



**ORIGINAL RESEARCH PAPER**

**ENT**

**EFFECTIVENESS OF TRANSORAL SURGICAL APPROACH IN TREATMENT OF EAGLE'S SYNDROME**

**KEY WORDS:** Stylalgia, Pharyngodynia, Eagle's syndrome, Styloidectomy, Styloid process

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**ABSTRACT**

The Eagle's Syndrome is a condition in which the styloid process is elongated which is associated with dull nagging type of pain in the throat and ear especially while swallowing and mastication. Elongated styloid process leads to cranio facial or cervical pain. It is one of the cause for referred otalgia. The diagnosis and treatment of neuralgias of the head and neck form one of the most difficult clinical problems for the patient and for the clinician. So if diagnosed and treated properly it will be of great relief. In this study, the importance of digital palpation through tonsillar fossa and radiographs in differentiating the pain of elongated styloid process from the wide variety of other facial neuralgias is emphasized and the outcome of effectiveness of transoral surgical approach in treatment of Eagle's syndrome is discussed.

**INTRODUCTION**

Eagle's Syndrome is a condition in which styloid process is elongated which is associated with dull nagging type of pain in the throat (Pharyngodynia) and ear (Otalgia) especially while swallowing and mastication. The incidence is 0.16%<sup>1</sup>.

Styloid process is derived from Greek word 'Stylos<sup>2</sup>' which means a pillar. This elongation was first described in 1652 by Italian surgeon Pietro Marchetti. In 1852, Demanchetis described a calcified stylohyoid ligament. Weinlecher also described the symptoms related to it.

In 1937, Watt W Eagle coined the term stylalgia<sup>3</sup> to describe pain associated with elongation of styloid process. He defined the syndrome of the elongated styloid process in which post tonsillectomy patients had dull long term pain in throat, headache and pain radiating to ear. Eagle has described two syndromes: classic Eagle's syndrome, Stylocarotid syndrome. In the former, sensation of foreign body in throat and pain on deglutition are present. The second syndrome may or may not follow tonsillectomy. Pain is caused by mechanical irritation of sympathetic nerve tissue in walls of internal and external carotid artery by the tip of styloid process or ossified ligament.

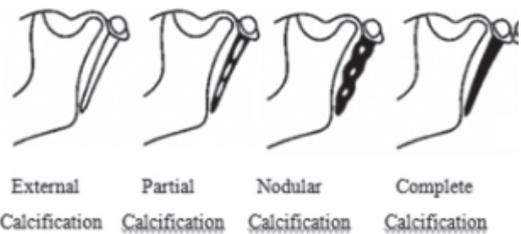
Styloid process is derived from reichert's cartilage<sup>5</sup> of the second pharyngeal arch. Embryologically it consists of four parts: tympanohyal portion, which fuses to petrous temporal bone to form base, stylohyal portion, which forms main body and ceratohyal portion, which becomes stylohyoid ligament and hypohyal portion, which forms lesser horn of hyoid bone. Styloid process, stylohyoid ligament and lesser horn of hyoid bone comprises the stylohyoid complex or apparatus. Styloid process is a cylindrical bony outgrowth located in front of the stylomastoid foramen which extends from temporal bone. It is positioned between internal carotid artery medially and external carotid artery which bifurcates into superficial temporal and maxillary arteries laterally. Medial to it is internal jugular vein along with cranial nerves VII, IX, X, XI and XII. Anatomically it is present posterolateral to tonsillar fossa.

The normal length of styloid process is 2 to 3 cm<sup>6</sup>. Eagle's syndrome is symptomatic elongation or thickening or angulation of styloid process or mineralization (ossification or calcification) of stylohyoid ligament complex. It can project into tonsillar fossa and irritate surrounding anatomical structures of the neck. Due to its position, any abnormality may lead to non-specific symptoms including pharyngeal pain localized to the tonsillar fossa, dysphagia, referred otalgia, and foreign body sensation in throat. These symptoms can be confused with a wide variety of facial neuralgias, and temporomandibular, oral and dental diseases.

