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Morphological and Morphometric study of suprascapular notch**Dr. Rajveer Singh Chourasia**

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Abstract--Variation in the morphology of suprascapular notch is associated with suprascapular nerve entrapment neuropathy. So, the knowledge about different shapes of suprascapular notch is important for clinicians in understanding the source of the entrapment syndrome. The Shapes of suprascapular notch are of five in types - Deep U Shaped, shallow U Shaped, J Shaped, V Shaped & indented shaped. Deep U shape is most common & Indented is least common type of suprascapular notch. Suprascapular notch is semicircular in shape, situated in the superior border of the scapula just below the base of the coracoid process. Suprascapular notch is converted to the foramen by the attachment of the suprascapular ligament. Suprascapular vessels passes above the ligament & Suprascapular nerve passes below the ligament. In present study morphological data were obtained and classify the suprascapular notch according to their shape. Present study was conducted on 70 dry human scapulae of both sides with unknown age & sex. This study was conducted in the Department of Anatomy, Hind Institute of Medical Sciences, Barabanki. In the Present study Anatomical variation were found in suprascapular notch which included shape, partial & complete ossification of superior transverse ligament. Various shapes of the notch were observed and analyzed. Dimension of the suprascapular notch were recorded with the help of Digital caliper. The mean ($\pm$ SD) of transverse diameter of suprascapular notch was 10.18 ($\pm$ 1.88) mm. & mean ($\pm$ SD) of vertical length of suprascapular notch was 5.88($\pm$ 2.19) mm. The means of parameters of left suprascapular notch

were slightly higher than the right but on applying the 't' test we found the difference is not significant. The knowledge about the different shapes of suprascapular notch and its involvement in suprascapular nerve entrapment neuropathy helps the clinician in early diagnosis and planning about the most suitable surgical intervention.

Keywords---scapula, suprascapular notch, suprascapular nerve entrapment, superior transverse, scapular ligament.

Introduction

Scapula is a flat type of bone, & it's triangular in shape. Scapula bone situated on the posterolateral aspect of the thoracic wall. Scapula has two surfaces costal & dorsal surface and three borders superior, medial & lateral border, superior border of the scapula is thin & sharp and shorter of the three borders.[1]. Suprascapular notch is semicircular in shape, situated in the superior border in medial to the root of the coracoid process of the scapula. Suprascapular notch is converted to the *foramen* by the attachment of the *suprascapular ligament* (*superior transverse ligament*). Suprascapular foramen passage Suprascapular vessels above the ligament & Suprascapular nerve below the ligament. Supra scapular nerve give motor supply to the supraspinatus & infraspinatus muscles and sensory supply to the rotator cuff muscles, shoulder joint & acromioclavicular joint. [2]

Morphological variation shape of suprascapular notch & partial and complete ossification of notch lead to compression of Supra scapular nerve during movement of shoulder joint mainly abduction & adduction condition caused by Supra scapular nerve entrapment syndrome.[2] Kopell and Thompson was the first worker in suprascapular nerve entrapment syndrome at SSN [2]. Anatomical variations of SSN are found out the ossified suprascapular ligament and develop suprascapular neuropathy this is know as suprascapular nerve entrapment syndrome is characterized by shoulder pain, weakness in arm, difficulty in external rotation and abduction, and atrophy of supraspinatus and infraspinatus muscles. suprascapular nerve entrapment syndrome is commonly seen in athletes such as baseball players, volleyball players, weight lifters etc. [3]. Rengachary classification of the SSN in six categories based on the shape SSN.

