ORIGINAL RESEARCH PAPER

Anatomy

EVALUATION OF LENGTH OF STYLOID PROCESS OF TEMPORAL BONE TO FIND ANY CHANGES IN ITS LENGTH AS THE AGE ADVANCES

KEY WORDS: Styloid process, ossification, skull.

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ABSTRACT

The length of styloid process that varies greatly in different population and depends on geographical background. Styloid process is a projection of the temporal bone, its length is between 20-30mm .When its longer than 30mm then it is defined as elongated styloid process. The objective of this study was to evaluate the length of styloid process in two age groups . Group I include at the age of 25-40yrs; Group II comprised age above 40yrs to find out any morphometric changes of the styloid process of temporal bone and prevalence of elongated styloid process in Central Indian population due to age related or ossification of styloid complex.

Material And Method: For the study 200 skulls were analysed , 100 skulls were of the age group between 25-40 years and 100 skulls were of above 40 years. The styloid process was observed on both the side of skull, if any elongations were present that was noted. The styloid length was measured by using digital vernier calliper. It was measured from the point where styloid process start at temporal bone to its tip. Styloid process measured more than 30mm were considered elongated.

Result: Out of 100 skull in age group 25-40yrs the mean length of styloid process was 17.26mm and 17.32 mm for right and left sides respectively and only one skull showing elongated styloid process that is bilateral where as out of 100 skull in age group above 40yrs the mean length of styloid process was 18.29 mm and 18.47mm for right and left side respectively and 7 skull exhibited elongated styloid process. Among them 6 skull (6%) having bilateral elongation and one skull (1%) having unilateral elongation . So there is no significant difference in mean length of styloid process in these two age group but the prevalence of elongated styloid process is higher in age group above 40 yrs that is 7%.

Conclusion: The clinical anatomy of this congential variant or any ossification in stylohyoid ligament is important to the neurosurgeon and radiologist, while interpreting the computed tomogram and magnetic image scans.

INTRODUCTION:

Styloid process of temporal bone is a slender projection attached to base of skull and extend downwards ,forwards and slightly medially. From its extremity the stylohyoid ligament passes downward and forward to the lesser horn of the hyoid bone.[1]

Many important anatomical structures are in close proximity to the styloid process and the stylohyoid ligament. Just posterior to the styloid process lies the stylomastoid foramen, through which the facial nerve exits to run anteriorly and medially to the styloid process . The internal carotid artery, the internal jugular vein and the accessory and vagus nerves lie medially. The external carotid artery runs laterally to the stylohyoid ligament. The glossopharyngeal nerve exists in close proximity under the styloid process, stylohyoid muscle and the stylopharyngeal muscle. It is therefore worth studying the variability of these structures and analysing the possible effects of an elongated styloid process or ossified stylohyoid complex.The length of the styloid process is usually 2-3 cm [2]. When its more than 3cm long it is called elongated styloid process. This elongation was first describe in 1652 by Italian surgeon Pietro Marchetti in1937. Watt W.Eagle coined the term stylalgia to describe the pain associated with elongation of styloid process. [3].Embryologically the styloid process ,stylohyoid ligament and lesser cornu of the hyoid bone are derived from Reichters cartilage which is arises from second pharyngeal arch.[4].

The congential elongated styloid process or ossified stylohyoid ligament can compress the surrounding structures, leading to mild or severe clinical syndromes, such as sore throat, dysphagia, otalgia, the sensation of a foreign body in the throat, facial pain radiating to the ear or along the mandible and head and neck pain [5].

The ossification of styloid complex that varies from person to person, symptoms may occur in a particular individual with varying degree of ossification of styloid process and different length of the styloid process.

There are some studies reported in literature various methods have been use for evalulating the length of styloid process like manual method (human dry skull) [6], digital panoramic radiography[7], multidector computed tomography (CT)[8]. The length and prevalence of elongated styloid process has been studied in different population using different methods found high variability these may be due to geographical background.

Here the aim of this study was to evaluate the length of styloid process in two age groups .Group I include at the age of 25-40yrs; Group II comprised age above 40years. To find out any morphometric changes of these styloid process and prevalence of elongated styloid process in an Central Indian population due to age related or any ossification of styloid complex.

MATERIAL AND METHOD:

The present study is conducted in the department of Anatomy, Government Medical college, Nagpur. Present study included 200 dried skull .The skull which had damage styloid process were excluded from study.In this study 200 skulls were analysed they were grouped according to age. For age consideration in these skulls those skull where bassiocciput fuse age consider above 25yrs and external sutures were start obliterating or obliterated considered as age above 40 years , If not obliterated consider as age below 40 years [9]. i.e shown in figure (1)and (2).

For styloid process measurement, it was measured from the point where it emerges from the temporal bone to its tip. The styloid process measured more than 30mm were considered elongated.

The measurement of length of styloid process by using vernier caliper shown in figure (3) where as elongated styloid process shown in figure (4) and(5).

Data were analysed by using software. The mean, standard deviation and p value were calculated and if p value less than 0.05 were considered to be statistically significant .

