgical resection [8, 13—16]. In addition, 60—85% of patients with lymphatic malformations in the face or oral cavity had recurrences after the initial surgery, compared to 10—15% of patients with lymphatic malformations in the infrahyoid area; this is because most lesions in the suprathyroid area are microcystic and infiltrative [7, 17]. Therefore, symptomatic relief is the treatment goal for microcystic lymphatic malformations of the oral cavity.

Recently, radiofrequency ablation has been introduced to achieve the goal of symptomatic relief, with promising results [1, 10, 11]. In one recent report, the radiofrequency ablation of microcystic lymphatic malformations of the oral cavity was effective with acceptable results in 7 (64%) of the 11 patients [10]. As for the energy of the radiofrequency ablation used for lymphatic malformations, the effective doses are much higher than are conventionally recommended for standard tongue-base reduction procedures [11]. Thus, all of the prior trials on radiofrequency ablation of lymphatic malformations have used relatively high energy (800—1200 J) [3, 10, 11].

However, low energy radiofrequency ablation might provide symptomatic relief from a lymphatic malformation of the tongue using similar energy levels as the procedures for tongue-base reductions. The high energy radiofrequency procedures can produce pain and swelling and are not suitable for the office-based setting with local anesthesia [3, 10, 11]. High dose therapy can also cause postoperative edema, which might obstruct the airway [3, 10]. Therefore, we modified the high energy ablation method to a low energy (less than 100 J per site) ablation, with the aim of causing less pain and providing a procedure tolerable by patients, even children, with local anesthesia.

As expected, the patient (12-year-old girl) tolerated the modified method during the two sessions of

Fig. 2 Gross findings of the microcystic lymphatic malformation of the tongue. (A) Initial findings, (B) at 1 month after the first radiofrequency ablation, (C) at 6 months after the second radiofrequency ablation.
radiofrequency ablation. After the sessions, the volume of the microcystic lymphatic malformation of the tongue was reduced and she no longer complained of bleeding and recurrent swelling. In addition, there were no complications associated with the radiofrequency ablation, and no recurrence was noted at the one-year follow-up.

This modification of radiofrequency ablation has the following clinical advantages compared to prior methods. First, it is easily performed in an office-based setting and under local anesthesia. Thus, if patients have a recurrence after the initial radiofrequency ablation, repeated procedures can be performed. Moreover, use of a low energy ablation has reduced risks of ablation-related complications. In summary, the low energy radiofrequency ablation for microcystic lymphatic malformations is a simple and cost effective treatment option. This method can be a useful alternative treatment for lymphatic malformations of the oral cavity, particularly for symptomatic relief.

Conflict of interest statement

All authors have no financial and personal relationships with other people or organizations that could inappropriately influence this work.

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