VIA MEDICA

CASE REPORT

Folia Morphol.
Vol. 71, No. 4, pp. 282–284

ISSN 0015–5659
www.fm.viamedica.pl

The bifid anterior coracoscapular ligament: a new morphological variation and its potential clinical implications

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[Received 13 August 2012; Accepted 15 October 2012]

The suprascapular notch (SSN) is the most common site of compression and injury of the suprascapular nerve (SN), which results in a neuropathy known as SN entrapment. The SSN is enclosed from the top by the superior transverse scapular ligament (STSL), creating a tunnel for the SN. On both sides of the SSN, below the STSL, the anterior coracoscapular ligament is found. This fibrous band can potentially narrow the opening and contribute to the occurrence of suprascapular entrapment syndrome. This study presents the first case of a bifid anterior coracoscapular ligament coexisting with an atypical SN course, which has never been described in the literature before. Knowledge of such anatomical variations can be helpful in arthroscopic and open procedures of the suprascapular region and confirms the safety of operative decompression for entrapment of the SN. (Folia Morphol 2012; 71, 4: 282–284)

Key words: anterior coracoscapular ligament, anatomical variation, suprascapular nerve entrapment, suprascapular nerve

INTRODUCTION

The suprascapular notch (SSN) is a groove on the upper edge of the scapula. It is enclosed from the top by the superior transverse scapular ligament (STSL), converting it into an osteofibrous passage. The SSN is the most common place for suprascapular nerve (SN) entrapment, which results in poorly localised dull pain over the lateral and posterior aspects of the shoulder, as well as weakened abduction and external rotation of the upper extremity. This neuropathy is a considerable clinical problem because it is often diagnosed incorrectly; the symptoms are nonspecific and therefore it is usually diagnosed late when the supra- and infraspinatus muscles have atrophied [4, 11]. Arthroscopic techniques for SN decompression have recently been described with successful results [3, 7]. However, the safety and success of these arthroscopic procedures are predicated on a thorough understanding of the anatomy of the suprascapular region. Previous studies confirm that anatomical variations found in the suprascapular region are significant, as they can increase the chance of SN compression [1, 2, 5, 8–10, 12, 13].

In 2002, Avery et al. [1] were the first to describe an additional, singular fibrous band that extends on the anterior side of the SSN, below the STSL. The authors named this structure the anterior coracoscapular ligament (ACSL). Although there are a few studies of the superior traverse scapular ligament, only three descriptions of ACSL can be found in the literature [1, 2, 8]. Knowledge of the morphological variations of ACSL is vital as far as suprascapular neuropathy is concerned. Avery et

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al. [1] and Bayramoglu et al. [2] proposed that it might reduce the space available for the SN passage, predisposing it to trauma. The morphology of the suprascapular region is important in avoiding an iatrogenic lesion of the SN during arthroscopic and open procedures of the shoulder region [7, 13].

In this study, we describe an example of a bifid ACSL coexisting with an atypical SN course. To our knowledge, such a case has never been published before.

CASE REPORT

Dissection of the suprascapular region was performed on the left upper extremity of an 82-year-old formalin-embalmed Caucasian female. The SN and corresponding vessels were identified, and the bifid ACSL was exposed. The measurements of the ACSL were taken using two complementary methods: a classical approach using an electronic digimatic calliper (Mitutoyo Company, Tokyo, Japan) and a new one based on analysis of the digital photographic documentation of the ACSL taken using MultiScan-Base v.18.02 software (Computer Scanning System II, Warsaw, Poland).

In the presented case, the ACSL was found to have a common distal attachment to the lateral border of the SSN. It extended medially with two fibrous bands that attached separately to the medial border of the SSN (Fig. 1). The common distal portion was 9.6 mm wide, and the upper and lower portions at the point of medial attachment were, respectively, 4.1 mm and 3.6 mm wide. The length of the superior band was 32.0 mm and the inferior one was 33.6 mm. The area of the opening limited by the inferior border of the STSL and superior border of the ACSL was 32.66 mm^2. The suprascapular vein ran between the STSL and the ACSL (Figs. 1A, C). The SN and artery travelled inferior to the ACSL through a very narrow tunnel (Figs. 1B, C). The diameter of the suprascapular artery was significantly smaller than that of the suprascapular vein. The shape of the SN travelling below the ACSL was flat; its width at this point was 7.2 mm.

