ORIGINAL ARTICLE

Morphology of Suprascapular Notch of Scapula and its Clinical Implications

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Abstract

Morphology of suprascapular notch was studied in a tertiary care teaching hospital of North India on sixty dry adult human scapula of unknown sex. Firstly it was determined, whether the suprascapular notch was present or not. Then the shape of the suprascapular notch was noted i.e. whether it was 'U' shaped, 'V' shaped, 'J' shaped ,or round in the form of Foramen. The foramen is formed due to complete ossification of the superior transverse scapular ligament.The suprascapular nerve passes through it, and in some cases anterior coracoscapular ligament was also found.The study of morphology of suprascapular notch is important as suprascapular nerve entrapment is a common entity which leads to wastage of muscles supplied by it i.e. supraspinatus and infraspinatus.The knowledge of suprascapular notch variations is of importance for surgeons performing suprascapular nerve decompression, especially by means of endoscopic techniques.

Key Words

Morphometry, Scapula, Suprascapular Notch, Suprascapular Nerve

Introduction

The scapula of man is one of the interesting bones of his skeleton. It presents numerous features and dimensions, which are easy to systematically examine and measure, when in good condition, and it also presents many variations (1, 2). Scapula has three borders viz; superior, medial and lateral border. The superior border amongst all is the thinnest, sharpest and shortest. At its anterolateral end it is separated from the root of the coracoid process by a semicircular notch called as suprascapular notch. The suprascapular notch is situated medial to the root of the coracoid and covered by a variable transverse scapular ligament to form suprascapular foramen. The suprascapular nerve lies within the suprascapular notch/ suprascapular foramen. A number of variations occur in the shape of suprascapular notch from a discrete notch to "J" shaped, "V" shaped , "U" shaped or "O" shaped (i.e. as a complete foramen).Different authors have classified the suprascapular notch into different types. Authors like Olivier (3) has divided it into 5 types and authors like Rengachary (4) has divided into 6 types. In all these types the notch can be more or less open, narrower or wider. Regional variations in the incidence of complete absence of suprascapular notch and its involvement in suprascapular nerve entrapment neuropathy should be kept in mind during surgical or arthroscopic shoulder procedures. Thorough scanning of available literature revealed that there is a dearth of literature on morphometric study of suprascapular notch. Moreover, different authors have observed different types of suprascapular notches. Some have divided the notch into 3 types and some have observed 5 types while some

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have seen 6 types of suprascapular notch. Therefore, a curious desire developed to conduct this study. This study will furnish morphological and morphometric data providing an anatomical baseline which will facilitate to devise appropriate surgery of shoulder joint. So, it is of immense help to anatomists, osteologists, anthropologists and orthopaedicians.

Material and Methods

The material for the present study comprised of 60 adult human scapulae of unknown sex. These scapulae were obtained from the Department of Anatomy Government Medical College, Jammu. Only those scapulae which were free from physical deformity were included in the study. Labelling of the scapulae was done i.e. they were numbered from 1 to 60 with suffix " R" for right sided scapula and suffix "L" for left sided ones. As 60 scapulae were used in the study so right sided scapulae were labelled from R1 to R 30 and left sided scapulae were labelled from L1 to L30.

Suprascapular notches of the following shapes were observed: U, V, and J. some scapulae were without suprascapular notch as shown in *Fig.2* and complete foramen was also seen in some scapulae. U shaped suprascapular notch is defined as having approximately parallel sides with rounded base (*Fig.3*). V shaped suprascapular notch is defined as having medial and lateral sides which converge toward a narrow base (*Fig. 4*). J shaped suprascapular notch is defined as having medial and lateral sides parallel (*Fig. 5*). Complete ossification of the superior transverse scapular ligament resulted in the formation of complete foramen (*Fig. 6*).

Results

The observations were recorded under the following headings:-

1. *Side of scapula:*-Out of total 60 number of scapula, 30 were of right side and 30 were of left side. (Fig.1)

2. *Presence of the suprascapular notch:*-The suprascapular notch was present in almost all the scapulae but three scapulae out of thirty on the right side and five scapulae out of thirty on the left side were without

Fig. 1 Number of Scapulae according to side

Fig.2. Without notch

Fig 3. V shaped Notch

Fig 4. U Shaped Notch

Fig. 5. J Shaped Sotch

Fig.6 Foramen

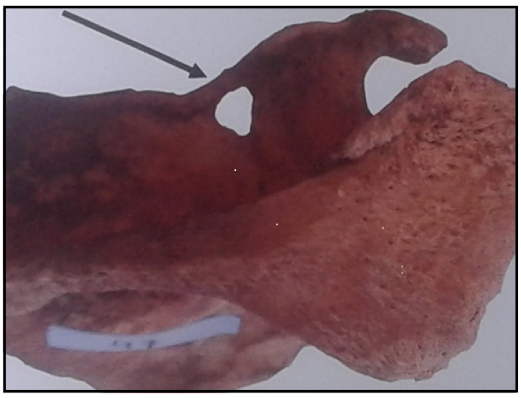

Fig. 7 Pie Chart Showing Distribution of Different Types of Shapes of Suprascapular Notch

