Orthopaedics & Traumatology: Surgery & Research 100 (2014) 515–519

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

Original article

The suprascapular vein: A possible etiology for suprascapular nerve entrapment and risk of complication during procedures around the suprascapular foramen region

M. Podgórski [a], M. Sibiński [b], A. Majos [c], L. Stefańczyk [c], M. Topol [d], M. Polguj [a,*]

[a] Department of Angiology, Chair of Anatomy, Medical University of Łódź, Narutowicza 60, 90–136 Lodz, Poland
[b] Clinic of Orthopaedic and Pediatric Orthopaedics, Medical University of Łódź, Łódź, Poland
[c] Department of Radiology and Diagnostic Imaging, Medical University of Łódź, Łódź, Poland
[d] Department of Normal and Clinical Anatomy, Chair of Anatomy, Medical University of Łódź, Łódź, Poland

ARTICLE INFO

Article history:
Accepted 13 May 2014

Keywords:
Anatomical variation
Suprascapular notch vein
Suprascapular nerve entrapment
Superior transverse scapular ligament
Suprascapular notch
Anterior coracoscapular ligament

ABSTRACT

Introduction: Nerve can be compressed when traveling through any osteo-fibrous tunnel. Any eventual anatomic structure limiting this passage increases the risk of neuropathy. During dissection of the shoulder region we recognized a vein travelling on the inferior border of the suprascapular notch together with the suprascapular nerve. The aim of this work was to evaluate the morphological characteristics of this vein in cadaveric material.
Materials and methods: The suprascapular notch (SSN) region was dissected in 60 cadaveric shoulders. The course, number and diameter of nerve and vessels in the suprascapluar notch region were evaluated. Length, proximal and distal width of the superior transverse scapular ligament were measured. Photographic documentation was taken to evaluate the suprascapular nerve passage area.
Results: The vein identified was named as the suprascapular notch vein. It was present in 58.3% of shoulders. In 11 specimens, it was double. Its mean diameter was 1.7 mm (SD 0.7 mm) and did not correlate with the suprascapular nerve passage area. A suprascapular notch vein co-occurred more often with the anterior coracoscapular ligament (ACSL). In comparison with the SSN without the ACSL, it has a significantly greater diameter (2 mm; SD 0.7 mm vs 1.5 mm; SD 0.6 mm, respectively; $P = 0.021$).
Conclusions: The suprascapular notch vein was a common structure that did not replace the suprascapular vein. Its presence correlated with the occurrence of the ACSL and was independent of body side, STSL type and SSN type.
Type of study: Observational anatomic study.

1. Introduction

The suprascapular notch (SSN) is the incisure at the upper border of the scapulae. It is bridged by the superior transverse scapular ligament (STSL) creating an osteo-fibrous tunnel whose area ranges from 4.6 mm^2 to 85.4 mm^2 [1]. Anterior coracoscapular ligament (ACSL) is independent fibrous band extending on the anterior side of the suprascapular notch, below the superior transverse scapular ligament (Fig. 1). Such structured tunnel usually holds the suprascapular nerve (SN) and the suprascapular vein. The suprascapular artery only occasionally runs below the STSL [2,3]. The suprascapular nerve innervates the supraspinatus and infraspinatus muscles and also provides sensory branches to joints (acromioclavicular and glenohumeral); ligaments (the coracohumeral and coracoacromial); subacromial bursa [4] and to a variable area of the overlying skin and soft tissues [5].

Structures passing below the STSL through the osteo-fibrous tunnel may increase the risk of neuropathy by limiting the space available for the SN. This can result in suprascapular nerve entrapment syndrome which was described in 1936 by André Thomas'a [6] and usually occurs in the SSN [7].

During dissection of the shoulder region, we found an unusual vein that passed through the SSN on its inferior border. Because this vein may restrict the passage for the SN, we aimed to determine its morphology and the prevalence.

* Corresponding author. Tel.: +48 42 63 04 949.
E-mail addresses: michal.polguj@umed.lodz.pl, chilam17@hotmail.com (M. Polguj).

http://dx.doi.org/10.1016/j.otsr.2014.05.008
1877-0568/

2. Materials and methods

The shoulder region was dissected in 60 formalin-fixed cadaveric shoulders, 30 left and 30 right, derived from a Polish population (age and sex unknown). The humeral attachment of the subscapularis muscle was cut and the muscle was retracted medially. The fasciae were cleaned, revealing the anterior side of the scapula. When the SNV was present, its course was traced from the SNN to the upstream veins. The arrangement of the suprascapular artery, vein and SN was also noted. Afterwards, the posterior aspect of the SSN was exposed. The attachment of the trapezius and deltoid muscles were separated from the spine of the scapulae. The supraspinatus muscle was cut distally and bluntly dissected from the supraspinatus fossa. The suprascapular notch vein was followed to the site of its emptying.

The dissected scapulae were fixed at a standardized distance from the camera, and their anterior aspect was photographed in the coronal plane. The ten millimeter long scale was placed at the level of measured structures and served for further calibration of measuring tool. The dimensions of the STSL, the anterior coracoscapular ligament (ACSL) and the areas of the SSN and the SN passage were measured using MultiScanBase 18.03 software (Computer Scanning System II, Warsaw, Poland). The diameter of the SN, suprascapular vessels and SNV were also evaluated. In further analysis, the STSL was classified as either fan- or band-shaped [1] and the SSN to one of the 5 types [8].

