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Original Research Paper

Anatomy

SHAPE OF SUPRASCAPULAR NOTCH IN HUMAN SCAPULAE: AN OSTEOLOGICAL STUDY

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ABSTRACT

Introduction: The suprascapular notch is a depression on the superior border of scapula which gives passage to the suprascapular nerve to enter the supraspinatus fossa. The suprascapular nerve after arising from the upper trunk of brachial plexus, passes through the suprascapular notch and then through the spinoglenoid notch and supplies the supraspinatus and the infraspinatus muscles. The presence of anatomical variations in the shape of the suprascapular notch, may lead to compression of the suprascapular nerve resulting in suprascapular nerve entrapment syndrome.

Aim: The purpose of the study was to determine the variations of the shape of suprascapular notch of scapula.

Materials and Methods: The study was conducted in the department of Anatomy, Subbaiah Institute of Medical Sciences. A total 138 dried human scapulae of both sides available in the bone library were grossly examined for variations in shape of the notches.

Results: The results of our study obeyed Rengachary et.al. classification. The frequencies of various type of suprascapular notch were Type I (28.25%) , Type II (23.19%), Type III (31.16%), Type IV (7.9%), Type V (5.79%) and Type VI (3.62%).

Conclusion: The anatomical variations in the shape of suprascapular notch are common in population. Hence the clinicians need to have precise anatomical knowledge of SSN to make proper diagnosis and plan for surgical interventions like arthroscopic shoulder procedures for suprascapular nerve entrapment syndrome.

KEYWORDS : Scapula, Suprascapular notch(SSN), Variations

Introduction:

The scapula is a flat bone of shoulder girdle that lies on the posterolateral aspect of the thorax. The lateral part of superior border of scapula contains suprascapular notch which is bridged by superior transverse scapular ligament converting into foramen. This foramen transmits suprascapular nerve to the supraspinous fossa.[1] This notch is frequently bridged by bone in some animals.[2] In human, it is commonly bridged by superior transverse scapular ligament and by bone (ossified ligament) in some cases.[3,4] The foramen thus completed, transmits the suprascapular nerve to the supraspinatus fossa, the suprascapular vessels passes backward above the ligament.[3] It supplies motor branches to the supraspinatus, infraspinatus, and sensory branches to rotator cuff muscles and ligamentous structures of the shoulder and acromioclavicular joints.

Complete or partial ossification of superior transverse scapular ligament may form and convert the notch into the suprascapular foramen (SSF). This is frequently seen in animals, but its prevalence is said to be very low in humans.[5] The anatomical variations in the shape of suprascapular notch may lead to nerve compression causing suprascapular nerve entrapment which is an uncommon cause for shoulder pain and weakness. It was initially described by Thompson and Kopell.[6]

Many authors proposed different classifications based on measurements and shapes of suprascapular notch. Iqbal et al described three types of shapes of suprascapular notch- U, V & J.[7] Natsis et al classified the suprascapular notches based on vertical and horizontal diameters of the notch into 5 types.[8] Rangachary et al have reported six different types of anatomical variations of suprascapular notch.[9] In the present study, we examined the anatomical variations of the shape of suprascapular notch of dried human scapulae which is useful for clinicians to correlate with the type of notch causing suprascapular nerve entrapment syndrome.

Materials & methods:

The study was conducted in the department of Anatomy, Subbaiah Institute of Medical Sciences. A total 138 dried human scapulae of both sides available in the bone library were grossly examined for variations in shape of the notches. We followed the classification which was stated by Rengachary et al.,[9-11]:

Type I –complete absence of notch.

Type II -wide blunted V shaped notch occupying a third of superior border of scapula.

Type III -symmetrical and U shaped notch with parallel lateral margins.

Type IV -small V shaped notch.

Type V -U shaped notch with partial ossification of medial part of suprascapular ligament. Type VI -complete ossified ligament with bony foramen of variable size.

Observation & Results:

The frequencies of various type of suprascapular notch in the present study are tabulated in table 1.

