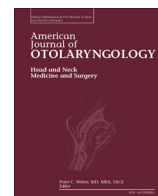




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The experience of treatment of coblation assisted surgical approach to Eagle's syndrome

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ABSTRACT

Objective: This article aimed to Summarize our therapeutic experience with Transoral coblation assisted surgical approach used for treatment of Eagle's syndrome.

Methods: sixty-two consecutive patients, from 2010 to 2015, underwent coblation assisted surgical treatment to remove elongated styloid process transorally. Outcomes were assessed in terms of intraoperative and postoperative complications, patients' evolution and efficiency of treatment.

Results: The amount of bleeding was 1 ml ~ 4 ml, average 2.7 ml, unilateral operation time was 3 min to 10 min, average 6.2 min, bilateral for 7 min to 15 min, average 13.5 min. no bleeding and complications after operation. Pseudo membrane completely off the 14 days or so, the cure rate was 58.1%, the efficiency of 30.6%.

Conclusion: In order to get a good curative effect, we should pay attention to the accurate diagnosis, choose the appropriate way of intubation and mouth opening device, pay attention to the details of the operation, maximize the effect of coblation to achieve a more minimally invasive treatment effect.

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1. Introduction

The terms 'Eagle's syndrome'(ES) or 'Stylohyoid syndrome' describe a series of symptoms caused by an elongated styloid process and/or the mineralization (ossification or calcification) of part or the entire stylohyoid ligament [1].The elongated styloid process syndrome can be treated conservatively or surgically [2]. Conservative therapy includes analgesics and local corticosteroid or anesthetic administration [3]. Surgical resection of elongated styloid process include transoral and transcervical approach. Usually, Transoral approach is more commonly used. Traditional transoral approach often demand performance of tonsillectomy before the incision of elongated styloid process.

However, for patients with no recurrent tonsillitis, concurrent tonsillectomy causes not only unnecessary damage, time consuming, but also the increased amount of bleeding.

In recent years, some literatures have reported some tonsil-sparing transoral surgical approaches to Eagle's syndrome [4–6], which not only reduce unnecessary injury, but also shorten the operation time, reduce the amount of bleeding.

Coblation technology, whose operating temperature is 40 to 70 degrees, is a minimally invasive technique and has the characteristics of cutting, ablation, hemostasis and suction. According to the character of

the minimally invasive treatment of coblation technology, we treated the Eagle's syndrome by using coblation, with tonsil-sparing transoral surgical approach, achieved the minimally invasive aim, achieved a good therapeutic effect and accumulated a certain amount of clinical experience. The aim of this article is to describe the coblation assisted tonsil-sparing transoral approach, present the outcomes of our clinical work in patients with Eagle's syndrome and summarize our clinical experience.

2. Materials and methods

A total of 62 consecutive patients (20 female and 42 male) with Eagle's syndrome, ages 38 to 69 years (mean age = 52.3 years), with symptomatic elongated styloid process, who received surgical treatment between 2010 and 2015, were included. The diagnosis of Eagle's syndrome was made on the basis of the following criteria:

- 1) the symptoms of the patient;
- 2) palpation of an elongated styloid process in the tonsillar bed as a hard bony spicule that aggravates the symptoms with local tenderness;
- 3) temporary relief of symptoms on the infiltration of 1 ml of 2% lidocaine locally;
- 4) radiographic findings that reveal elongated styloid process [7]. A detailed medical history and complete physical examination were undertaken on all patients. Patients with certain diseases that may cause a sense of foreign body sensation in the pharynx, such as

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Table 1
Patients' Complaints.

Complaint	Number of Patients
Only Pain in the throat	12
Foreign body sensation in the throat	21
pain on changing head position	20
earache	4
Pain in lower right neck	2
Pain in the throat, worsen when changing the head position	3

hypertrophy of lingual tonsil, were excluded. Among these, 18 cases were bilateral, 32 were on the right, and 12 were on the left, and there were 80 elongated styloid processes in total. None of the patients had a history of tonsillectomy. The preoperative symptoms are summarized in Table 1.

The surgical procedures were all conducted under general anesthesia. The patient was nasal intubated. The neck was hyperextended and the mouth was suspended open. The procedure started with placement of the Davis mouth gag for better visualization of the surgical field. When we excised the left side of the styloid process, we chose the mouth gag which open to left side, and vice versa. Meanwhile, Davis mouth gag with proper length was carefully chosen. The protuberance of elongated styloid process was identified by digital palpation and then, the overlying mucosa and tonsillar tissue was incised by 5874# coblation, 7 grades for cutting, 5 grades for hemostasis, until the tip of styloid bone exposed. A proper hollow ethmoid curette was set into the tip of the styloid process and pushed to the root along the direction of styloid process. While doing this, the adjacent tissues were constantly separated to allow visualization of the entire length of the styloid process. In this process, a needle holder was used to assist the ethmoid curette and applied to removed the elongated styloid process from the tip up to the base. Keep the original position of ethmoid curette unchanged, use the coblation to hemostasis until no active bleeding. The muscles and mucosa over the surgical bed were closed in a plain. The patients received intravenous Cefalotin 1.0 g half hour before the beginning of the surgery and every 8 h at the hospital for a period of 48 h. They also received an oral administration of Cefuroxime 250 mg every 12 h for 2 days as an outpatient. Good oral hygiene was maintained in the postoperative period. (See Fig. 1.)