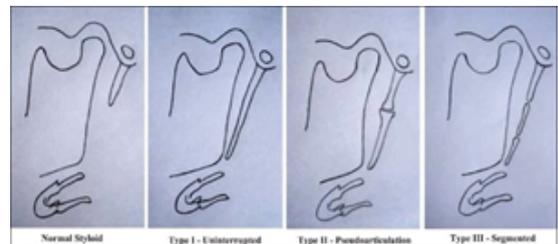
Styloid process is grossly enlarged in 4% of general population<sup>2</sup>. Only 4 to 10% of the above is symptomatic. It is commonly observed in third and fourth decade of life and women outnumber men. Styloid process elongation can occur both unilaterally and bilaterally<sup>7</sup>. Bilateral elongation is more common, though it is not always true with the symptoms produced<sup>8</sup>.

Steinman has proposed three theories to explain the ossification of the Stylohyoid ligament. The theory of Reactive Hyperplasia states that trauma can be the cause, the theory of Reactive Metaplasia explains that it can be post traumatic healing response and theory of Anatomic variance states that such ossification is an anatomical variation that occurs without any recognizable trauma<sup>9</sup>.

Langlais et al. have classified elongated styloid process as type I which is uninterrupted, type II which is a pseudo-articulation between styloid process and stylohyoid ligament and type III in which there are interrupted segments of mineralized ligament, creating the appearance of multiple pseudoarticulations<sup>10</sup> (Figure 1 & Figure 2).



**Figure 1. Calcification classification proposed by Langlais**



**Figure 2. Morphological classification proposed by Langlais**

Panoramic radiograph, lateral head and neck radiographs, Towne's radiographs, lateral oblique radiograph of mandible, antero-posterior head radiograph and computed tomography are taken for confirmation. However, the complete details of length, angulation and relation to adjacent structures can be obtained from a CT scan by formulating a 3D-CT.

Treatment of Eagle's syndrome is both non-surgical and surgical. Nonsurgical treatment includes reassurance, nonsteroidal anti-inflammatory drugs, physiotherapeutic neck exercises and steroid injections. Steinmann has reported good results with injection of a steroid or a long acting anesthetic drug at lesser horn of hyoid or inferior aspect of tonsillar fossa. Surgery includes intraoral or extraoral approach.

Due to variable and non-specific symptoms, patients seek treatment in several different clinics such as otolaryngology, neurology, neurosurgery, psychiatry and dentistry.

In this scientific article, 20 cases of Eagle's syndrome are presented and the importance of digital palpation in tonsillar fossa and radiographs in differentiating the pain of elongated styloid process from the wide variety of other facial neuralgias is emphasized.

**AIM OF THE STUDY**

The aim of the study was to emphasise the importance of digital palpation through tonsillar fossa and radiographs in differentiating the pain of elongated styloid process from the wide variety of other facial neuralgias and to examine the effectiveness of transoral surgical approach in management of Eagle's Syndrome.

**MATERIALS AND METHOD**

The study was conducted in the outpatient department of ENT, Karpaga Vinayaga Institute of Medical Sciences & Research Centre in 2016-17. During the study period (October 2016 to September 2017) 80 patients reported with ear or throat pain without any respective signs. Out of which 20 were diagnosed to have Eagle's syndrome. After getting informed written consent and anaesthesia fitness all the selected patients underwent trans tonsillar styloidectomy.

Prior to the procedure all the patients underwent CT neck. Out of 20, nine of them had unilateral elongated styloid process. In the patients with unilateral styloid process, 4 had right sided elongated styloid process.

The procedure was done under general anaesthesia patient in Rose position parts painted and draped. Mouth opened and fixed using Boyle Davis mouth gag. Bilateral tonsil visualised. Tonsillectomy done by dissection and snare method. Styloid process was palpated and identified. Tonsillar bed dissected and the styloid process was removed. Tonsillar bed was palpated and checked for any remnants. Remnants if present were removed. Patient extubated after achieving haemostasis.

**RESULTS AND DISCUSSION**

Out of the total patients that reported with ear or throat pain without any respective signs, 25% patients were diagnosed to have Eagle's syndrome (Table 1). The case history of patients showed that, 30% of patients had ear pain, 20% had throat pain, 10% had headache and 40 % had neck pain. 80% were female and 20% were male. 40% belonged to the age group 30 to 40 years, 45% belonged to the age group 41 to 50 years and the remaining 15% were above 51 years. Styloid process was palpebral for 80%. All 20 patients had temporary relief from pain while 2% xylocaine jelly was applied in the tonsillar fossa. All the patients underwent trans tonsillar styloidectomy under general anaesthesia.

Post-operative period was uneventful for all the patients. All the patients were discharged on the third post-operative day and were followed up for the first time on the seventh post-operative day followed by three more follow ups, after three weeks, six weeks and three months respectively. All the patients were found to be symptomatically feeling good.