Discussion:

The incidence of Type III (31.16%) was predominant in the present study followed by Type I (28.25%). Our results were in accordance with reports of other studies which are tabulated in table/figure 2. The incidence of completely ossified superior transverse scapular ligament was 3.62% which was compared with other studies and is tabulated in table/figure 3.

Our study also showed a unique variation found in one left scapulae that, presence of groove extending from lateral end of superior border to its spinoglenoid notch, where SSN was absent. Assuming this groove in living bridged by ligament, converting groove into osseofibrous tunnel which may cause increased risk of SN entrapment.

Notch with foramen is described by Natsis et al as bony bridge, which limit the area of SSN and divide it into a bony foramen inferiorly and a notch superiorly.[8]

Present study demonstrates that complete ossification of STSL (superior traverse scapular ligament) is common in Indian population.

Conclusion:

The morphological variations of suprascapular notch and complete ossification of superior transverse scapular ligament with formation of suprascapular foramen may cause suprascapular nerve entrapment syndrome. Hence knowledge on such variations is

essential for clinicians, for making a proper diagnosis and for further management. Present study reported incidence of suprascapular foramen which is a potential risk factor for the suprascapular nerve entrapment syndrome. Considering the higher incidence of suprascapular foramen, further detailed studies using the cadaveric dissection, dry bones, radiology, MRI and clinical screening of high risk population by specialists of community medicine, sports medicine, orthopaedicians and general surgeons for the incidence of suprascapular nerve entrapment syndrome are required to understand the gravity of adverse clinical outcomes related to suprascapular foramen.

Shape of suprascapular notch	Number	Incidence percentage
Type I	39	28.25%
Type II	32	23.19%
Type III	43	31.16%
Type IV	11	7.9%
Type V	8	5.79%
Type VI	5	3.62%

TABLE 1: Incidence of shape of SSN in the present study

Study	Population	No. of scapulae (n)	Type (%)					
			I	II	III	IV	V	VI
Rengachary et al., [9-11]	American	211	8	31	48	3	6	4
Sinkeet et al., [12]	Kenyan	138	22	21	29	5	18	4
Muralidhar [13]	Indian	104	21.15	8.65	59.61	2.88	5.76	1.93
Paolo Albino et al., [14]	Italian	500	12.4	19.8	22.8	31.1	10.2	3.6
Usha Kannan et.al [15]	Indian	400	20	10	52	4	4	10
Present study	Indian	138	28.25	23.19	31.16	7.9	5.79	3.62

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Present study	Indian	138	28.25	23.19	31.16	7.9	5.79	3.62

Table 2: Frequency of variation of different type of SSN in different population

Author	No. of scapula	No. of scapulae with suprascapular foramen	Percentage (%)
G Soni [16]	100	3	3
Iqbal et al., [7]	250	0	0
Muralidhar Reddy [13]	104	2	1.93
Vyas et al., [17]	300	11	3.62
Kalpana et al., [18]	100	2	2
Pragna et al., [19]	80	3	3.75
Vandana and Sudha et al., [20]	134	17	12.6
Jadhav et al., [21]	350	37	10.57
Usha et al., [15]	400	40	10
Present study	138	5	3.62

Table/ Figure 3: Comparison of incidence of completely ossified superior transverse ligament by different authors

