

## Treatment of Eagle's Syndrome By Intended Fracture of The Styloid Process: Report of Two Cases

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### Abstract

Eagle's syndrome is a symptomatic condition of the long styloid process which radiates to the ear, temporomandibular joint region and presents as facial-neck pain. Diagnosis is usually made by palpation of the styloid process in the tonsillar fossa and three-dimensional computed tomography. Both surgical and conservative treatments can be used in the treatment. Manual fracture of the styloid process may be an alternative treatment for patients who refuse surgical treatment. The first patient, a 36-year-old male, was admitted with the complaint of dysphagia. The second patient, a 29-year-old male, was admitted with the complaint of pain and foreign body sensation in the throat. In both patients, clinical examination revealed increased pain on palpation of the tonsillar fossa. OPG showed elongated styloid processes. These findings together with clinical manifestations established diagnosis of Eagle's Syndrome Since both patients refused surgical resection, we preferred fracturing the elongated processes by digital pressure. Procedures were performed under conscious sedation. Post-operative periods were uneventful, and patients reported significant regression in their symptoms at 3-months follow-up. This procedure may be a minimally invasive and successful treatment modality in patients who refused the surgical resection. However, long-term close follow-up of these patients is recommended to evaluate the outcomes of the treatment.

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**Keywords:** Eagle's syndrome, fracture, styloid.

### Introduction

Eagle's syndrome (ES) is associated with recurrent orofacial and cervical pain where symptoms result from an elongated styloid process (SP) or a calcified stylohyoid ligament. American otolaryngologist Watt W. Eagle, characterized it in great detail in 1937(1).

Various symptoms have been reported in patients with ES. Those symptoms are sore throat extending towards the ear, foreign body sensation in the throat, dysphagia, headache, pain in neck rotation, dizziness, tinnitus, discomfort during chewing, dysphonia and hypersalivation (2).

Women older than 30 years old usually affected by the condition. It can be confused with many head and neck disorders—including trigeminal neuralgia, glossopharyngeal neuralgia, temporal arteritis, migraine, and cervical arthritis. There is still no evidence of this syndrome's exact pathophysiology.

, Nevertheless, It usually seen after a history of neck trauma, tonsillectomy, or the presence of an arcuate foramen.(3).

The normal length of the SP in human varies from 1.5 to 2.5 centimeters.(cm) Lengths over 2.5 cm may be symptomatic due to compression over some neural and vascular structures such as the carotid artery, the facial and lingual arteries, the internal jugular vein and the facial, accessory, hypoglossal, vagus, lingual and glossopharyngeal nerves (4).

In accordance with Piagkou et al., there are four different parameters for the diagnosis of ES including clinical manifestations, digital palpation of the process in the tonsillar fossa, radiological findings, and lidocaine infiltration test (5). Prolonged styloid process alone is not pathognomonic for ES because it can be seen in many asymptomatic patients (6).

Panoramic radiographs can be used to diagnose elongated styloid process or calcified stylohyoid ligament, however Cone-beam computed tomography (CBCT) is the gold standard. (7-10). CBCT allows the accurate measurement of the length of the styloid process, better understanding of the anatomy of the surrounding structures and visualization of the exact spatial orientation of the styloid processes (11).

Management of ES is basically performed either with conservative methods or surgically, or both and each method has its own advantages and limitations. We herein report two cases of Eagle's syndrome which was managed by intended fracture of styloid processes as an alternative treatment modality.

### Case Reports

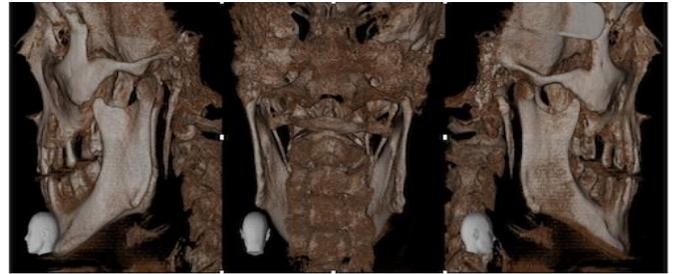
A 36-year-old male patient was admitted to our clinic who referred occasional dysphagia and a sensation of a foreign body in the right side of the throat. Medical history of the patient was insignificant and there was no history of any trauma or surgery including tonsillectomy. On clinical examination, tenderness on palpation of the right and left tonsillar fossa regions were present and pain aggravated on neck movement toward the right side. Orthopantomogram (OPG) revealed bilateral elongated styloid processes (Figure 1).



