Study of Morphological Variations of Suprascapular Notch in Human Dry Scapulae of South Indians.

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Abstract- The superior margin of the scapula is thin and sharp and is the shortest of the three. It is interrupted by the scapular notch, which lies very close to the root of the coracoid process. This notch is bridged by the superior transverse scapular ligament, thus converting it into a foramen. The shape of the suprascapular notch is one of the important predisposing factor for the suprascapular nerve entrapment. The present study was done by observing 112 human dried scapulae. Type IV was the most common type with 40 (35.71 %) scapulae, whereas type V was the least observed type with just two (1.79 %) scapulae. The reason for the different shape of suprascapular notch can be probably explained from the point of ossification of corocoid process and other bony parts in and around the suprascapular notch. Knowledge of suprascapular notch variations may be essential for surgeons performing SN decompression, especially by means of endoscopic techniques.

Index Terms- Corocoid process, Entrapment, Scapula, Suprascapular nerve, Suprascapular notch.

I. INTRODUCTION

Scapula also known as the shoulder blade is triangular in shape and is the fulcrum and basis of all the motions of the humerus. Its peculiar shape has always been a point of attraction to many Anatomists. The superior margin of the scapula is thin and sharp and is the shortest of the three. It is interrupted by the scapular notch, which lies very close to the root of the coracoid process. This notch is bridged by the superior transverse scapular ligament, thus converting it into a foramen. The suprascapular nerve, one among the two branches from the upper trunk of the brachial plexus passes through the suprascapular foramen and supplies supraspinatus descends lateral to the scapular spine in the spinoglenoid notch along with suprascapular vessels and enters the infraspinous fossa and then it supplies infraspinatus and gives a twig to the shoulder joint also[1].

Superior transverse scapular ligament sometimes get ossified and convert the notch in to complete foramen. Entrapment of the suprascapular nerve is seen whenever there is formation of complete suprascapular foramen. This suprascapular nerve entrapment syndrome was first described by Kopell and Thompson[2]. This disease is characterized by pain in the posterolateral region of the shoulder (characterized as a dull ache), atrophy of the infra- and supraspinatus muscles and weakness of the arm's external rotation and abduction[3].

The shape of the suprascapular notch is one of the important predisposing factor for the suprascapular nerve entrapment, this condition is more commonly seen in some athletes like volleyball players and baseball pitchers[4]. Hence, the study of variations in the shape of suprascapular notch become important.

Table 1: showing the classification of suprascapular notch into six types based on its shape by Rengachary[5] et al

Type of notch	Shape of the notch
Type I	A wide depression from the medial superior angle to the base of the spine.
Type II	A wide blunted V shaped notch along the superior border at the scapula.
Type III	A symmetrical U shape.
Type IV	A small V shaped notch with a shallow groove adjacent to it.
Type V	The partial ossification of the superior transverse scapular ligament.
Type VI	The complete ossification of the superior transverse scapular ligament converting the notch into a complete bony foramen.

II. MATERIALS AND METHODS

The present study was done by observing 112 human dried scapulae from department of Anatomy of DM- Wayanad Institute of Medical Sciences, Wayanad, Kerala. Scapulae with damaged superior border were not considered for the study. Scapulae were observed for the different shape of the suprascapular notch and for the ossification of the superior transverse scapular ligament.

III. RESULTS

Fig 1: Type I- A wide depression from the medial superior angle to the base of the spine.

Fig 2: Type II- A wide blunted V shaped notch along the superior border at the scapula.

Fig 3: Type III- A symmetrical U shape.

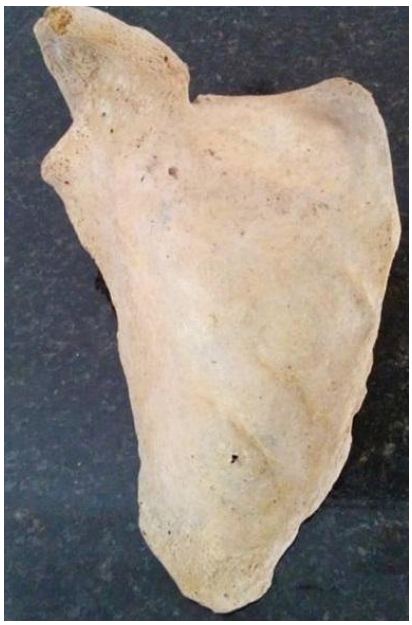

Fig 4: Type IV- A small V shaped notch with a shallow groove adjacent to it.