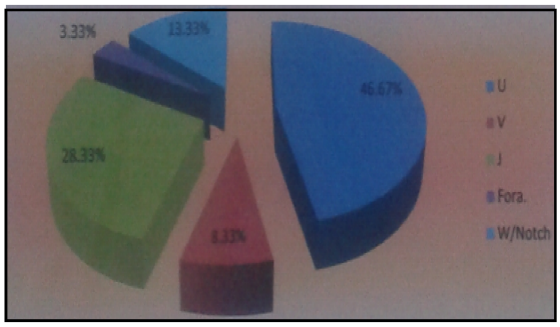

Table 1. Shapes of Suprascapular Notches

S.no	Shape	Rt.(n=30)	Lt.(n=30)	Total	%age
1	U	16	12	28	46.67
2	V	3	2	5	8.33
3	J	7	10	17	28.33
4	Foramen	1	1	2	3.33
5	No Notch	3	5	8	13.33

Table 2: Showing comparison of shape of suprascapular notch

Author	U	V	J	Foramen	Without notch	Indentation instead of notch
Ticker	77%	23%	-	-	-	-
Natsis	-	-	-	7.3%	8.3%	-
Duparc	63.3%	36.7%	-	-	-	-
Iqbal	13.2%	20%	22%	-	18%	26.8%
Soni	58%	7%	27%	3%	2%	3%
Mahdy	76.7%	13.56%	10.17%	-	-	-
Mahato	-	-	-	-	19.64%	-
Present	46.67%	8.33%	28.33%	3.33%	13.3%	-

notch. (Fig 7)

3. Shape of suprascapular notch:-Four types of shapes of suprascapular notches were observed (*Table-1*) which were:- a.V shaped suprascapula notch- It was seen in a total of five scapulae that is three on the right side and two on the left side.(*Fig-3*)

b.*U shaped suprascapular notch*-This type of suprascapula notch was seen in 28 scapulae that is 16 on the right side and 12 on the left side.(*Fig-4*)

c. J shaped suprascapula notch-It was seen in 17 scapulae that is seven on the right side and ten on the left side.(*Fig-5*)

d. O shaped suprascapular notch/foramen-It was observed in only two scapulae that is one on each side.(*Fig-6*)

Discussion

Different morphological features of the suprascapula

notch were noted in the present study. In the present study we determined:

1. *Side of scapulae:* Out of 60 scapulae 30 were of right side and 30 were of left side.

2. *Shape of suprascapular notch:* For understanding of location and source of entrapment syndrome several morphological variations and classifications of the suprascapular notch were reported. These features are of importance in suprascapular nerve entrapment which causes the supraspinatus and infraspinatus muscles to waste. Different authors have observed different shapes of suprascapular notch in scapulae.(*Table-2*)

Two oldest classification of the type of suprascapular notch were introduced by Hrdlicka (2) and Olivier (3). Hrdlicka (2) was first to separate the suprascapular notches into five types based on visual observations. Olivier (3) also described five types of suprascapular notches. Rengachary *et al*. (4) classified suprascapular notches into six types. Ticker *et al.* (5) mentioned only about U and V shaped notch types and result of their studies are higher than the present study. Natsis *et al*. (6) proposed a new method of classification based on specific geometric parameters. Results of Natsis *et al.* (6) are higher in case of values of foramen but less in case of values of without notch scapulae. In a study conducted by Iqbal *et al.* (7) results were higher in case of V shape notch and foramen while less in case of U shape notch and J shape notch. Mahdy *et al.* (8) also conducted a study on suprascapular notch. The results of present study are higher in case of values of J shape notch but less in case of U and V shape notch. Mahato *et al.* (9) studied only complete absence of notch and results of their study were slightly higher than the present study. Results of present study corresponds with that of Soni *et al.*(10) with respect to V shape notch, J shape notch and Foramen , expect for U shape notch, values of which were on lower side when compared to the study of Soni *et al.*(10)

Conclusion

The different shapes of suprascapular notch were observed."U" shaped suprascapular notch was the predominant one and 8 scapulae showed absence of notch. Complete ossification of superior transverse scapular ligament resulting in formation of foramen was seen in two scapulae. The knowledge of suprascapular notch variations is of great importance for surgeons performing suprascapular nerve decompression especially by means of endoscopic techniques.

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