

ORIGINAL ARTICLE

Elongated Styloid Process: A Diagnostic Challenge and Surgical Tremulousness

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ABSTRACT

Aims: Elongated styloid process (ESP) is distressing to patients and often difficult to diagnose due to its wide variability of symptoms. It is easily confused with dental pain or temporomandibular joint disorder, leading to missed diagnosis and unnecessary procedures. An elongated styloid process should be considered as a possible etiology of dull pain along the jaw and temple line. Our aim is to present our experience with case series of 30 cases of ESP treated by intraoral tonsillo-styloidectomy.

Material and methods: This is a hospital-based observational study of 30 cases of ESP diagnosed clinically and radiologically. They all underwent intraoral tonsillo-styloidectomy. We followed them up to 1 year. All peri-operative/post-operative complications and symptomatic improvements were recorded. VAS (visual analogue score) scoring system was used for post-operative pain assessment.

Results: Age range of cases was 20-60 years with female preponderance. 18 patients had bilateral and 12 had unilateral symptoms. Most common symptom was vague neck pain. Length of styloid process among these cases ranged between 30-50 mm. There was no intra-operative and post-operative complication. Out of 30, 2 patients presented with recurrence of pain at 12 months follow-up.

Conclusion: Any case of unexplained and persistent neck pain should be evaluated thoroughly. Clinical and radiological correlation for exact diagnosis of this entity is necessary and surgical excision is the best modality for its treatment.

Keywords: Styloid process; elongated; difficult diagnosis; styloidectomy

Availability of data and material: Patients who attended our OPD were evaluated and then after applying inclusion and exclusion criterias they were included in the study.

Institutional Ethical Approval: All procedures performed in present study involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards and got institutional Ethical Approval.

Informed Consent Statement: Informed and written consent was obtained from all individual participants included in the study.

INTRODUCTION

Elongated styloid process also known as Eagle's syndrome was first noted in 1652 by Pietro Marchetti but described by W. W. Eagle in 1949. It occurs due to elongation of styloid process or ossification of stylohyoid ligament impinging on local neurovascular bundle¹. It is a rare clinical entity with difficult diagnosis as a result of its vague symptomatology. It leads to variable symptoms like: throat pain, facial pain, ear pain, globus sensation, dental pain, odynophagia, pain during head movements and headache. Throat pain is the commonest symptom². Its incidence is 4% but only 4 –7 % of this group is symptomatic³.

Normal length of the styloid process ranges between 20–30 mm. It is supposed to be elongated when its length is more than 30 mm^{4,5}. There are various theories explaining its etiology but it is still uncertain. Some theories state that it is genetically associated whereas some suggest that it may be a result of trauma. In one of

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the literature it was associated with early onset of menopause⁶.

The ambiguity of its presentation and infrequent exposure to such cases at clinics make it a diagnostically challenging entity. These patients may be handled by an otorhinolaryngologist, dentist, neurologist or by a pain expert at pain clinics. Despite of being treated by various medicines patients remain unsatisfied with persistence of symptoms.

There are variety of pathologies which are enlisted as differential diagnosis of Eagle's syndrome. Thus, it can be a diagnosis of exclusion. The diagnosis of this condition requires awareness and vigilance. It is confirmed through history, palpation of the tonsillar fossa, local anesthesia infiltration, and radiography. If pain is reproduced by palpation and either referred to the ear, face, or head, the diagnosis of an elongated styloid process is very likely. A styloid process of normal length is usually not palpable. The diagnosis should be confirmed by imaging. Some clinicians still go through orthopantomogram but in this era of advanced technologies, three-dimensional computed tomography (3D-CT) is the best imaging modality as it gives accurate measurement of styloid process⁷.

There are both surgical and conservative methods for treating Eagle's syndrome, but in most cases, surgery is performed to remove the elongated styloid process. Surgical excision can be accomplished via the external or intraoral approach. The objective of this study is to present our experience with surgical excision of elongated styloid process in 30 cases via intraoral approach.

