

MORPHOLOGICAL STUDY OF STYLOID PROCESSES IN SKULLS IN THE STATE OF GOA

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ABSTRACT

The aim of our study was to find the length of the styloid process and to see if there is any difference in the length on the right and left side. For this purpose, 53 skull bones were studied from the student sets & Department of Anatomy. According to Grey's Anatomy, the styloid process is approximately 2.5 cm in length. Eagle stated that normal styloid process is approximately 2.75 cm. & any beyond that is elongated (Eagle 1949). In our study we have considered the range between 2.5 cm & 2.7 cm as normal. It was observed that 14% of styloid process were elongated on the right side and same number on left side, with no significant difference on both the sides.

AIM & OBJECTIVE

To study the length of the styloid process in the Cadaveric Skull in the population of Goa, to co-relate the study with the Eagle Syndrome, to find any significant difference between the length of right & left side styloid process.

KEYWORDS

Styloid process, Eagle Syndrome.

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INTRODUCTION: The styloid process is slender, pointed structure which projects antero-inferiorly from the interior aspect of the temporal bones just below the external auditory meatus. Its length is variable, ranging from a few millimeters to an average of 2.5cm (Grey's Anatomy)¹. It develops from the second pharyngeal arch cartilage (Reichert's cartilage) which extends from the otic capsule to the midline on each side. Its dorsal end separates & becomes enclosed in the developing tympanic cavity as the stapes. The cartilage also gives rise to the styloid process, stylohyoid ligament, the lesser cornu & cranial rim of body of hyoid bone (Grey's Anatomy)¹.

Eagle stated that the normal styloid process is approximately 2.75 cm and any styloid process beyond that length may be considered elongated (Eagle 1949)².

He observed that elongated styloid process, appeared to be cause of pharyngeal & cervical pain (Eugene and Saunders 2008)³. Eagle syndrome sometimes referred to as Stylalgia, which is characterized by a dull aching pain localized to either or both sides of the throat with referred otalgia. Some pain may occur on swallowing or protrusion of the tongue or on rotating the head. Some patients complain of foreign body sensations in their throat (Eugene and Saunders 2008)³ Eagle syndrome occurs more frequently in women than in men & is usually found in patients older than 30 years (Strauss 1985)⁴. Palpation of the tonsillar fossa will reveal a hard mass (Subramaniam 2003)⁵. This study was carried out to measure the length of the styloid process in the skulls from students at our medical college.

MATERIALS & METHOD: Fifty-three adult skull bones were studied. The skulls used were obtained from the students' sets belonging to MBBS & BDS streams & from the department of Anatomy, Goa Medical College. The skulls having intact styloid process were selected and the skulls with broken styloid process were discarded. The styloid process was measured using divider & ruler from base to tip. The length of the styloid process on right side & left side were noted separately.

RESULTS: The length of the styloid process observed on the right side ranged from 2.4cm to 5.4 cm & on the left side, between 2.4 cm. & 4.00 cm.

It was noted that variation in length of styloid process was not significant ($P = 1.00$) the longest styloid process observed on right side was 5.4 cm & the longest styloid process observed on left side was 4.00. The mean length of the styloid process on the right side was 2.72 ± 0.52 and on the left was 2.67 ± 0.32 . The percentage of styloid process less than 2.5 cms found on right side was 5.6% on left side was 7.5%. In the range from 2.5 cms to 2.7 cms was 75% on right side and 73% on left side. The styloid process with length more than 2.75 cms was 18% on both sides. As shown in the table 1

Length in cms.	No. of styloid process on Right side	No. of styloid process on Left side	% on Right Side	% on left Side
< 2.5	3	4	5.6	7.5
2.5 to 2.7	40	39	75.4	73.5
> 2.7	10	10	18.8	18.8
Total No	53	53	-	-

Table 1: Size of the styloid process on the right and left side

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Fig. 1: Skull showing elongated styloid process (measuring 5.4cms on right side and 4cms on left side)

DISCUSSION: Gruber (Gruber 1870)⁶ measured the styloid process in 2000 skulls & found that most styloid process measure from 3.0-5.0cm Eagle stated that the normal styloid process is approximately 2.75 cm and any styloid process beyond that length may be considered elongated.

The parapharyngeal space is divided by styloid process and muscles arising from it into prestyloid a poststyloid space. Prestyloid space is bounded medially by buccopharyngeal fascia & laterally by medial pterygoid muscle. The glossopharyngeal nerve is situated within the prestyloid space (Thomas R.Van 2006). ICA, IJV, Superior Sympathetic, ganglion, CN VII, CN IX, CNX, CNXI, CNXII are contained within poststyloid space. The pain due to elongated styloid process is because of glossopharyngeal neuralgia, as the nerve is closely related to styloid process & may get stretched. This condition may be unilateral or bilateral (K. B. Bhargava 2009).

We found that 18% of Styloid processes were elongated in our study.

The Styloid process, stylohyoid ligament, and lesser cornu of the hyoid bone are derived from Reichert's Cartilage, which arises from second branchial arch (Langman 2006)⁷. These are derived in four segments, tympanohyal, Stylohyal, Ceratohyal and Hyohyal segments. Styloid process develops from tympanohyal (first) and stylohyal (second) segments that usually fuse at puberty. Stylohyoid ligament from (third), lesser cornu from hyohyal (fourth) segment. These stylohyoid chain components are composed of dense fibro connective tissue in adults but has potential for ossification.

An Elongated styloid process with or without calcification of stylohyoid ligament can be seen on plain posterior view of the head and neck (Eugene N. Myers 2008)³.

Palpation of the tonsillar fossa will reveal a hard mass (Subramaniam S., Majid M.D.2003)⁵.

The pathogenesis of Elongated styloid process is unclear. The exact cause of pain is unknown, although several mechanisms have been suggested. Mechanism most easily understood is compression of glossopharyngeal nerve as it passes the elongated styloid process and the condition may be classified as an Entrapment syndrome (Slavin K. V. 2002)⁸.

CONCLUSION: In our study we found that equal number of elongated styloid process were found on both the right & left side with very little difference in their lengths on the two sides. We found that the average length of the styloid process ranged from 2.4-5.4 cms. cm on Right side and 2.4 cms. to 4 cms. on left side.

The styloid process observed were smooth, regular & well corticated with rounded tips and without any marked medical angulations.

An Elongated styloid process may impinge against carotid arteries and cause disturbances in circulation, as well as irritation of nerve plexus around the vessels (Maqbool)⁹. A larger study with the age and sex determination, also comparison with the clinical data of patients with Eagle syndrome needs to be conducted to know the exact prevalence of elongated styloid process in state of Goa.

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