

A Case Report on Excessive Elongation of Styloid Process

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Abstract

During retrieving of skull bone from a known male cadaver of 44 years, excessive elongated styloid process was observed on both the sides of skull. The length of styloid process was same on both the sides i.e. 4.4 cm. It was concavo-convex and pointed. It was directed anteriorly, inferiorly and medially. Excessive elongated styloid process may create pressure on facial nerve and external and or internal carotid artery which causes pain in cervicofacial region and sometimes it is asymptomatic. Surgical resection of styloid process is required if elongated styloid process is associated with severe symptoms.

Keywords: Styloid process; Long styloid process; Eagle's syndrome; Cervicofacial pain.

Introduction

Styloid process (SP) is pointed bony process of temporal bone which is derived from dorsal part of Reichert's cartilage of second arch or hyoid arch. It is slender, pointed and projects anteroinferiorly from the inferior aspect of temporal bone. It is almost straight, it can show curvature, an anteromedial concavity being most common. SP lies anterior and medial to the mastoid process and stylomastoid foramen lies between the mastoid and styloid process. The length of SP varies from few millimetres to few centimetres to an average of 2.5 cm.¹

The proximal part of SP is called as tympanohyal which is ensheathed anterolaterally by tympanic plate. The distal part of SP is called as stylohyal part where muscles and ligaments are attached.

These parts are united by cartilage which undergoes ossification often as late as middle age.² SP carries clinical significance as it has important relations with muscles, nerve and vessels. SP is related to parotid gland laterally and is separated from beginning of internal jugular vein by the attachment of stylopharyngeus. Facial nerve crosses SP at the base and external carotid artery crosses SP at its tip.¹ Internal jugular vein, accessory, vagus, and glossopharyngeal nerves, internal carotid artery, sympathetic chain are located medial to the process³ while the occipital artery and hypoglossal nerve run along its lateral side and also found is the posterior belly of the digastric muscle.⁴ Attachment of muscles like styloglossus, stylopharyngeus, stylohyoid and ligaments like stylohyoid, stylomandibular to SP forms styloid apparatus. Through these structures, the styloid process facilitates the movement of the tongue, pharynx, larynx, hyoid bone and mandible.⁴ Excessive elongation of styloid process may create compressive effect on nearby neurovascular structures and lead to cervicofacial pain. It may be useful to do assessment of the length of styloid process in case of cervicofacial pain to find out the cause of pain.

Case Report

Bilateral excessive elongated and pointed SP was observed during retrieval of skull bone of 44 years of male cadaver. The length of SP was 4.4 cm and it was directed anteriorly, inferiorly and medially with curvature.



Fig. 1: Photograph shows excessive elongated bilateral presence of SP.

Discussion

Styloid process is bony prolongation starts from temporal bone and present on anteromedial aspect of stylomastoid foramen. Five structures consist of three muscles and two ligaments constitute styloid apparatus. Styloglossus, stylopharyngeus and stylohyoid muscles play role in mastication and deglutition. Stylomandibular ligament is thickening of deep cervical fascia and connects tip of SP and angle of mandible while the stylohyoid ligament's proximal attachment lies at the apex of the styloid process, while the distal end of the ligament attaches to the lesser cornu of the hyoid. Both ligaments facilitate the movement of the tongue, pharynx, larynx, hyoid bone, and mandible.^{5,6}

SP shows variations in the length, angulation and other morphological features. The reported normal length of SP ranges from 20–32 mm.⁷ This varies from person to person, males to females and even from side to side in the same person.^{8–11} Wide literature about length of SP shows variations in the length of SP, it ranges from 23 to 36 mm, 42 mm for women under age of 35 years and 49 mm for men over 35 years,¹² mean length of SP was found to be 3.7 mm on right side and 3.8 mm on left side,¹³ in males on right side is 25.78, on left side is 22.69 and in females on right side is 25.8 and on left side 22.75 mm.¹⁴ Average length of SP was 2 to 3 cm^{10,15–17} 1.52 to 4.77 cm,¹⁸ 2.51 to 6.11 cm.¹⁹ The normal SP was approximately 2.5 cm in length and any process longer than 2.5 cm might be considered to be elongated which was found in 4% of the patients.²⁰ When length of SP is more than 30 mm then it is considered as elongation.²¹ When symptoms are associated with elongated SP then it is termed as Eagle syndrome.²² Incidence of elongation of SP is around 4–7%; only 4% of the patients with elongation of SP show the symptoms.^{23,24} In the present study the length of SP is 44 mm which is excessively elongated and same on both the sides.

SP length is not related to age, gender^{25,26} but significant co-relation was seen between serum calcium concentration and length of SP, longer the SP higher the serum calcium concentration was found.²⁵ Association of dental status and SP length was evaluated.^{11,25} Muscle tension from occlusal disarrangements and changes in both bones' height in partially or completely edentulous patients can be probable factor in the incidence of a co-relation between no of teeth present in the mouth and SP length.¹¹

Cause of elongation of SP is not clearly understood. It may be related to complete or partial calcification of stylohyoid ligament or abnormal ossification of stylohyoid ligament.

The styloid process originates as a part of Reichert's cartilage, which forms from the second pharyngeal arch during embryological development.²⁷ Reichert's cartilage divides into four parts, the tympanohyal part, the stylohyal part, the ceratohyal part, and the hypohyal part. The tympanohyal part develops antenatally, attaches to the petrous portion of the temporal bone, and gives rise to the base of the styloid process which is ensheathed by the vaginal process of the tympanic part. The stylohyal part appears post-natally, and it gives rise to the shaft of the styloid process and the proximal portion of the stylohyoid ligament. The stylohyal part might unite with the tympanohyal after puberty, but in some cases they never do. The ceratohyal and its fibrous sheath regress, giving rise to the stylohyoid ligament. The hypohyal part gives rise to the lesser cornu of the hyoid bone.^{28,29} The stylohyal part might unite with the tympanohyal after puberty. If the stylohyal part successfully fuses with the tympanohyal part and the stylohyal aspect ossifies, it results in a long styloid process.²⁸ In the current case excessive elongation of SP may be because of ossified stylohyoid ligament. We could not elicit the history of pain in the cervicofacial region as we received the cadaver with cause of death as cardiac arrest.

Elongated SP may go unnoticed or it is incidental finding if it is not associated with symptoms of cervicofacial pain. If it is associated with symptoms then surgical resection of SP is required for better outcome.

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