For the purposes of statistical analysis, $P < 0.05$ was regarded as statistically significant. Data is presented as a mean ± standard deviation, unless stated otherwise. A comparison of the prevalence of SNV between body sides, STSL types and SSN with or without the ACSL was performed with the χ^2 test. Differences in SNV diameter between those variables was estimated with Student's t test for independent samples. This test was also employed to compare areas of the SSN and the SN passage between specimens with and without the SNV. The relationship between SNV diameter and the number of its upstream veins was evaluated by means of one-way Anova with dedicated post-hoc tests. This method was also used to compare SNV diameter between types of the SSN. Correlations of the SNV diameter and areas of the SSN and the SN passage were evaluated by means of the Spearman's rank correlation coefficient.

3. Results

The suprascapular notch vein was present in 35 shoulders (58.3%) (Fig. 2). In 11 specimens, it was double (Fig. 3). It originated from 3 veins in 20 cases, 4 veins in 11, 2 veins in 3, and 5 veins in 1 case. Veins of origin arose on the anterior side of the scapula, inferior to the SSN, from a bone-nutrient vein of the scapula and/or veins laying beneath the fascia of the subscapularis muscle. All SNVs emptied into the suprascapular vein immediately after passing the SSN. After exclusion of a single case with five upstream veins, the diameter of the SNV differed significantly between three groups ($P = 0.0274$) and tended to increase as the number of upstream veins increased (Table 1) (Fig. 4).

In all cases, the SN (diameter = 2.1 mm; SD = 0.4 mm) travelled below the STSL. The diameters of the suprascapular artery and vein were 2.3 mm (SD = 0.6 mm) and 3.4 mm (SD = 0.7 mm), respectively. In two cases, the suprascapular artery accompanied the SN beneath

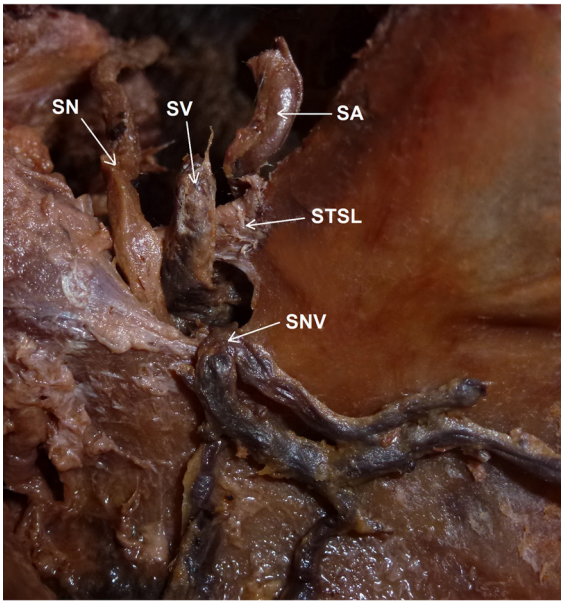

Fig. 2. The representative example of the suprascapular notch vein (SNV) that passes through the suprascapular notch together with suprascapular nerve (SN) and vein (SV). Suprascapular artery (SA) travels above the superior transverse scapular ligament (STSL).

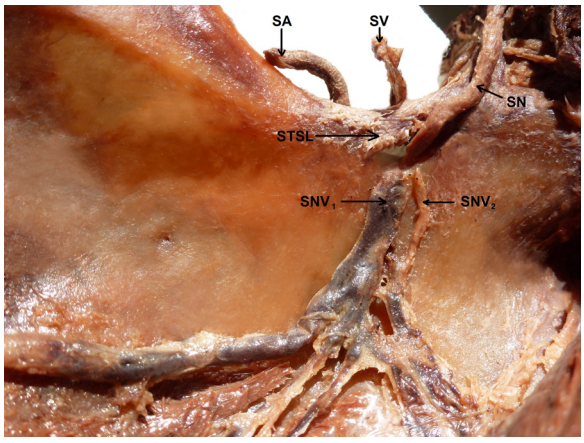

Fig. 3. Double suprascapular notch vein (SNV_1 and SNV_2) that passes through the suprascapular notch together with suprascapular nerve (SN). Suprascapular artery (SA) and vein (SV) travel above the superior transverse scapular ligament (STSL).

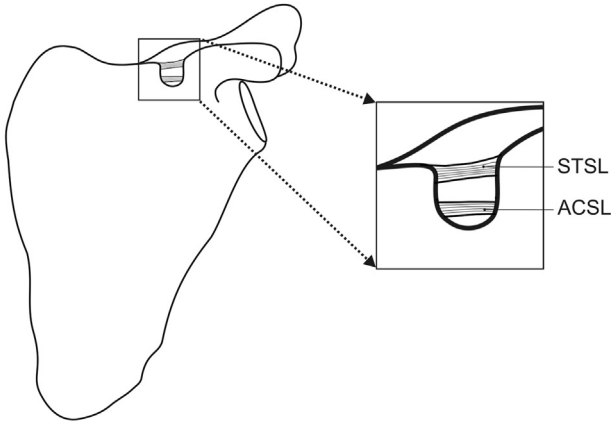

Fig. 1. Schematic arrangements of the superior transverse scapular ligament (STSL) and anterior coracoscapular ligament (ACSL) at suprascapular notch.

Table 1
P value for post-hoc test.

Number of veins	2	3	4
2	–	0.3449	0.0493
3	0.3449	–	0.1018
4	0.0493	0.1018	–