MATERIALS AND METHODS

This is a hospital based, observational study conducted in the department of otorhinolaryngology of our institute from 2010 to 2016. 30 patients with symptomatic elongated styloid processes who underwent surgical treatment were enrolled in the study. Both male and female patients with age range 20-60 years were included. This study was approved by institutional ethical Committee. A detailed history and physical examination of the head and neck was done. The most common complaints of the patients were pain in the throat, otalgia and foreign body sensation in the throat. Physical examination included careful palpation of the tonsillar fossa, lateral pharyngeal wall, and the area between mastoid process and mandibular angle in an attempt to precipitate the patient's discomfort. All of the patients were screened thoroughly, and pain due to other factors, such as temporomandibular, dental, orthopedic and

neurologic causes, were ruled out. Diagnosis was confirmed radiologically either by orthopantomogram (OPG) or 3D-CT scan and patients having a styloid process longer than 30 mm were planned for surgical excision by transoral approach [Figure 1]. Hematological and biochemical investigations were carried out to assess medical and surgical fitness.

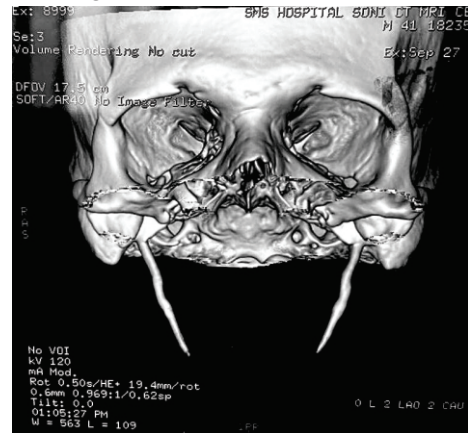


Fig. 1: 3D CT scan showing bilateral elongated styloid process

After the examination and appropriate investigations, informed and written consent was taken for participation in the trial after which they underwent pre-anesthetic check-up. The operation was performed under general anesthesia in tonsillar position (Rose's position). Unilateral or bilateral tonsillectomy was performed according to the case, the tonsillar bed was palpated and the tip of the styloid process was identified. Periosteum was incised by 11 number surgical blade and elevated along the styloid process in the tonsillar fossa. Denuded styloid process was excised with a bone nibbler rongeur. Hemostasis was achieved. An Alternate approach was also used in a few patients going through anterior tonsillar pillar and saving tonsil (Figure 2). Oral feeding was started on the next day. They all were discharged after 24 hours of the surgery. All patients were managed with oral antibiotic and analgesic therapy for 1 week. First follow-up examination at 7 days showed uneventful recovery without any complications. Patients were followed up for at least 12 months.



Fig. 2: Intraoperative picture showing elongated left styloid process approached through anterior tonsillar pillar

The data were entered into Statistical Package for Social Sciences version 15.0 (SPSS Inc., Chicago, IL, USA) and analyzed. Absolute numbers and simple percentages were used to describe categorical variables. Quantitative variables were described using measures of central tendency (mean, median) and measures of dispersion (range, standard deviation) as appropriate.

RESULTS

Total 30 patients with clinically and radiologically confirmed elongated styloid process were included in the study. There were 9 males and 21 females with age ranging from 20 to 60 years were included. 12(40%) patients had bilateral symptoms and underwent bilateral styloid process resection and rest 18(60%) patients had unilateral symptoms; hence a unilateral styloid process resection was performed. In total, 42 styloid processes from 30 patients were resected [Table 1]. The length of styloid processes ranged from 30 to 50 mm (mean 40 mm). Presenting symptoms of patients are mentioned in table 2.

All patients underwent tonsillo-styloidectomy either unilateral or bilateral as per decision taken by the operating surgeon pre-operatively after proper evaluation. No immediate or delayed post-operative complications were encountered in the patients. Pain grading was done using VAS score both pre- and post-operatively at follow-up after 1 week and upto 12 months. This scoring was cumulatively used for those 24 patients whose presenting symptom was pain irrespective of the site. At the first follow-up after 7 days there were no patients who had complaint of pain but at 12 months follow-up 1 patient experienced recurrence of throat pain and 1 had recurrence of vague neck pain.

DISCUSSION

The styloid process is a thin bony projection that emerges from the skull base. It has several attachments including the stylomastoid foramen, the jugular foramen, the mastoid process, and importantly, the carotid canal⁸.