Chart 1. Side of pain.

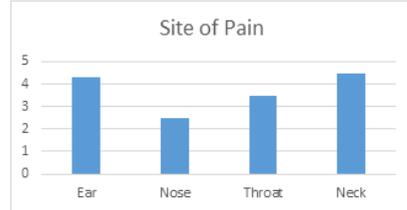


Chart 2. Site of pain.

Table 1. Characteristics of the sample (n = 20).

Sl No	Age	Sex	Side of pain	Site of pain	Pain duration- months	Styloid process- Palpebral or not	Length of styloid process (cm)	
							Left	Right
1	47	F	Bilateral	neck	6	Yes	4.1	4
2	35	F	Unilateral -Left	ear	2	No	2.6	3.5
3	40	F	Bilateral	head	12	Yes	4.6	4.3
4	60	M	Bilateral	neck	9	Yes	3.7	4.2
5	40	F	Bilateral	neck	11	Yes	4.2	4.1
6	56	M	Bilateral	throat	4	Yes	3.5	3.7
7	40	F	Unilateral -Right	ear	7	Yes	2.1	4.0
8	38	F	Unilateral -Left	neck	8	No	3.9	2.0
9	45	F	Bilateral	neck	12	Yes	4.0	4.1
10	47	F	Unilateral -Right	ear	6	No	2.5	3.9
11	42	F	Bilateral	throat	2	Yes	3.9	3.8
12	50	M	Bilateral	head	12	Yes	4.3	4.0
13	54	F	Bilateral	throat	9	Yes	4.4	4.3
14	40	F	Bilateral	ear	10	No	3.8	4.0
15	47	M	Bilateral	ear	4	Yes	3.7	3.9
16	40	F	Unilateral -Left	neck	5	Yes	4.1	2.2
17	34	F	Unilateral -Right	ear	5	Yes	2.9	3.9
18	45	F	Unilateral -Left	throat	8	Yes	2.8	4.6
19	47	F	Unilateral -Right	neck	11	Yes	2.7	4.3
20	42	F	Unilateral -Left	neck	9	Yes	3.9	2.6



Figure 3. CT Neck lateral view showing the right elongated styloid process.



Figure 4. 3D reconstruction showing bilateral elongated styloid process.



**Figure 5. Intra operative picture showing the elongated styloid process.**



**Figure 6. Specimen of trans tonsillar styloidectomy.**

20% of the patients who came with ear or throat pain without any respective signs were diagnosed with Eagle's syndrome and cured by trans tonsillar styloidectomy. This shows the prevalence of need for alterations in the morphology of the styloid process. This shows that the elongation of the styloid process should not be considered a rare finding in adults and greater importance should be given to study these changes.

Eagle says palpation can help diagnose elongated styloid process<sup>11</sup>. Nayak et al.<sup>12</sup> identifies that radiographic analysis should be done to obtain the length of the styloid process at various levels. Nickel et al says that length helps to determine if surgery is needed. The mean lengths of the right and left elongated styloid processes were 4.04 cm and 4.0 cm, respectively in this study.

In the same way of the present study, 55% of bilateral elongation versus 45% of unilateral elongation, other authors like Phulambrikar et al.<sup>13</sup> also found a predominance of bilateral stretching. It was also observed in this study that the similarity between the length of the styloid process on the right and left sides are statistically similar, which correlates with the findings of Kaufman<sup>14</sup>.

In the examined individuals, we could see a slight tendency to stretch the left side, since we find 5 elongated styloid process on the left and 4 in the right side. Earlier studies also found predisposition to stretching the left side<sup>15</sup>.

## CONCLUSION

The present study concludes that Eagle's syndrome has vague symptoms like oro-facial pain, ear pain, throat pain, neck pain, dull aching headaches, or temporomandibular joint pain. Careful palpation of tonsillar fossa, 2% xylocaine jelly test along with radiography will confirm the diagnosis of elongated styloid process. The diagnosis and the treatment of neuralgias of the head and neck form one of the most difficult clinical problems for the patient and for the clinician. Proper diagnosis and effective treatment will bring great relief to patients with Eagle's syndrome.

All the 20 patients had relief from pain after surgery. Transoral surgical technique has an advantage as it does not leave behind any scar. It is effective in that, the procedure guarantees a permanent cure for the patient<sup>16</sup>. The data presented in this study is consistent with data reported in other studies like Nayak, Kaufman.

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