Figure1: Skull Showing Age Below 40yrs

Figure2: Skull showing age above 40yrs

Figure 3: Showing Measurement

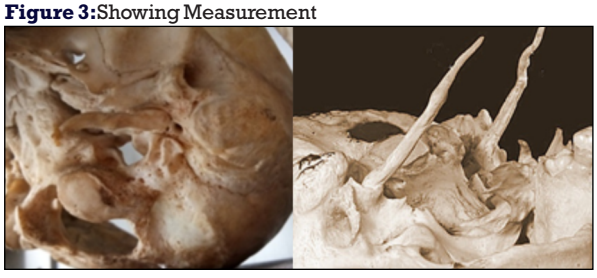

Figure 4 And 5: Showing Elongated Styloid Process

RESULTS:

Total 200 skulls were taken (100 skulls at the age 25- 40 years of groupI and 100 skull of group II of age above 40 years).

The morphometric data of styloid process in the present study it is represented in Table 1,Table 2,Table 3 ,Table 4 and Table 5.

Table 1-Morphometric Data Of Styloid Process In Group I : At The Age Of 25-40years (n=100)

Styloid process	Mean	Standard deviation	T test	P value
Length of styloid process on right side	17.26 mm	3.50	0.8275	0.4099
Length of styloid process on left side	17.32 mm	3.51		

Table 2 - Prevalance Of Elongated Styloid Process In Group I (n=100)

Styloid process	Unilateral	Bilateral	Percentage
Elongated styloid process	—	1	1%

Table-3 Morphometric Data Of Styloid Process In Group II : Age Above 40years . (n=100)

Styloid process	Mean	Standard deviation	T test	P value
Length of styloid process on right side	18.29mm	5.27	1.2231	0.2242
Length of styloid process on left side	18.47mm	5.09		

Table 4-Prevalance Of Elongated Styloid Process In Group II (n=100)

Styloid process	Unilateral	Bilateral	Percentage
Elongated styloid process	1	6	7%

Table 5- Comparision Of Mean In Styloid Process In Age Group I And Age Group II

Styloid process	Mean	Standard deviation	T test	P value
Length of styloid process in age group at age of 25-40 years	7.29 mm	3.48	1.7560	0.0806
Length of styloid process in age group above 40 years	18.38 mm	5.13		

Table 1 and 2 :Showed analysis of length of styloid process and prevalence of elongated styloid process in the age GroupI (at the age of 25-40yrs) that showing no significant difference in mean length of styloid process of right and left side and prevalence of elongated styloid process is 1%.

Table3 and 4: Showed analysis of length of styloid process of right and left side and prevalence of elongated styloid process in the age group above 40yrs that showing insignificant difference in mean length of styloid process on right and left side and prevalence of elongated styloid process is 7%.

Table 5 : That showed there was no significant variation in the length of styloid process in different age group only differences was the mean value of length of styloid process slightly higher in age group II (age above 40yrs) than group I (at the age 25-40 yrs).

DISCUSSION:

In Our study ,we calculated the mean length of styloid process and prevalence of elongated styloid process in two different age group to find out any morphometric changes in its length due to advance age or any ossification in styloid complex and we found that there was no significant differences in mean length of the styloid process in these two different age group: in Group I (25-40years) mean length was 17.29 mm ;Group II (age above 40years) mean length was 18.38mm. These findings were corroborated with the findings provided by Omair Shah etal [8] who calculated the the mean lengths of the styloid process of people in different age groups in Kashmiri population using mulitidector computed tomography.In there study the mean length of the styloid process in different age groups as follows :in Group I(21-30yrs)-30.9+ 4.4mm; GroupII (31-40yrs) -31.2+4.8mm;Group III (41-50yrs)-31.6+4.3 mm; Group IV(>50 yrs)- 31.5+4.5mm.

They also found that there is no significant differences in mean length of the styloid process in different age group. But there mean valve is slightly higher than value of present study this is may be due to geographic and ethnic variations in the size of the styloid process. Giovanni etal [7] they had done epidemiological study on digital panoramic radiographs to seen length and elongated styloid process in Italian population, thay found slight differences in mean valve in different age group.

In our study we also calculate the mean length of the styloid process in different age group on right and left side and we found no significant difference in mean of right side and left side these findings correlates with most of authors findings (Rajaniganda Vadgaokar etal [6],their study on dry skull, Giavonni etal [7] study done on digital panoramic radiographs and Omir Shah etal [8] study on multidector computed tomography).

In our present study we found increasing prevalence of elongated styloid process as the age advances that is 7%. Even other authors also found increasing prevalence of elongated styloid process as the age advances .Giovanni etal[7] found 8.42% in patient younger than 17yrs, 33.33% in age group between 17-35yrs, 36.91% in age group 36-53yrs and 72.76% in age group above 54yrs. Data previously reported in the medical literature showing a prevalence range between 1.4 to 83.6% [10,11,12]. So increasing prevalences of elongated styoloid process with advancing age confirming that chronic development of calcification described in literure [13] even if clear etiology not known.

CONCLUSIONS–

The mean length of styloid process varied widely depending on ethnic and geographical background of the studied population.The mean length of styloid process is 17.29mm at the age group 25-40yrs and 18.38mm in the age group above 40yrs in Central Indian Population. There is no significant variation in mean length of styloid process in these two age group. But prevalences of elongated styloid process increases with age that indicate chronic development of calcification or ossification may occur due to advance age.

The knowledge of elongated styloid process and its clinical anatomy of any congential variant or any ossification in stylohyoid ligament is important to the neurosurgeon and radiologist, while interpreting the computed tomogram and magnetic image scans.

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