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Incidence of Complete Ossification of the Superior Transverse Scapular Ligament of Human Dry Scapulae in Maharashtrian Population

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Abstract

The superior transverse scapular ligament bridges across suprascapular notch to form a suprascapular foramen which transmits the suprascapular nerve. This ligament is sometimes ossified which may lead to suprascapular nerve entrapment syndrome. In the diagnosis of suprascapular nerve entrapment syndrome, variations in the anatomy of the transverse scapular ligament must be considered as possible etiologic factor.

The aim of this study was to see the incidence of the ossified superior transverse scapular ligament on dried human adult scapulae. 90 dried scapulae from the Anatomy Department of Dr. VMGMC, Solapur were examined. Scapulae with damaged superior border were not considered for the study. Scapulae with ossified superior transverse scapular ligament were recorded.

The anatomical knowledge of ossified superior transverse scapular ligament may be helpful for neurosurgeons and clinicians dealing with suprascapular nerve entrapment neuropathy.

Keywords: Entrapment Syndrome; Superior Transverse Scapular Ligament; Suprascapular Nerve.

Introduction

The scapula is one of the bone of the shoulder girdle. It is flat, triangular in shape and is situated in the postero-lateral part of the chest wall overlapping the second to seventh ribs. Superior transverse scapular ligament converts the scapular notch into suprascapular foramen and is attached medially to the limit of the notch and laterally to the root of the coracoid process. The suprascapular nerve passes below the ligament through the opening, while the suprascapular artery and vein passes above the ligament.

Suprascapular nerve is a branch from upper trunk of brachial plexus, supply the motor branches to supraspinatus and infraspinatus muscles and sensory branches to rotator cuff muscles and ligaments of shoulder girdle. Many researchers reported variable incidence of complete ossification of superior transverse scapular ligament which varies in different population. The documented variations of this ligament include calcification, partial or complete ossification and multiple band. Rarely, the suprascapular nerve becomes entrapped in this region as first described by Thomas in 1936 [1]. Ossification of the suprascapular ligament results in a bony foramen through which the suprascapular nerve passes and may result in suprascapular nerve compression [2,3,4].

In the diagnosis of suprascapular nerve entrapment syndrome, these variations in the anatomy of the superior transverse scapular ligament sometimes feature in the hierarchy of possible etiologic factors. Sporting activities with a predilection for such compression are gymnastics, tennis, weightlifting, boxing, and baseball pitching [2]. We are describing a completely ossified superior transverse scapular ligament in a dried scapulae of an adult Indians. We studied about this topic as in maharashtrian population there is less data about ossified superior transverse scapular ligament of dry scapulae.

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Materials and Methods

The total of 90 dried human adult scapulae were studied in the Anatomy department of Dr. Vaishampayan memorial Government medical college, Solapur, irrespective of age and sex to see the presence of ossified superior transverse scapular ligament. Each bone was closely observed for the presence of suprascapular foramen and was photographed.

Result

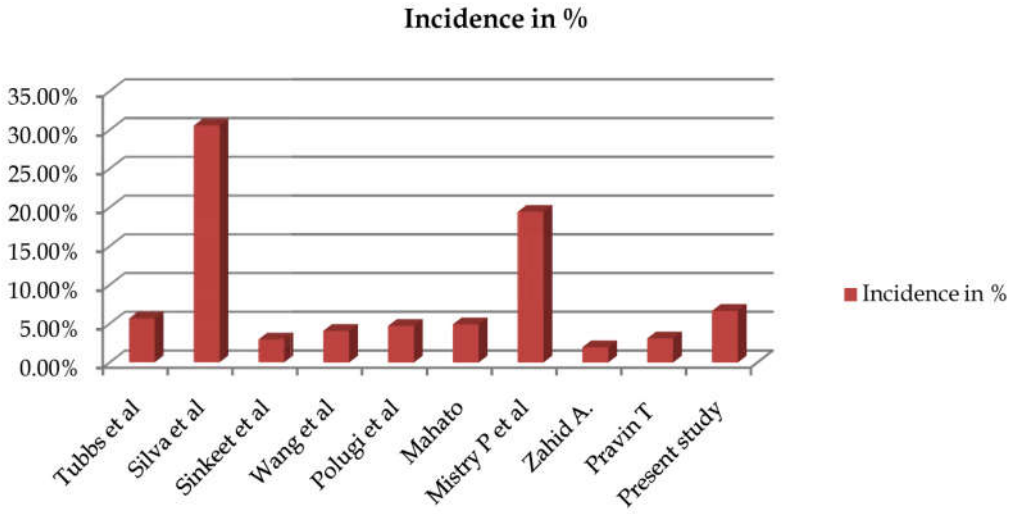
Out of 90 Scapulae, complete ossification of superior transverse scapular ligament was found in six scapulae i.e. 6.66%.Three scapulae were of right side and three scapulae were of left side.

