Eur. J. Anat. 22 (5): 424-427 (2018)

Anatomical variation of suprascapular notch amongst the dissected cadavers in anatomy department, Bayero University Kano, Nigeria

Anas I. Yahaya[1], Ibrahim A. Atiku[2]

[1]Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, Bayero University Kano, Kano State, Nigeria, [2]Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, Federal University Dutse, Jigawa State, Nigeria

SUMMARY

The majority of medical students may not have witnessed the absence of the suprascapular notch throughout their dissection period in their medical schools due to its rarity. This absence is very important to the physicians and to the surgeons, as it can cause suprascapular nerve entrapment neuropathy. The aim of this paper is to report the incidence of the total absence of suprascapular notch amongst the past and the presently dissected cadavers in the department. The Anatomy Department had procured averagely 90 human cadavers within thirty years of its establishment. Each formalin-embalmed cadaver was fully dissected by either 200 or 300 level medical or para-medical students. Since the inception of the department, any morphological anomalies of the soft or hard tissues and variations in terms of shape, size, position, or absence were always recorded and published. The human scapulae from those previously dissected cadavers were always examined just like any other bone in the human body to determine any variations or anomalies. Our previous records did not indicate any absence of the suprascapular notch except in one cadaver that was recently dissected and macerated in early 2017.

Thus, it can be said that the incidence of absence of the suprascapular notch in Nigeria is 2:180 (90 cadavers: 90 left side, 90 right side scapulae), which is 1.1%. In summary, the absence of the suprascapular notch in our environment is also rare. Notwithstanding, physicians and surgeons should bear in mind the rare absence of the suprascapular notch and its possible involvement in the development of neuropathy due to the entrapment of the suprascapular nerve.

Key words: Anatomical variation – Absence – Suprascapular notch – Nigeria

INTRODUCTION

Anatomical variation of the suprascapular notch (SSN), especially its complete absence, is very uncommon, although it has been reported in the Caucasians (Bayramolu et al., 2003; Yücesoy et al., 2009; Polguj et al., 2012), Asians (Agrawal et al., 2014; Pushpa and Roshni, 2015), and Africans (Ofusori et al., 2008; Gamal and Mohammad, 2015). Therefore, it is possible for thousands of medical students not to have come across the absence of SSN throughout their dissection years in Anatomy. The suprascapular notch (SSN) is a small gutter at the root of the coracoid process, which is bridged in life by a ligament: the superior transverse scapular ligament (STSL), thus converting the notch into suprascapular opening (SSO) for the entrance of the suprascapular nerve (Williams et al., 2004; Polguj et al., 2014). In some individuals, SSN may be narrowed as commonly reported in patients with suprascapular nerve entrapment (Ofusori et al., 2008; Yücesoy et al., 2009). Additionally, the shape and size of SSO may be reduced because of the anatomical variations of the

Corresponding author: Anas I. Yahaya. Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, Bayero University Kano, Kano State, Nigeria. Phone: +2348128139785. E-mail: suhhis@yahoo.com

Submitted: 22 April, 2018. *Accepted:* 25 June, 2018.

STSL, which was recently classified into three types (Polguj et al., 2013). In type 1: STSL is fan-shaped and more common than type II, which was described as band-shaped, and this is also commoner than type III, which was shown to be bifid (Polguj et al., 2013) (Fig. 1). The second and the third types were implicated in suprascapular nerve entrapment (SNE). Similarly, anatomical variations of the neurovascular bundles' (nerve, artery, vein) topography, and their relations to the STSL, are occasionally found and are of also clinical relevance in SNE. Thus, 4 types of the topography of neurovascular bundles in the suprascapular region and their relation to the STSL were distinguished (Polguj et al., 2014) (Fig. 2): In the 1st variant (type I), the suprascapular artery is superior to the STSL, while the suprascapular vein and nerve are inferior to it. In the 2nd variant (Type II), the suprascapular artery and vein run above the STSL, while the nerve is below it. In the 3rd variant (type III), the suprascapular vessels and nerve lay directly under the ligament. Type IV comprised the other variants of these structures (Polguj et al., 2014). The suprascapular nerve supplies motor branches to the supraspinatus and infraspinatus muscles of the scapula, and sensory branches to musculo-tendinous and ligamentous structures of the shoulder joints (Shishido and Kikuchi, 2001). Although, SNE may be caused by several factors, variations in the shape and size of the suprascapular notch is the most common factor of suprascapular nerve injury and possible nerve entrapment (Bayramolu et al., 2003). Therefore, the knowledge of various shapes of the suprascapular notch or its complete absence is clinically very important to the physicians and to the surgeons such as in the clinical diagnosis and treatment of suprascapular neuropathies and suprascapular nerve decompression procedures. In the Southern part of Nigeria, complete absence of the notch was similarly reported (Ofusori et al., 2008). Here again in the Northern part of the country, we report another case of complete absence of the suprascapular notch.