**Figure 1.** OPG showing elongated styloid processes on both sides in case #1.

On CBCT, the length of right and left styloid processes was measured 46 and 44 millimeters (mm), respectively (Figure 2). The second case was a 29-year-old male patient who admitted to our clinic with complaints of pain and foreign body sensation in the throat for almost 5 years. On clinical examination, tenderness on palpation of the right and left tonsillar fossa regions were present. Medical history revealed a healthy man with no other significant complaints or history of trauma. OPG showed elongated styloid processes on

both sides (Figure 3). Measurements on CT revealed that the length of right and left styloid processes was 51 and 54 mm, respectively.



**Figure 2.** CBCT showing left and right elongated styloid processes in case #1.



**Figure 3.** OPG showing elongated styloid processes on both sides in case #2.

In both patients, radiologic findings together with clinical manifestations established the diagnosis of ES. Treatment modalities including medical therapy and surgical resection were discussed with the patients, however, they refused any long-term medical treatment or interventional surgery. Therefore, with the consent of the patients on possible complications and failure, we preferred an alternative management by intended fracturing the ES by digital pressure. Oral and written informed consent forms were obtained from both patients before the operations. Procedure was performed under conscious sedation. Fracture of styloid processes were radiologically confirmed (Figures 4 and 5).



**Figure 4.** Confirmation of fractured styloid processes on both sides in case #1.



**Figure 5.**Confirmation of fractured styloid processes on both sides in case #2.

Post-operative period was uneventful and both patients reported significant regression in their symptoms at 3-months follow-up.

### Discussion

Treatment of Eagle's syndrome can be a conservative and surgical. Basic medical therapy can be further divided into first-line analgesics such as NSAIDs and alternative management consisting of a combination of anticonvulsants, antidepressants or local injections and manipulation (12). As well as pharmacologic therapy, a few numbers of reports have been published addressing manual fracturing of elongated process within the concept of conservative therapy (8, 13-16).

Surgical treatments are usually recommended in patients who do not respond to conservative therapy. Surgical shortening of the elongated styloid process is the most satisfactory and effective treatment which they can be performed intraoral or external approach depending on the surgeon's choice. They both have its own advantages and disadvantages (16-21). The intraoral approach is a simple and less time-consuming method and leaves no visible external scar. (22). However, the main disadvantage is lack of access, particularly if there is a hemorrhage and subsequent deep neck infections have been reported. It is not recommended to make styloidectomy for both sides intraorally in the same act due to high postoperative discomfort for the patient (22). Extraoral technique involves access through cervical incision thence it allows better visualization of the surgical field. This technique, however, takes longer time, there is a risk of injury of the facial nerve, postoperative recovery is longer and results with visible scar. It should be performed with patients who have extreme ossification, from the styloid process to the hyoid bone. It is considered reasonable in such cases since it avoids the risk of intraoral access and iatrogenic injury to the

neurovascular structures (22). Postsurgery thrombosis of the internal carotid artery is a dreaded complication (23).

The rationale of performing the manual intended fracturing of elongated SP is based on the claim that fracture of styloid process can lead to granular tissue formation thus releasing pressure to nearby structures (24). When compared with pharmacologic management and surgical resection, this method may be considered as a good alternative with the advantages of short treatment time and less risk of complications. This method, however, has several limitations. First, this method requires patient cooperation since the symptoms may not regress or even worsen following this procedure. In case of failure, medical therapy or surgical resection may be mandatory to release the symptoms. Second, intended fracturing of SP is applicable if only the SP is intraorally palpable. Both cases presented had refused long term pharmacologic therapy and surgery, and the styloid processes were palpable intraorally, we prefer to perform the proposed method and achieved satisfactory outcomes.

### Conclusion

Intended fracture of the elongated SP may be a minimally invasive and acceptable treatment of Eagle's syndrome with proper indication. However, it should be kept in mind that a long-term close follow-up of these patients is recommended to further evaluate the outcomes.

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