Discussion

The suprascapular nerve is a motor nerve originating from c5 and c6 nerve roots of upper trunk of the brachial plexus. It passes through the suprascapular notch which is covered by the transverse scapular ligament into the supraspinous fossa where it supplies the supraspinatus muscle. The nerve continues around the lateral border of the spine of the scapula to supply the infraspinatus. Depending upon where the compression occurs either both or individual muscles may be involved.

Table 1: Table showing incidence of completely ossified superior transverse scapular ligament in different populations.

S. N	Study	Year	Country	Incidence in %
1.	Tubbs et al	2003	America	5.7%
2.	Silva et al	2007	Brazil	30.6%
3.	Sinkeet et al	2010	Kenya	3%
4.	Wang et al	2011	China	4.08%
5.	Polugi et al	2013	Poland	4.72%
6.	Mahato	2013	India(Andhra Pradesh)	4.92%
7.	Mistry P	2013	India (Surat)	19.44%
8.	Zahid A.	2014	Pakistan	1.96%
9.	Pravin T	2015	India (Madhya Pradesh)	3.1%
10.	Present study	2016	India (Maharashtra)	6.66%



Graph 1: Studies of different workers showing incidence of completely ossified transverse scapular ligament in different populations

The suprascapular notch is frequently bridged by bone rather than ligament, converting it into a foramen in some animals. But in humans, the conversion of suprascapular notch into foramen as a result of ossification of superior transverse scapular ligament differs in different populations. Tubbs reported incidence of complete ossification of the ligament as 5.7% in American population [5]. Silva et al studied the prevalence of the ossified superior transverse scapular ligament on dry bones of scapulae in Brazilian population and reported the incidence to be 30.76% [3]. Sinkeet et al observed the incidence of completely ossified ligament in Keniyan as 3% [6] while Wang et al and Polugi et al reported the incidence to be 4.08% [7] and 4.72% [8] respectively. According to Raj Kishore Mahato complete ossification of the ligament is 4.92% and also he describes that ossification may be influenced by age, mechanical load on ligament, sex and genetic factors and can be one of the risk factors for suprascapular entrapment neuropathy [9]. According to Mistry P studies the incidence of ossified ligament is 19.44% in Surat population [10]. In Pakistani population the incidence of complete ossification of the ligament was reported as 1.96% by Zahid A [11] and Pravin T observed the incidence as 3.1% [12]. The present study shows complete ossification of superior transverse scapular ligament in maharashtrian population as 6.66%.

Scapulae with an ossified suprascapular ligament resulting in a foramen scapulae have been classified as type VI by Rengachary et al. [13] and as type III by Ticker et al. [14] For most suprascapular nerve injuries, initial nonsurgical treatment is preferred [15,16]. Patients may present with a history of symptoms provoked by dominant upper extremity movement when suprascapular nerve got compressed. It is hypothesized that repetitive overhead motion or trauma contributes to ossification of the ligament as the incidence of entrapment of the suprascapular ligament is largely increased with strenuous overhead motion (e.g.,volleyball,baseball).

Treatment for compression of the suprascapular nerve begins with physical therapy to strengthen the rotator cuff musculature. If conservative treatment fails, surgical decompression of the suprascapular ligament is recommended. This may be performed from an anterior, superior, or posterior direction [17,18]. Generally, a 10- cm incision is made 1 cm proximal and parallel to the spine of the scapula with the trapezius muscle either split or elevated [17]. Arthroscopic decompression may facilitate a more rapid recovery especially when the entrapment is caused solely by the ossified ligament [15]. The subperiosteal technique, according to de Jesus avoids dissection of the trapezius and supraspinatus muscles and results in less soft tissue damage [18].

Conclusion

The present study indicates that complete ossification of superior transverse scapular ligament can occur in Maharashtrian population as well and will be of help to the clinicians and surgeons in the diagnosis and treatment of suprascapular nerve entrapment.

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