



Original Research Article

Morphology and a Proposed System of Classification of Suprascapular Notch in Tamil Nadu Population

Perumal A¹, Ravichandran D², Shanthi KC³

¹Assistant Professor, ³Associate Professor, Dept. of Anatomy, Vinayaka Mission's Kirupananda Variyar Medical College & Hospitals, Sankari Main Road, NH - 47, Seeragapadi, Veerapandi (P.O), Salem - 636308. Tamil Nadu.

²Associate Professor, Department of Anatomy, Narayana Medical College, Nellore, Andhra Pradesh, India.

Corresponding Author: Perumal A

Received: 25/04/2014

Revised: 15/05/2014

Accepted: 03/06/2014

ABSTRACT

Background: The variable morphology of the suprascapular notch is considered to be one of the predisposing factors in the etiology of suprascapular nerve entrapment syndrome. The morphology of the notch has been classified by various authors based on shape, ossification of superior transverse supra scapular ligament and measurements of the notch. Based on these classifications the "U" type is present more commonly and "V" type is more prone for entrapments. Owing to variations in the morphology of the notch in different populations, this paper attempts to study and classify the variable morphology of the suprascapular notch in Tamil Nadu population of India.

Materials & Methods: 240 dry human scapulae without any obvious pathology from the bone banks of VMKV Medical College and Vinayaka Mission's Homeopathy Medical College, Tamil Nadu were studied. The morphology of the notch including its shape, ossification of superior transverse scapular ligament were noted and analysed statistically.

Results: The "J" shaped variety of the notch was most commonly found followed by "U" and "V" shaped varieties. Completely ossified and partially ossified ligaments converting the notch into foramen were also observed. Presence of double notches was a unique finding in the present series. A modified classification system based on the observations is proposed.

Conclusion: The morphology of the suprascapular notch in Tamil Nadu population of India shows commonly the "J" shaped variety. Based on the observations a modified classification (Type I – IX) has been proposed which would be of use to the surgeons involved in treating the entrapment syndromes.

Key Words: Scapula, suprascapular notch, entrapment, superior transverse scapular ligament.

INTRODUCTION

The morphology of the Suprascapular Notch (SSN) has been classified by various authors. The morphology of the notch plays an important role in the entrapment of the suprascapular nerve resulting in chronic shoulder pain and

dysfunction. It is proposed that narrow "V" shaped notches and notches which are converted into a foramen by ossified Superior Transverse Suprascapular Ligament (STSL) predisposes to entrapment more commonly. Rengachary et al^[1] classified the morphology of notch into

six types (Type I – VI) based on the inferior shape of the notch and also on the degree of ossification of the STSL. Another study by Natsis et al [2] classifies the notch morphology into five types (Type I – V) based on the vertical and horizontal diameters of the notch. Yet another classification by Iqbal et al [3] is based on the shape of the notch ("U", "V" and "J" shape) without involving any measurements. The classification by Ticker et al [4] subdivided the scapulae into two types – "U" and "V" types. Studies also show that the morphology of the suprascapular notch shows ethnic variation among different populations. [5] To our knowledge few studies are available involving the morphology of suprascapular notch in north Indian population. The aim of the present research paper is to study the morphology of the suprascapular notch in Tamil Nadu population of India as this anatomic information would be of great importance to the Orthopedic surgeons managing suprascapular nerve entrapment neuropathy.

MATERIALS AND METHODS

Two hundred and forty dry human scapulae belonging to the bone banks of VMKV Medical College and Vinayaka Mission's Homeopathy Medical College, Salem, Tamil Nadu were utilized for the present study. Fractured bones, bones damaged due to conservation and bones with

obvious pathology were excluded from the study.

The bones were studied by gross examination. Presence and absence of the suprascapular notch was first noted. In scapulae with notch, the morphology was noted by visual inspection and classified according to the shape of the notch and degree of Ossification of STSL ^{1,3}. Any other morphological patterns other than the described patterns were also noted. The data were recorded and analysed statistically.

RESULTS

The results are tabulated in Table I. The present series showed "J" shaped notches (Fig. 4) as the most common variety with an incidence of 47.91%. The second commonest variety was "U" shaped (Fig.2) variety with an incidence of 14.58%. "V" shaped notch (Fig.3) was observed in 9 bones out of 240 (3.75%). Complete ossification of STSL converting the notch into a foramen was observed in 9.58% of bones (Fig.6) whereas incomplete ossification of STSL was seen in 10.83% of bones (Fig.7). Four bones out of 240 bones (1.66%) presented both notch and a separate foramen (Fig. 8). Five bones out of 240 bones (2.08%) presented boat shaped notch (Fig.5). One scapula out of 240 bones (0.41%) showed a double notch (Fig.9). Absence of notch was observed in 9.16% of bones (Fig. 1).