FIGURE 5: TYPE V- U SHAPED NOTCH WITH PARTIAL OSSIFICATION OF MEDIAL PART OF SUPRASCAPULAR LIGAMENT

FIGURE 4: TYPE IV- SMALL V SHAPED NOTCH

FIGURE 3: TYPE III- SYMMETRICAL AND U SHAPED NOTCH WITH PARALLEL LATERAL MARGINS

FIGURE 2: TYPE II- WIDE BLUNTED V SHAPED NOTCH

FIGURE 1: TYPE I- COMPLETE ABSENCE OF SUPRASCAPULAR NOTCH

FIGURE 6: TYPE VI - COMPLETE OSSIFIED LIGAMENT WITH BONY FORAMEN OF VARIABLE SIZE

REFERENCES

1. Roger W Soames. Skeletal system: In Williams PL., Bannister LH., Berry MM., Collins P., Dyson M., Dussek JE., Ferguson MWJ: Gray's Anatomy, 38thed. London, Churchill – Livingstone, 2004; chapter 6, pp.615-618.
2. Khan, M. A. Complete ossification of the superior transverse scapular ligament in an Indian male adult. Int. J. Morphol., 2006;24(2):195-6.
3. Standring S, ed. Gray's Anatomy. 40th Ed., New York, Churchill Livingstone. 2008; 794-821.
4. Edelson JG. Bony bridges and other variations of the suprascapular notch. J Bone Joint Surg Br. 1995; 77:505–6.
5. Osuagwu FC, Inocemi IO, Shokunbi MT. Complete ossification of the superior transverse scapular ligament in a Nigerian male adult. International Journal of Morphology. 2005; 23(2):121-2.
6. Thompson W, Kopell H. Peripheral entrapment neuropathies of the upper extremity. N Engl J Med 1959; 260: pp.1261-1265.
7. Iqbal K, Iqbal R, Khan SG. Anatomical variations in shape of suprascapular notch of scapula. J Morphol Sci. 2010;27:1-2.
8. Natsis K. A bony bridge within the suprascapular notch. Anatomic study and clinical relevance – Case report. Aristotle University Medical Journal, 2008; 35(1):2933.
9. Rengachary, S. S.; Burr, D.; Lucas, S.; Hassanein, K.M.; Mohn, M.P. & Matzke, H. Suprascapular entrapment neuropathy: a clinical, anatomical, and comparative study. Part 1-Clinical study. Neurosurg., 1979;5:441-46.
10. Rengachary SS, Burr D, Lucas S, Hassanein KM, Mohn MP, Matzke H. Suprascapular entrapment neuropathy: a clinical, anatomical, and comparative. Study Part 2: anatomical study. Neurosurgery. 1979;5(4):447-51.
11. Rengachary SS, Burr D, Lucas S, Brackett CE. Suprascapular entrapment neuropathy: A clinical, anatomical, and comparative study. Part 3. Neurosurgery. 1979;5(4):452-5.
12. 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;69:241-5.
13. Muralidhar Reddy Sangam. A Study on the Morphology of the Suprascapular Notch and Its Distance from the Glenoid Cavity. J Clin Diagn Res. 2013;7(2):18992.
14. Paolo Albino, Stefano Carbone, Vittorio Candela, Valerio Arceri, Anna Rita Vestri, Stefano Gumina. Morphometry of the suprascapular notch: correlation with scapular dimensions and clinical relevance. BMC Musculoskelet Disord. 2013;14:172.
15. Usha Kannan et al., Morphometric Study of Suprascapular Notch in Indian dry Scapulae. Journal of Clinical and Diagnostic Research. 2014 Mar, Vol-8(3): 7-10
16. G Soni VS Malik, L Shukla, S Chabbra, N Gaur. Morphometric Analysis of the Suprascapular Notch. The Internet Journal of Biological Anthropology. 2012;5(1):DOI:10.5580/2B19.
17. Vyas KK, Rajput HB, Zanzrukiya KM, Suttarwala I, Sarvaiya BJ, Shroff BD. An osseous study of suprascapular notch and various dimentions of safe zone to prevent suprascapular nerve injury. Indian Journal of Applied Basic Medical Sciences. 2013;15(20):27.
18. Kalpana Thounaojam Renuca Karam, N. Saratchandra Singh. Ossification of transverse scapular ligament. / Volume 2/ Issue 12/ March 25, 2013: 1790-1791. Journal of Evolution of Medical and Dental Sciences. 2013;2(12):1790-1.
19. Pragna Patel, S V Patel, S M Patel, Badal Jotania, Sanjay Chavda, Dhara Patel. Study of variations in the shape of the suprascapular notch in Dried Human Scapula. Int J Biol Med Res. 2013;4(2):3162-4.
20. Vandana R, Sudha Patil. Morphometric study of Suprascapular Notch. National Journal of Clinical Anatomy. 2013;2(3):140-44.
21. Jadhav SD, Patil RJ, Roy PP, Ambali MP, Doshi MA. Supra scapular foramen in Indian dry scapulae. NJCA. 2012;1(3):133-5.