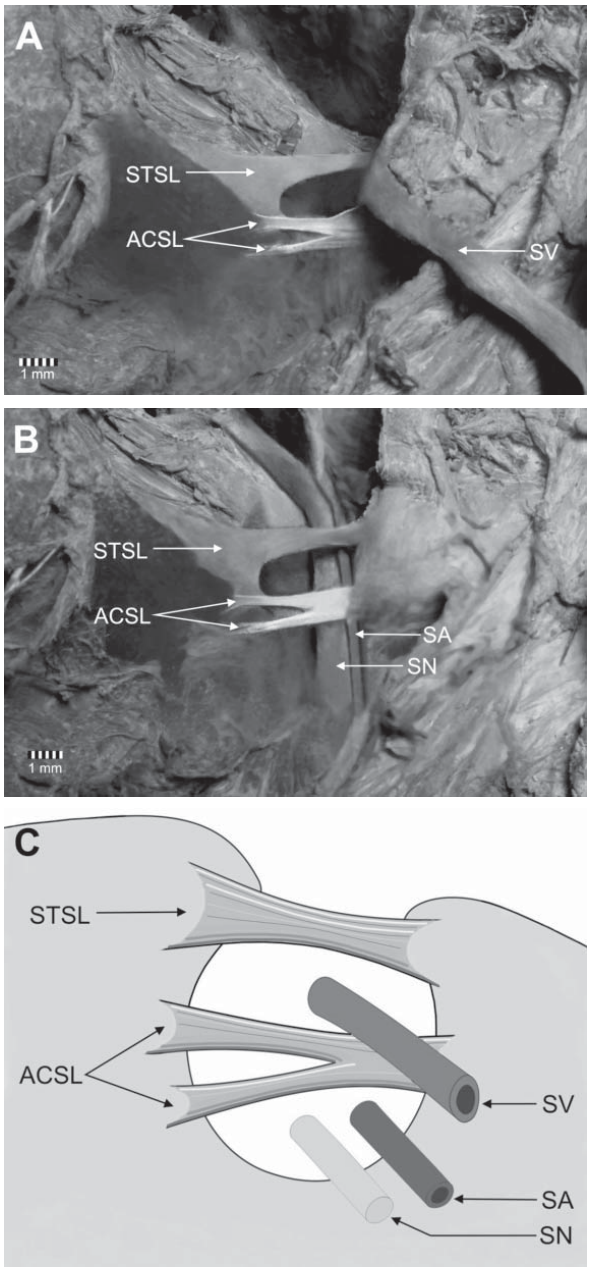

Figure 1. Anterior view of structures at the suprascapular region; **A, B.** Structures at the cadaver; **C.** Schematic arrangements; ACSL — anterior coracoscapular ligament; STSL — superior transverse scapular ligament; SV — suprascapular vein; SA — suprascapular artery; SN — suprascapular nerve.

DISCUSSION

Avery et al. [1] describe the presence of the ACSL in 60% of 54 dissected shoulders (41% of them bilaterally). Researchers have highlighted its role in the narrowing of the suprascapular foramen, which can potentially increase the risk of nerve entrapment. Bayramoglu et al. [2] confirmed the presence of an ACSL in 6 of the 32 shoulders (18.8%) and proposed its presence as an additional aetiological factor of the condition. The influence of the ACSL on SN entrapment is probably also affected by the shape of the SSN. Piyawinijwong and Tantipoon [8] reported that the ACSL was found in 19 of 64 cadavers (28%). Three types of this structure are recognised. Type I (15.79%)

has a distal attachment extending to the anterior surface of the scapula further away from the border of the SSN. In type II (63.16%) the ligament passes across the SSN, subdividing it into two foramina. Type III (21.05%) has a distal attachment extending to the nearby area of the bottom of the SSN.

Our description of the SN course in the SSN is similar to that of Avery et al. [1], who reported that the SN was found to pass below the ACSL, thus bringing the nerve in close contact to the bony floor of the SSN and intensifying the risk of neuropathy. However, on the contrary, Bayramoglu et al. [2] and Piyawinijwong and Tantipoon [8] describe the SN as always running between the STSL and ACSL. Usually the diameter of the suprascapular nerve is 2–3 mm [5, 6]. However, in our study, this nerve is 7.2 mm wide with a flat shape, probably as a result of compression by the ACSL. Also, the suprascapular artery runs with the nerve below the ACSL and occupies a wider space than normal. This feature could have a clinical implication on all extremities, as the suprascapular artery forms an important anastomosis with the dorsal scapular and circumflex scapular arteries.

This paper represents the first report of bifid ACSL coexisting with an atypical SN course. It is a new piece of anatomy, but also one that has important clinical implications. For example, should the SN be travelling alongside the suprascapular artery below the ACLS, an incision into the ligament for decompression may also increase the risk of injury to the artery. Therefore, any information concerning such anatomical variations can be helpful in both arthroscopic and open procedures in the suprascapular region.

ACKNOWLEDGEMENTS

The paper was supported by grant No. 502-03--1-031-01/502-14-115 from the the Medical University of Lodz, Poland.

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