Table 1: Morphology of the suprascapular notch (n=240):

S.No	Types of the notch	Morphology of the notch	Number of bones – Right side	Number of bones – Left side	Total number of bones
1	Type I	Absence of notch	13 (59.05%)	9 (40.90%)	22 (9.16%)
2	Type II	U-Shaped	13 (37.14%)	22 (62.85%)	35 (14.58%)
3	Type III	V-Shaped	3 (33.33%)	6 (66.66%)	9 (3.75%)
4	Type IV	J-Shaped	55 (47.82%)	60 (52.17%)	115(47.91%)
5	Type V	Boat Shaped	2 (40%)	3 (60%)	5 (2.08%)
6	Type VI	Completely ossified STSL converting notch into bony foramen	11 (47.82%)	12 (52.17%)	23 (9.58%)
7	Type VII	Incompletely ossified STSL (shape of notch may be "U", "V" or "J")	7(26.92%)	19 (73.07%)	26(10.83%)
8	Type VIII	Both notch and foramen	1 (25%)	3 (75%)	4 (1.66%)
9	Type IX	Double notches	-	1 (100%)	1 (0.41%)



Figure 1: Absence of notch



Figure 2: U-shaped notch



Figure 3: V-Shaped notch



Figure 4: J-Shaped notch

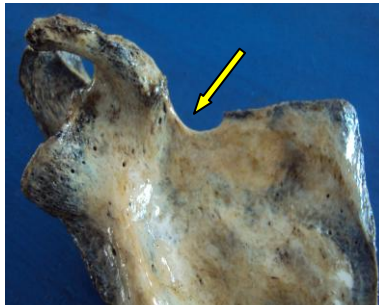


Figure 5: Boat Shaped

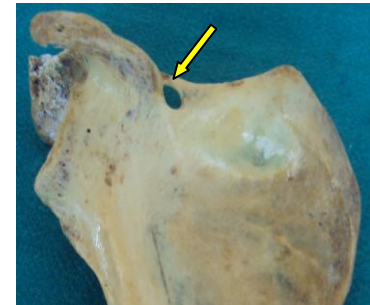


Figure 6: Notch become foramen

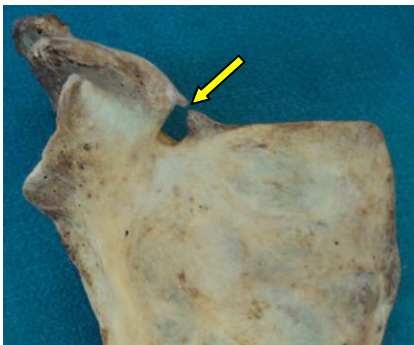


Figure 7: Incompletely ossified transverse suprascapular ligament

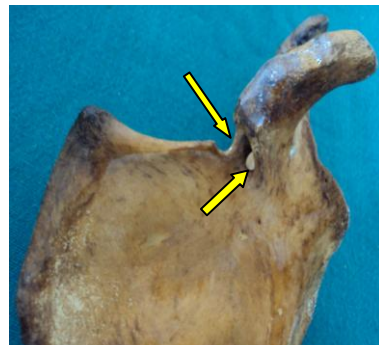


Figure 8: Both notch and foramen



Figure 9: Double notches

DISCUSSION

The suprascapular notch is located in the superior border of the scapula. The free superior margins of the notch are bridged by the superior transverse suprascapular ligament (STSL) and deep to it passes the suprascapular nerve. [6-8] The morphology of the suprascapular notch has been studied by various authors. [1-5] Rengachary et al has proposed that a “V” shaped narrow notch predisposes to entrapment of suprascapular nerve however a direct correlation between

the type of the notch and entrapment of nerve has still not been proven clinically. [9,10] The probable cause for variations in the morphology of the suprascapular notch has been attributed to the ossification of coracoid process. [11,12]

The present study shows "J" shape is the most commonest variety followed by the "U" and "V" shaped varieties in that order. Our observations are similar to the observations of Iqbal et al [3] who also observed "J" shaped variety more frequently

in the Pakistani population. Soni et al, [12] Wang et al [5] and Sinkeet et al [13] have reported a high incidence of "U" shaped variety where the transverse diameter is more than the vertical diameter whereas Natsis et al [2] observed a high incidence of both "U" and "V" shaped notches.

The presence of double notch is a unique finding in the present series with an incidence of 0.41%. Such a new variable morphological feature has been reported earlier in Chinese population. [5] Literature regarding the formation and purpose of such double notch, to our knowledge is not currently available. We also observed 4 bones (1.68%) presenting with both the notch as well as a foramen which is scarcely reported in the literature. Natsis et al [2] has reported a similar presentation (0.7%) in his study on the German scapulae.

