

# Eagle's Syndrome – a Short Review and a Case Report of Elongated Styloid Process

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## ABSTRACT

**Introduction:** styloid process presents as a slender projection from the undersurface of the petrous part of temporal bone. It provides attachment to two ligaments- stylohyoid and stylomandibular. While the muscles attached to styloid process are styloglossus, stylopharyngeus and stylohyoid. With its attachments, it is usually referred as styloid apparatus and enables the movements of hyoid bone, mandible, tongue, pharynx and larynx. Average length of styloid process is about 2-3cm and variations in the angulation and thickness are often reported. When elongated it can compress the neighboring structures and results in Eagle's syndrome.

**Keywords:** Carotid artery; Compression; Odynophagia; Temporal bone.

## Introduction

Styloid Process is a cylindrical, needle like projection from the inferior aspect of the temporal bone. It is usually 2-3 cm long. It gives attachment to stylohyoid, styloglossus and stylopharyngeus muscle. It develops as a part of Reichert's cartilage from the second pharyngeal arch and undergoes endochondral ossification in the early intrauterine life till the first decade of life. Internal jugular vein, internal carotid artery, glossopharyngeal nerve (CN IX), Vagus nerve (CN X), and accessory nerve (CN XI) lie medial to the styloid process. The occipital artery and hypoglossal nerve (CN XII) run along its lateral side. Styloid process shows variation in length, angulation, and other morphological

features between individuals. Eagle's syndrome refers to a collection of neuropathic and vascular occlusive symptoms caused by pathologic elongation or abnormal ossification of the styloid apparatus, consisting of the styloid process the attached stylohyoid ligament and the lesser cornu of hyoid bone<sup>1,2</sup>.

## Case Report

During a routine osteology class for 1<sup>st</sup> MBBS, we found an elongated styloid process on the left side of one of the skulls. The length of the styloid process was 6cm and maximum thickness measured was 0.8 cm (Fig 1). On the other side the length of the process was 4cm with maximum thickness of 0.8 cm.



**Figure 1.** Showing elongated styloid process.

## Discussion

Ossification of the styloid process and the stylohyoid ligament leads to an increase in the thickness and length of the styloid process. Thus, an elongated styloid process tends to exert pressure on the surrounding structures like the internal jugular vein, carotid artery, facial nerve, vagal nerve, glossopharyngeal nerve, and hypoglossal nerve, resulting in various pressure symptoms this leads to pain in the neck and throat. Pain often radiates to ear and collectively called as Eagle's syndrome<sup>3</sup>. The syndrome can be divided into 2 main subtypes – due to compression of the carotid artery (carotid artery type) and due to compression of the cranial nerves (classic type). The classic type usually follows tonsillectomy or trauma; presumably due to distortion of local anatomy during surgery. Carotid artery type frequently found in patients who have not had regional surgery<sup>4</sup>. In most cases the cause is unknown and compression of vessels and perivascular structure is due to elongated styloid process. The cause for elongation of the styloid process is not well understood. It can be idiopathic, congenital (due to the persistence of cartilaginous elements of precursors of the styloid process), or acquired (due to the proliferation of osseous tissue at the insertion of the stylohyoid ligament). This condition may also be associated with disorders causing heterotopic calcification and renal failure<sup>5</sup>.

Eagle's syndrome is quite rare in the clinical practice accounts for 4% cases. In the classic type of Eagle's syndrome, compressive cranial neuropathy most commonly reported symptom is sensation of a foreign body in the throat,odynophagia, and dysphagia. In the carotid type, compression over the internal carotid

artery can cause pain in the parietal region of the skull or in the superior periorbital region, among other symptoms<sup>6,7</sup>. Various causes have been described as pathophysiology of the symptoms of this disorder like fracture of the styloid process leading to granulation tissue proliferation; degenerative and inflammatory changes at the tendinous portion of the stylohyoid insertion referred as insertion tendonitis; irritation of the pharyngeal mucosa due to direct impact; post tonsillectomy scarring involving the cranial nerves V, VII, IX, and X; and impingement of the carotid vessels with irritation of the sympathetic nerves in the arterial sheath<sup>8,9,10</sup>.

Several imaging modalities have been employed for the diagnosis of Eagle syndrome, including conventional lateral and anteroposterior (AP) X ray of head and neck. The OPG can easily miss the findings, especially if styloid processes are not so long, due to superimposed teeth and mandible<sup>11</sup>. Similarly, the conventional radiographs are also very non-specific and limited in this context. Multi slice CT and 3D reconstruction is considered the best modality as it provides information about the actual length of the processes and their tract, and whether deviated medially or laterally along with the details of their relationship with other anatomical structures<sup>12,13,14</sup>.

## Conclusion

Although Eagle syndrome is a rare entity, its diagnosis and treatment are quite challenging. Our case is one such condition where the styloid is significantly longer compared to its average length reported in the literature.

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