- Type - I superior margin of the scapula shows a wide depression from the medial superior angle to the base of the coracoid process
- Type - II a wide and blunt v - shaped notch Type - III a symmetrical u - shaped notch, Type - IV a small v - shaped notch
- Type - V similar to type III with the medial part of the ligament ossified and
- Type - VI with the ligament completely ossified forming a foramen.[4]

Material and Methods

Present study was conducted on 87 dry human scapulae of both sides with unknown age & sex. This study was conducted in the Department of Anatomy,

Hind Institute Of Medical Sciences & Mayo Institute of Medical Sciences, Barabanki (U.P.). Study of suprascapular notch of scapula are shape & dimensions, & recorded with the help of *digital caliper* in millimeters (mm). The transverse diameter (TD) was measured at maximum superior transverse diameter of notch in between the medial to lateral margin of the notch. The vertical diameter (VL) was measured from deepest point at the base of suprascapular notch to an imaginary line between superior edges of notch. The data were tabulated on MS Excel sheet 2007 and statistical analyses were done.



Fig 1. Showing the measurement of the Transverse diameter & Vertical length of SSN



Fig 2. Type-I 'U' shape (1,2)

Observations and Results

The present study was done on 87 dry scapulae, 56 were of left side and 31 were of right side. On observation we found the suprascapular notch is of different shape, showing the number and percentage are tabulated form in Table no.1.

Table 1
Showing the shape, number and percentage of suprascapular notch

S. No.	Shape of Suprascapular Notch	Number	Percentage %
1.	'U' Shaped	22	25.28%
2.	'V' Shaped	10	11.49%
3.	'J' Shaped	30	34.48%
4.	Indentation	17	19.54%
5.	Ossified	04	4.54%
6.	Abscent	04	4.54%



Fig 3. Type-II 'V' Shape (3), Type-III 'J' Shape (4)



Fig 4. Type-IV Indentation (5), Type-V Absent (6)



Fig 5. Type-VI Complete ossified (7)

- The mean ($\pm$ SD) of transverse diameter of suprascapular notch was 10.18 ($\pm$ 1.88) mm.
- The mean ($\pm$ SD) of vertical length of suprascapular notch was 5.88($\pm$ 2.19) mm.

The mean ($\pm$ SD) of right & left side scapula showing in table no. 2.

Table 2
Showing comparison of parameters in right & left scapula

Parameter	Mean($\pm$ SD)	Mean($\pm$ SD)	P - Value
	Rt. Scapula	Lt. Scapula	
TD	9.76($\pm$ 1.76)	10.07($\pm$ 1.96)	P = 0.53 (not Significant)
VL	5.81($\pm$ 1.54)	5.92($\pm$ 2.49)	P = 0.85 (not Significant)

TD – transverse diameter of suprascapular notch,

VL - vertical length of suprascapular notch.

The means of parameters of left suprascapular notch were slightly higher than the right but on applying the 't' test we found the difference is not significant

Observations & Results:-

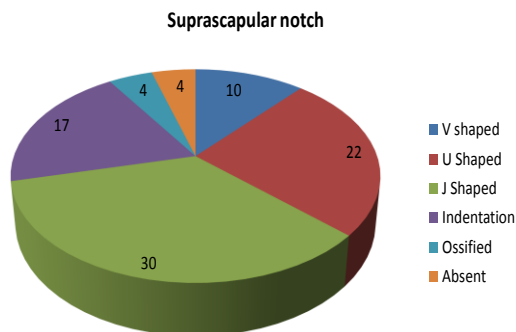


Fig. 4. showing different types of suprascapular notch

Discussion

Study of suprascapular notch has been **important** for adequate treatment and localization of suprascapular nerve entrapment. Due to the variation in shape, **Sinkeet S.R. et al** (2010) has divided into 6 different types. **Natisis K. et al** (2007) has divided into 5 *different types*. **Rangacharya et al** (1979) has divided into 6 *different type*. **In our study** we also have noted 6 *types* on the basis of shape of SSN which have been described.