CASE REPORT

The Anatomy Department (Faculty of Basic Medical Sciences, Bayero University Kano, Nigeria) had procured averagely 90 human cadavers within thirty years of its establishment. Each formalin-embalmed cadaver was fully dissected by either 200 or 300 level medical or para-medical students. Since the inception of the department, any morphological, soft or hard tissue anomalies and variations in terms of shape, size, position, or absence were always recorded in a hard-cover book in the past or in the computer at the moment. The human scapulae from those numerously dissected cadavers were always examined just like any other bone in the human body to determine any variations or anomalies.

During bone maceration in the Department of Anatomy, Bayero University Kano, a rare variation of the scapula was discovered, in which there is complete absence of suprascapular notch (Fig. 3).

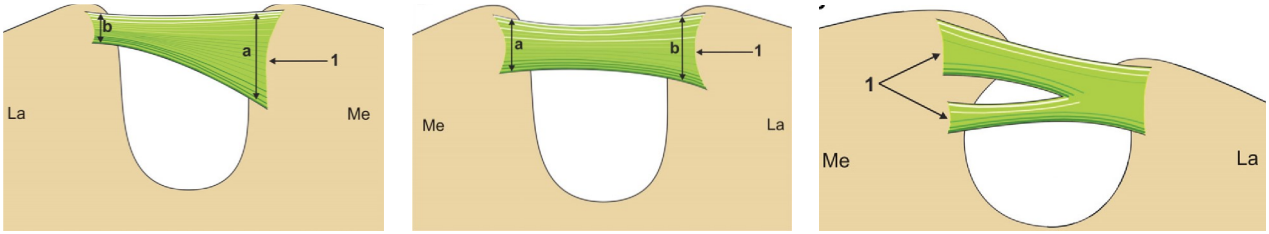

Fig 1. Type I: fan-shaped, Type II: band-shaped, Type III: bifid type (Adopted from Polguj et al., 2013).

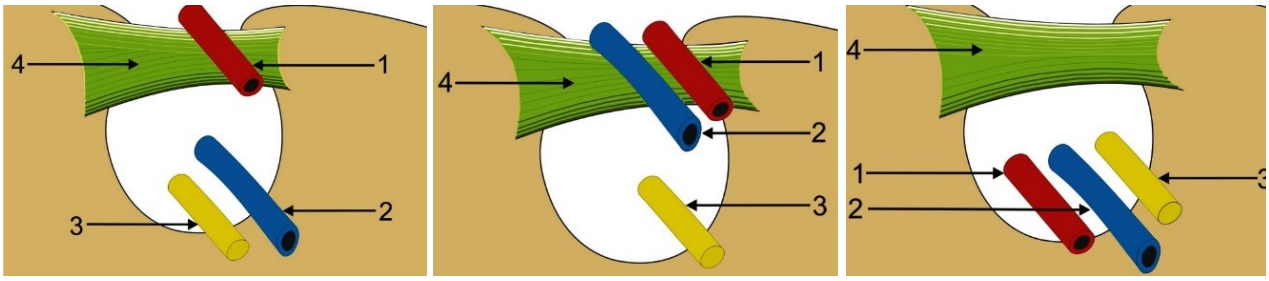

Fig 2. Types of arrangement of the suprascapular nerve, artery and vein location at the suprascapular notch. *1* suprascapular artery, *2* suprascapular vein, *3* suprascapular nerve, *4* superior transverse scapular ligament (Adopted from Polguj et al., 2014).

Fig. 3.- Ventral aspect of the scapula with absence of the suprascapular notch.

DISCUSSION

Complete absence of the suprascapular notch is a very much rare condition with few cases reported elsewhere in the world (Mahato and Parineeta, 2013), but only one in the southern part of Nigeria (Ofusori et al., 2008), where the current case was observed. An incidence of 1.36% was reported few years ago (Gopal et al., 2015), which is slightly higher than calculated in the current case report (1.11%). The suprascapular notch (SSN) serves as a passageway for the suprascapular nerve (Williams et al., 2004), with the latter getting trapped and compressed in the presence of the anomalous SSN (Rengachary et al., 1979). In the literature, the shapes of the SSN have been classified (Rengachary et al., 1979): 1. Type I: Presence of the complete absence of the notch. 2. Type II: Wide blunted V-shaped notch. 3. Type III: U-shaped notch with parallel lateral margins. 4. Type IV: Small V-shaped notch when it persists. 5. Type V: U shaped notch with partial ossification. Type VI: Complete ossified STSL. Patients with anomalous STSL (type II & III) (Polguj et al., 2013), or anomalous SSN, the suprascapular foramen (SSO) get narrowed, thus causing the condition called suprascapular nerve entrapment (SSNE), especially if associated with SSN type VI (Rengachary et al., 1979), bifid STSL or the ossified anterior coracoscapular ligament (ACSL) commonly found in most of the dissected cadavers (Polguj et al., 2013). The compression of the nerve leads to irritation during shoulder abduction and external rotation of the affected limb (Polguj et al., 2012b), with poorly localized and diffused pain. The present case fits into type I classification, as it presents complete absence of the SSN. The complete absence of the SSN is not clearly understood, but it is possible that this variant is genetically determined. Whatever the cause, it is of clinical importance to note that the suprascapular notch does not only vary in shape and size, but may also be absent completely and should also be considered as another factor for possible cause of SSNE.

