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Study of Morphological Variations of the Suprascapular Notch in the Indian Population

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Abstract

Anatomy of the suprascapular notch and its variations has clinical relevance in the fields of plastic and reconstructive surgery. The course followed by the suprascapular nerve predisposes it to compression in the suprascapular notch resulting in suprascapular nerve entrapment syndrome.This study is a descriptive study carried over a period of two years in the Department of Anatomy, Armed Forces Medical College Pune, Maharashtra. Ninety one dry completely ossified scapulae of undetermined age and sex available in the bone bank of the Anatomy department were studiedThe suprascapular notches were classified according to the classification given by Rengachary et al. In our study, Type III notch was the most commonly observed as per the Rengachary classification. Type IV was the least commonly observed morphological variation of the suprascapular notch. In six cases suprascapular ligament was completely ossified to convert it into a suprascapular foramen which is classified as Type VI. The measurement of the Superior transverse diameter and maximum depth was done by the Vernier's digital Calipers. In our study, type III suprascapular notch was the most common whereas type II and type IV turned out to be the least common as only one case of each type was reported. Knowledge in the variations of the morphology of suprascapular notch helps the surgeon attain adequate access to the suprascapular nerve. Adequate access is a prerequisite to effective decompression of this nerve in all cases of suprascapular nerve entrapment neuropathies.

Keywords: Suprascapular Notch; Suprascapular Nerve; Entrapment Syndrome.

Introduction

Anatomy of the suprascapular notch and its variations has clinical relevance in the fields of plastic and reconstructive surgery. The suprascapular nerve arises from the upper trunk of the brachial plexus in the lower part of the posterior triangle. Its root value is C5,6. It passes backwards and laterally to disappear beneath the border of the trapezius. It then passes through the suprascapular foramenand supplies supraspinatus. The nerve subsequently descends lateral to the scapular spine and supplies infraspinatus [1]. It also supplies the shoulder and acromioclavicular joints. It rarely has a cutaneous branch which pierces the deltoid close to the tip of acromian and supplies the skin of proximal third of the arm within the territory of the axillary nerve [2].

The course followed by the suprascapular nerve predisposes it to compression in the suprascapular notch resulting in suprascapular nerve entrapment syndrome. This syndrome was first described by Thompson and Kopell in 1959 [3].The other causes of the suprascapular nerve entrapment neuropathy include direct trauma, anterior shoulder dislocation [4], ganglion cysts [5], Ewing's Sarcomas and lipomas [6]. Moreover, iatrogenic injuries during surgical procedures on the shoulder constitute an important cause of suprascapular nerve entrapment neuropathy [7].

Aims & Objectives

Aim

To Study of morphological variations the suprascapular notch in the Indian population.

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Objectives

1. To Study etiological factors of suprascapular nerve entrapment from the available literature.
2. To compare the findings of our study to other studies done in various diverse population groups

Materials & Methods

This study is a descriptive study carried over a period of two years in the Department of Anatomy, Armed Forces Medical College Pune, Maharashtra. Ninety one dry completely ossified scapulae of undetermined age and sex available in the bone bank of the Anatomy department were studied. These scapulae were obtained from the body donors who had given the consent for using their dead bodies for dissection and research purposes. The suprascapular notches were classified according to the classification given by Rengachary et al.

The following measurements were done–

Superior transverse diameter (STD)

Maximum depth (MD)

The measurements were done using digital Vernier's calipers (Figure 1) and were expressed in millimeters. The data was expressed as range and mean values and analysed statistically.

Results

In our study, Type III notch was the most commonly observed as per the Rengachary classification. Type IV was the least commonly observed morphological variation of the suprascapular notch. In six cases suprascapular ligament was completely ossified to convert it into a suprascapular foramen which is classified as Type VI. The measurement of the Superior transverse diameter and maximum depth was done by the Vernier's digital Calipers. The distribution of the frequency and percentage of the different variations was tabulated in Table 1.

Graph box plot of Superior transverse diameter (STD) of various categories of suprascapular notch (Rengachary classification) is shown as graph 1. Analysis of variance was applied to all the categories and was statistically significant. This was followed by doing Post hoc analysis using Bonferroni method which showed statistically significant variation between type III and type V. Also, there was a statistically significant variance between type III and type VI categories.

Table 1: Frequency and percentage of different types ofsuprascapular notches (Rengachary Classification)

S. No.	Type of notch (Rengachary classification)	Frequency	Percentage
1	I	20	22
2	II	1	1
3	III	59	65
4	IV	1	1
5	V	4	4
6	VI	6	7

Fig. 1: Showing the measurement of superior transverse Diameter (STD) using digital vernier caliper

Discussion

Suprascapular nerve entrapment is caused by the fracture of the scapula with the involvement of the notch and blade of scapula or by the traction or compression of the nerve or the suprascapular notch. Variations in the morphology of the superior transverse scapular ligamenthave been identified and associated with suprascapular nerve entrapment. Ticker and associates classified the notches into two different types namely the U-shaped suprascapular notch, defined as having approximately parallel sides with a rounded base, and a V-shaped suprascapular notch, defined as having medial and lateral sides which converge toward a narrow base. They also observed the degree of ossification of the superior transverse scapular ligament classifying the notches into three groups: no ossification, partial ossification and complete ossification [8].

Rengacharry and colleagues proposed a classification system of the suprascapular notch based on the shape of the inferior border of the notch as well as the degree of ossification of the superior transverse scapular ligament, dividing the suprascapular notch intosix types [9,10].

The morphological variations of the superior transverse scapular ligament include partial or complete ossification and multiple bands. The complete ossification of the superior transverse scapular ligament is significant because it constitutes apotential predisposing factor for suprascapular nerve entrapment. This variation in the morphology of the superior transverse scapular ligament has been identified and associated with suprascapular nerve entrapment in several case reports [8,11,12].

In our study, type III suprascapular notch was the most common whereas type II and type IV turned out to be the least common as only one case of each type was reported. We also found a comparatively higher frequency of occurrence of complete ossification of suprascapular notch turning it into a foramen.A total of six cases of complete ossification of the superior transverse scapular ligament was found amounting to a 7 percent of cases.

We believe that this deviation could be due to a small sample size of our study. Moreover, genetic etiology of the complete ossification of superior transverse scapular ligament has been documented earlier [13].

Knowledge in the variations of the morphology of suprascapular notch helps the surgeon attain adequate access to the suprascapular nerve. Adequate access is a prerequisite to effective decompression of this nerve in all cases of suprascapular nerve entrapment neuropathies.

Conclusion

The knowledge of the anatomical variation of the suprascapular nerve is of immense importance for the surgical decompression of the nerve either by excision of the superior transverse scapular ligament alone or by excision of the ligament plus enlargement of the scapular notch [14,15].

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