Table 3

Parameter	Sudharsh an gupta et. (2017)	Present study	P-Value
Right Scapula TD - Mean($\pm$ SD)	6.33 $\pm$ 2.40	9.76 $\pm$ 1.76	P< .0001
Right Scapula VL - Mean ($\pm$ SD)	4.98 $\pm$ 1.75 (Sample size – 41)	5.81 $\pm$ 1.54 (Sample size- 22)	P=0.0665
Left Scapula TD - Mean ($\pm$ SD)	7.62 $\pm$ 1.59	10.07 $\pm$ 1. 96	P<0.0001
Left Scapula TD - Mean ($\pm$ SD)	6.10 $\pm$ 1.71 (Sample size - 47)	5.92 $\pm$ 2.49 (Sample size -40)	P=0.6919

Table 3. Showing the comparison between Sudarshan Gupta et al and present study. Our study comparing with the Sudarshan Gupta et al (2017) we found a significantly higher value of *transverse diameters & non significant difference of vertical length*.

Table 4

Parameter	Manikum C et.(2015)	Present study	P-Value
Right Scapula TD – Mean ($\pm$ SD)	14.68 $\pm$ 4.64	9.76 $\pm$ 1.76	P< 0.0001
Right Scapula VL – Mean ($\pm$ SD)	7.54 $\pm$ 2.51 (Sample size - 30)	5.81 $\pm$ 1.54 (Sample size - 22)	P= 0.0062
Left Scapula TD - Mean ($\pm$ SD)	13.03 $\pm$ 4.75	10.07 $\pm$ 1.96	P= 0.0065
Left Scapula TD - Mean ($\pm$ SD)	6.14 $\pm$ 1.82 (Sample size - 30)	5.92 $\pm$ 2.49 (Sample size - 40)	P= 0.6841

Table 4. Showing the comparison between Manikum C. et al and present study Our study Comparing with the Manikum C et al (2015), we found significantly lower value of transverse diameters of SSN & *non significant difference of vertical length*.

Conclusion

Knowledge about anatomical variations of SSN is helpful for location and source of entrapment syndrome. This study is useful for *anatomists, orthopaedicians, radiologists and neurosurgeons* for a better diagnosis and management of the entrapment syndrome.

References

1. Nafees Fatima¹, Shamir Rahman², Bipin Kumar³ A Morphological Study of Suprascapular Notch in Population of Bihar, Annals of International Medical and Dental Research, May 2017, Vol (3), Issue (4) ISN (O):2395-2822; ISSN (P):2395-2814.
2. Neeta Chhabra ^{*1}, Suraj Prakash ¹, MS Ahuja ² – Morphometric and morphology of suprascapular notch, Its importance in suprascapular entrapment *International Journal of Anatomy and Research, Int J Anat Res* 2016, Vol 4(3):2536-41. ISSN 2321-4287 DOI: <http://dx.doi.org/10.16965/ijar.2016.267>

3. Sudarshan Gupta, ZarnaPatel, Deepak Howale A Study on Morphometry and Morphological Variation of Suprascapular Notch in Dried Human Scapula, International Journal of Anatomy, Radiology and Surgery. 2017 Jul, Vol-6(3): AO05-AO09
4. Manikum, C.*; Rennie, C.*; Naidu, E. C. S.* & Azu, O. O.; A Morphological Study of the Suprascapular Notch in a Sample of Scapulae at the University of Kwazulu Natal *Int. J. Morphol.*, 33(4):1365-1370, 2015.
5. Kopell HP, Thompson WA. Pain and the frozen shoulder Surg Gynecol Obstet 1959;109:92-6.
6. Natsis K, Totlis T, Tsikaras P, Appell HJ, Skandalakis K. Proposal for classification of the suprascapular notch: a study on 423 dried scapulas. *Clin. Anat.* 2007; 20(2):135 - 9.
7. Rengachary SS, Neff JP, Singer PA, Brackett CF. Suprascapular nerve entrapment neuropathy. A clinical, anatomical and comparative study. Part1 Clinical study. *Neurosurg.* 1979;5:441-6. [12].
8. Sinkeet SR, Awori KO, Odula PO, Ogeng'o JA, Mwachaka PM. The suprascapular notch: its morphology and distance from the glenoid cavity in a Kenyan population. *Folia Morphol.* 2010; 69:241- 245.
9. Iqbal K, Iqbal R, Khan SG. Anatomical variations in shape of suprascapular notch of scapula. *J Morphol Sci.* 2010;27:1-2.