Fig 5: Type V- The partial ossification of the superior transverse scapular ligament.

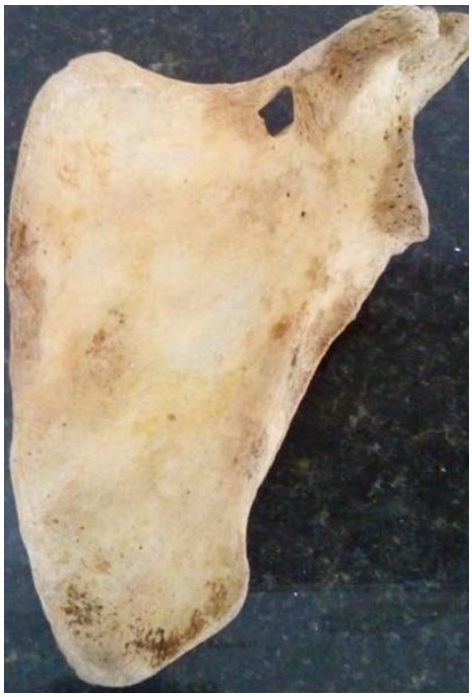

Fig 6: Type VI- The complete ossification of the superior transverse scapular ligament converting the notch into a complete bony foramen.

Table2: Showing the different varieties of suprascapular notch- their number and percentage.

Type	Number of scapulae	Percentage
Type I	23	20.54 %
Type II	16	14.29 %
Type III	28	25 %
Type IV	40	35.71 %
Type V	2	1.79 %
Type VI	3	2.68 %

One hundred and twelve scapulae were analysed. suprascapular notch was present in all the observed scapulae. The distribution of the various types of suprascapular notches is illustrated in Table 2. Type IV was the most common type with 40 (35.71 %) scapulae, whereas type V was the least observed type with just two (1.79 %) scapulae.

IV. Discussion

In comparison with previour workers like Natsis[6] K et al and Rengachary[5] et al, suprascapular notch type III was the most prevalent while type VI was the least prevalent. However in the present study reported the highest incidence of type IV suprascapular notch. A study by Rengachary SS[7] et al in 1979 observed that type III suprascapular notch has a small sized foramen, thus having a higher predisposition to suprascapular nerve entrapment neuropathy. The most important contributing factor for the nerve entrapment is presence of anomalous superior transverse scapular ligament, this is first reported by few workers like Alon M[8] et al, Bayramoglu A[4] et al, Cohen SB[9] et al and Ticker JB[10] et al. It would be useful to find out the type of suprascapular notch in patients presenting with suprascapular nerve entrapment neuropathy locally to help explain the possible association between the two.

Table 3: Frequency of various types of suprascapular notch (SSN) in different populations

Author	Population (N)	Type I	Type II	Type III	Type IV	Type V	Type VI
Natsis[6] et al., 2007	Greek (423)	6%	24%	40%	13%	11%	6%
Rengachary[12] et al., 1979	American (211)	8%	31%	48%	3%	6%	4%
S.R. Sinkeet[11] et	Kenyan (138)	22%	21%	29%	5%	18%	4%

al, 2010							
Present study, 2014	South Indians (112)	20.54%	14.29 %	25%	35.71%	1.79%	2.68%

One interesting finding in the present study is the comparatively high prevalence of suprascapular notch type IV (35.71 %) compared to previous workers observations (Table 3). This probably reflects racial and regional differences. The reason for the different shape of suprascapular notch can be probably explained from the point of ossification of corocoid process and other bony parts in and around the suprascapular notch. Odita[12] et al, reported that these appeared earlier in Nigerian infants than in Caucasians. Whether this will influence the type of notch formed is not clear, but this probably explain the regional and racial variations in the presence of suprascapular notch shape.

V. Conclusion

The study of variations of suprascapular notch and ossification of suprascapular ligament is important to understand suprascapular nerve entrapment syndrome. Hence, our study attempted to define the various varieties of the suprascapular notch. This study is useful for anatomists, orthopaedicians, radiologists and neurosurgeons for a better diagnosis and management of the entrapment syndrome. Knowledge of suprascapular notch variations may be essential for surgeons performing SN decompression, especially by means of endoscopic techniques.

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