Fig 3. Ventral aspect of the scapula with absence of the suprascapular notch

CONCLUSION

The complete absence of the SSN is very rare worldwide, if we rely on the literature search in the internet, and the typology and topography of the suprascapular notch, the superior transverse scapular ligament or the complete absence of the SSN, are important factors causing the suprascapular nerve entrapment. It is essential to note that variations in the suprascapular notch or its complete absence for purposes of clinical diagnosis and treatment of suprascapular neuropathies and suprascapular nerve decompression.

DISCLAIMER

The authors of this case report did not receive any financial assistance from any institution for the purpose of this report.

ACKNOWLEDGEMENTS

The authors acknowledge the contributions of the medical and paramedical students as well as the Anatomy laboratory of Bayero University Kano, Nigeria for the proper recording of any anomaly in the macerated bones or dissected cadavers.

REFERENCES

AGRAWAL D, SINGH B, AGRAWAL GA (2014) Human scapulae: suprascapular notch, morphometry and variations. *Ind J Clin Anat Physiol*, 1(1).

BAYRAMOLU A, DEMIRYÜREK D, TÜCCAR E, ERBIL M, ALDUR M, TETIK O, DORAL MN (2003) Variations in anatomy at the suprascapular notch possibly causing suprascapular nerve entrapment: An anatomical study. *Knee Surg Sports Traumatol Arthrosc*,11: 393-398.

GAMAL HE-SH, MOHAMMAD BA (2015) Variations of suprascapular notch in adult Egyptian scapulae. *Int J Anat Res*, 3(4): 1536-1542.

GOPAL K, KUMAR A, AGARWAL J, KUMAR V (2015) Variations in suprascapular notch morphology and its

clinical importance. *Int J Res Med Sci*, 3(1): 301-306.

MAHATO RK, PARINEETA S (2013) Complete absence of the suprascapular notch: a risk factor for suprascapular nerve entrapment neuropathy. *J Evol Med Dental Sci*, 2(5): 4542.

OFUSORI D, UDERA, OKWUONU C, ADESANYA O (2008) Complete absence of the suprascapular notch in a Nigerian scapula: A possible cause of suprascapular nerve entrapment. *Int J Shoulder Surg*, 2: 85-86.

POLGUJ M, PODGORSKI M, JEDRZEJEWSKI K, TOPOL M (2012a) The double suprascapular foramen: Unique anatomical variation and the new hypothesis of its formation. *Skeletal Radiol*, 41(12): 1631-1636.

POLGUJ M, JEDRZEJEWSKI K, MAJOS A, TOPOL M (2012b) Coexistence of the suprascapular notch and the suprascapular foramen - A rare anatomical variation and a new hypothesis on its formation based on anatomical and radiological studies. *Anat Sci Int*, 88 (3): 156-162.

POLGUJ M, JEDRZEJEWSKI K, PODGORSKI M, MAJOS A, TOPOL M (2013) A proposal for classification of the superior transverse scapular ligament: variable morphology and its potential influence on suprascapular nerve entrapment. *J Shoulder Elbow Surg*, 22(9): 1265-1273.

POLGUJ M, ROZNIECKI J, SIBINSKI M, GRZEGORZEWSKI A, MAJOS A, TOPOL M (2014) The variable morphology of suprascapular nerve and vessels at suprascapular notch: a proposal for classification and its potential clinical implications. *Knee Surg Sports Traumatol Arthrosc*, 23(5): 1542-1548.

PUSHPA N, ROSHNI B (2015) Morphology of suprascapular notch: a study on 176 dry scapulae. *Int J Anat Res*, 3(4): 1642-1645.

RENGACHARY S, BURR D, LUCAS S, HASSANEIN K, MOHN M, MATZKE H (1979) Suprascapular entrapment neuropathy: a clinical, anatomical, and comparative study. Part 1: Clinical study. *Neurosurgery*, 5(4): 441-446.

SHISHIDO H, KIKUCHI S (2001) Injury to the suprascapular nerve during shoulder joint surgery: an anatomical study. *J Shoulder Elbow Surg*, 10: 372-376.

YÜCESOY C, AKKAYA T, ÖZEL O, CÖMERT A, TÜCCAR E, BEDIRLI N, UNLÜ E, HEKIMOĞLU B, GÜMÜŞ H (2009) Ultrasonographic evaluation and morphometric measurements of the suprascapular notch. *Surg Radiol Anat*, 31: 409-414.

WILLIAMS P, BANNISTER L, BERY M, COLLINS P, DYSON M, DUSSEK J (eds) (2004) *Gray's Anatomy*. 38th edit. Churchil Livingstone, London.