The authors based on their observations propose a modified classification system (with nine types, Type I - IX) to understand the morphology of the supra scapular notch. This includes Type I- absence of notch, Type II- "U" shaped notch, Type III- "V" shaped notch, Type IV- "J" shaped notch, Type V- Boat Shaped, type VI- Completely ossified STSL converting the notch into a bony foramen, Type VII- incompletely ossified STSL, Type VIII- presence of both notch and foramen (shape of notch may be "U", "V" or "J") and Type IX- double notches. The morphological data of the suprascapular notch varies among different population. The results of our study showed that in the Tamil Nadu population of India "J" shaped variety is the most commonest followed by "U" and "V" shaped varieties. The anatomic information presented in the modified classification proposed by the authors would be of use to the orthopedic surgeons in the diagnosis and management of supra scapular nerve entrapment neuropathy.

CONCLUSION

The morphology of the suprascapular notch in Tamil Nadu population of India shows commonly the "J" shaped variety. Based on the observations a modified classification (Type I – IX) has been proposed which would be of use to the surgeons involved in treating the entrapment syndromes. The present study also shows variations like double notches, presence of both notch and foramen in the same bone which were not reported in an Indian literature. To our knowledge so far boat shaped suprascapular notches were not reported. The present study throws light in this field by expressing such variations and thus helping the surgeons during the procedures in this region.

REFERENCES

1. Rengachary SS, Burr D, Lucas et al. Suprascapular entrapment neuropathy: a clinical, anatomical and comparative study, Part 2: anatomical study. *Neurosurg* 1979; 5: 447-451.
2. Natsis K, Toltis T, Tsikaras P et al. Proposal for classification of the suprascapular notch: a study on 423 dried scapulas. *Clin. Anat* 2007; 20: 135-139.
3. Iqbal K, Iqbal R, Khan SG. Anatomical variations in shape of suprascapular notch of scapula. *J. Morphol. Sci* 2010; 27: 1-2.
4. Ticker JB, Djurasovic M, Straugh RJ et al. The incidence of ganglion cysts and variations in anatomy along the course of the suprascapular nerve. *J. Shoulder Elbow Surg* 1998; 7(5): 472-8.
5. Wang HJ, Chen C, Wu LP, Pan CQ, Zhang WJ, Li YK. Variable Morphology of the Suprascapular Notch: An investigation and Qualitative measurements in Chinese

- population. Clin. Anat 2011; 24:47-55.
6. Williams PL, Bannister LH, Bery MM. Gray's Anatomy. 38th ed. London: Churchill-Livingstone; 2004.
 7. Khan MA. Complete ossification of superior transverse scapular ligament in an Indian male adult. Int J Morphol 2006;24(2):195-6.
 8. Weinfeld AB, Cheng J, Nath RK, Basaran I, Yuksel E, Rose J E. Topographic mapping of the superior transverse scapular ligament: a cadaver study to facilitate suprascapular nerve decompression. Plast. Reconstr. Surg 2002; 110:774-9.
 9. Alon M, Weiss S, Fischell B and Dekel. S. Bilateral suprascapular nerve entrapment syndrome due to anomalous transverse scapular ligament. Clinical Orthopaedics 1998; 234: 31-33.
 10. Cummins CA, Messer TM, Nuber GW. Suprascapular nerve entrapment. J Bone Joint Surg Am 2000; 82: 415-424.
 11. Odita JC, Ugbodaga VI, Omene JA, Okolo AA. Humeral head and coracoids ossification in Nigerian newborn infants. Paediatric radio 1983; 13: 276-278.
 12. Soni G, Malik VS, Shukla S, Chhabra, Gaur N. Morphometric Analysis of the Suprascapular Notch. The Internet Journal of Biological Anthropology 2012; 5(1).
 13. Sinkeet SR, Awori KO, Odula PO et al. The suprascapular notch: its morphology and distance from the glenoid cavity in the Kenyan population. Folia Morphol 2010; 69: 241-245.

How to cite this article: Perumal A, Ravichandran D, Shanthi KC. Morphology and a proposed system of classification of suprascapular notch in Tamil Nadu population. Int J Health Sci Res. 2014;4(7):123-127.

International Journal of Health Sciences & Research (IJHSR)

Publish your work in this journal

The International Journal of Health Sciences & Research is a multidisciplinary indexed open access double-blind peer-reviewed international journal that publishes original research articles from all areas of health sciences and allied branches. This monthly journal is characterised by rapid publication of reviews, original research and case reports across all the fields of health sciences. The details of journal are available on its official website (www.ijhsr.org).

Submit your manuscript by email: editor.ijhsr@gmail.com OR editor.ijhsr@yahoo.com