An elongated styloid process may be a source of craniofacial and cervical pain. This condition is characterized by a dull & nagging pharyngeal pain. Sometimes the pain is localized, or radiates to the jaw and ear and may mimic dental pain. The mean age of presentation is usually 3rd and 4th decades, with female predilection⁹.

Exact cause of symptomatic ESP is still unclear. Various theories are given at different time intervals including (1) traumatic fracture of the styloid process exerting pressure on the surrounding structures(2) compression of adjacent nerves; the glossopharyngeal,

lower branch of the trigeminal, or chorda tympani (3) insertion tendonitis of the stylohyoid muscle(4) irritation of the pharyngeal mucosa by direct compression on cranial nerves V, VII, IX, and X and (5) encroachment of the carotid vessels, causing irritation of the sympathetic nerves present in the vascular sheath¹⁰.

The Clinical examination of tonsillar region is must whenever a patient comes with unexplained craniofacial or cervical pain. A clinician should pay attention to patient's complaints even in the absence of any exact cause and try to reach on its cause. It is wise to keep in mind all the causes of the origin of oropharyngeal pain at the time of evaluation.

W. W. Eagle conducted a study and he mentioned that the normal length of the styloid process was 2.5 cm to 3 cm. He noted that medial deviation of the styloid process can be a cause of facial pain. Eagle reported two forms of the syndrome, carotid artery and classic type. Cause of pain in the classic type was compression on the cranial nerves V, VII, IX, and X due to scar formation underneath the tonsillar fossa after tonsillectomy. The carotid artery type was characterized by headache and nerve problem because of the irritation of the sympathetic nerve plexus³.

To make a diagnosis, complete history and a thorough clinical examination of the head and neck is of utmost importance. The symptoms can be reproduced by palpation over the stylohyoid complex cautiously. The tip of the styloid process can be palpated at the level of the tonsillar fossa as a bony spicule, which is hard and, when palpated, can cause local tenderness and associated symptoms¹¹.

Imaging is the best tool to confirm the diagnosis. Various imaging modalities are there like orthopantomogram, Towne's projection, lateral oblique view of the mandible, anteroposterior skull radiographs and 3D-CT scan. In current scenario, 3D-CT imaging of the skull base is the imaging modality of choice as it provides the most accurate evidence of the osseous-ligamentous anomalies related to the syndrome as well as the accurate measurement¹².

The Treatment is based on the severity of symptoms. Non-surgical interventions can be helpful in mild symptoms which includes reassurance, oral analgesics and local corticosteroid injections, but when symptoms are severe and recurrent, surgical excision via transcervical or transoral approach is the best treatment modality. Both approaches have their own pros and cons. Transcervical approach provides good visualization and also has less chance of deep neck space infection. But external scar mark, comparatively longer duration of

surgery, and risk of injury to the facial nerve are some of its disadvantages. On the other hand, intraoral approach is comparatively safe, simple, and less time-consuming procedure in which external scar mark can be avoided. But in this approach possibility of deep neck spaces infection, risk of injury to major vessels, and poor visualization of surgical field are some associated disadvantages^{10,13}.

One more intraoral technique is mentioned in the literature in which tonsillectomy is not required. In that technique incision is given just anterior to ramus of mandible and plane of dissection remains lateral to superior constrictor muscle. They found it to be simpler than tonsillo-styloidectomy¹⁴.

Table 1: Laterality of elongated styloid process among study population

Laterality	No. of patients (%)	No. of styloid processes resected
Unilateral	18 (60)	18
Bilateral	12 (40)	24
Total	30 (100)	42

Table 2: Symptoms of patients

Symptoms	No. of patients (N=30)	Percentage (%)
Vague neck pain	12	40
Throat pain	8	26.67
Foreign body sensation in throat	6	20
Pain on swallowing	2	6.67
Ear pain	1	3.33
Temporomandibular joint pain	1	3.33

KEY MESSAGE

Eagle syndrome is a clinical entity caused by elongated styloid process along with a wide variety of symptoms. It should be considered a possible etiology of dull cranio-facial or cervical pain. Due to presence of various causative factors of such type of pain it is important to attend to such patients carefully and with patience as they are ignored by most of the clinicians. Keeping this diagnosis in mind one should proceed accordingly. Surgery is the best option for ESP. In our study, successful outcomes were there using an intraoral approach without any complications.

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