3. Results

In 62 patients, simultaneous bilateral styloidectomy in 18 cases, left styloidectomy in 12 cases, the right styloidectomy in 32 cases. All patients were treated with a tonsil-sparing transoral surgical approach. The length of the resected portion of the styloid process was 1.2 cm to 2.5 cm, with an average of 1.8 cm. Intraoperative bleeding volume is of 1 ml ~ 4 ml, the average 2.7 ml, unilateral operation time for 3 min to 10 min, average 6.2 min, bilateral 7 min to 15 min with an average of 13.5 min. All patients can be a normal diet on the day of surgery. There were no postoperative bleeding, hematoma and complications occurred. Suture was removed on the seventh postoperative day, part of them shed on their own. The incision healed well. Pseudo membrane completely shed off on postoperative 14 days or so. Patients followed-up range from 3 months to 5 years. Among these patients, 36 patients had total relief of symptoms and the cure rate was 58.1%. 19 patients had significant relieve of symptoms and the effective rate was 30.6%. 5 patients reported partial improvement of symptoms. The remaining 2 patients, lost to follow up, were considered as ineffective. 2 cases reported recurrence of symptoms in six months after the surgery.

4. Discussion

An elongation of the styloid process related to an ossifying process of the stylohyoid ligament was first described in 1652 by an surgeon from Padua, Pietro Marchetti and the clinical signs and symptoms were defined by Eagle in 1937 [8].

Treatment for Eagle's syndrome is usually conservative and surgical. Since the effect of conservative method is not long lasting [9,10], Surgical resection has generally been accepted as the primary treatment for Eagle's syndrome.

several transoral and transcervical approaches have been described for the surgical management of Eagle's syndrome [4,5,7,11–15]. There are ample discussion about the advantages and disadvantages of both the extraoral transcervical and transoral approaches in these literature. Oral surgeons and otolaryngologists most often perform the intraoral approach. However, Some literatures have reported some disadvantage of transoral approach, such as possible infection of deep neck spaces, risk of injury to major vessels, poor visualization and postoperative trismus, airway edema [7,13,16,17]. Yet, with the assistant of coblation, patients in our series did not experience any of the complications

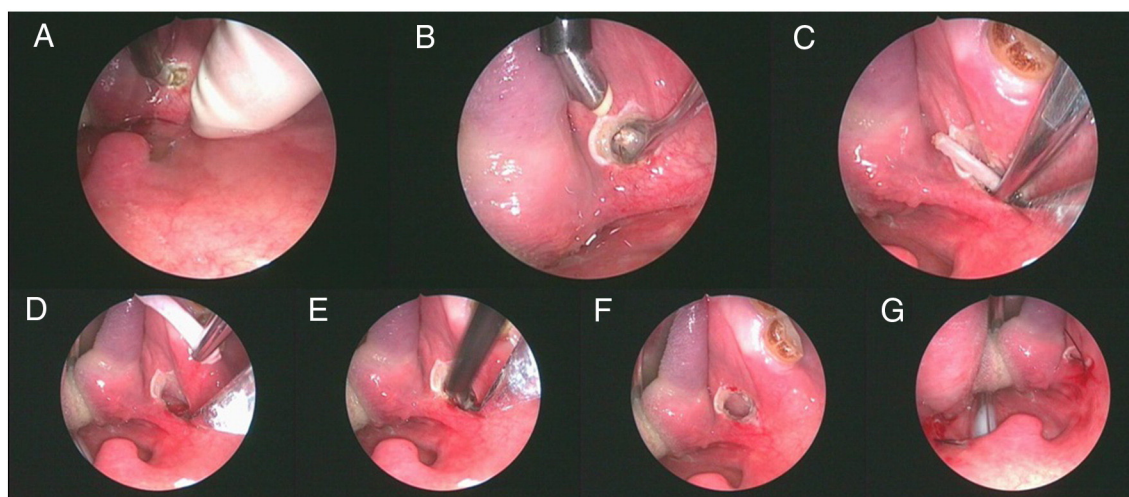


Fig. 1. Intraoperative endoscope views: (A) Finger palpation confirmed the tips of styloid process, incision by the coblation; (B) The tip of styloid bone was exposed, a proper hollow ethmoid curette was set into the tip of the styloid process; (C) Needle holder was used with force to help to promote the curette until the base of the styloid process; (D,E) After the styloid process was resected, hold the position of curette and does not move it; (F) The image after resection of the styloid process; (G) Bilateral styloidectomy, Image after incision was sutured.

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