ABSTRACT

Anatomy



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Aim: To find the incidence and clinical correlation of bony neural canal in clavicle.

Objective: To understand the existence of bony neural canal as an anatomic entity for the knowledge of physicians. Material and methods: 54 adult human clavicles were procured from the Department of Anatomy, RIMS, Ranchi, Jharkhand, for the study. Each clavicle was carefully observed for the presence of bony canal and its location in the shaft.

Results: The incidence of bony neural foramen in the clavicle was found to be 1.8% and it was found located at the junction of middle and lateral third of the shaft.

Conclusion: This study is of clinical importance to physicians, surgeons and radiologists. The existence of bony neural canal in clavicle is an anatomic entity which can lead to intermediate supraclavicular nerve entrapment, which should be considered in the differential diagnosis of shoulder pain. Also, there could be a possibility of the clavicle being weakened by the presence of such a bony canal at a site which is already the weakest part of the bone.

KEYWORDS : clavicle, bony canal, supraclavicular nerve variation, nerve entrapment

INTRODUCTION:

The clavicle is a long bone which is gently curved, lies horizontally at the root of the neck and is subcutaneous throughout its whole extent. [1] Normally, the shaft of clavicle shows only one canal on the inferior surface which transmits the main nutrient artery of the bone. Occasionally, well defined canals perforating the entire thickness of the clavicle may be present, indicating variant passage of intermediate supraclavicular nerves. The intermediate supraclavicular nerves in its normal course, cross the clavicle but they can have a variant passage through an intraclavicular bone canal. The plausible cause for the formation of intraosseous canal could be by enclosure of the nerve within the clavicle during normal development. In most of the cases the bone canals are situated in the shaft of the clavicle and rarely at the acromial end. The canals are either superficial or deep. Often bone bridges are formed by roofing the course of intermediate supraclavicular nerves.[3]

MATERIAL AND METHOD:

54 adult human clavicles (25 of right and 29 of left side) of unknown age and sex, obtained from the department of Anatomy, RIMS, were taken for the study. The surface of each clavicle was studied for the presence of any intraclavicular bony canal and its location in the shaft with respect to anterior or posterior border.

RESULTS:

Table 1: Table showing incidence of bony canal in clavicle in the present study

Number of	Number of clavicles with	Percentage of
clavicles	bony neural canal	incidence
54	1	1.8 %

In the present study of 54 adult clavicles, an intraclavicular bony canal was found in 1 clavicle of right side, located in the shaft at the junction of middle and lateral thirds. The opening of the canal was found to be present near the posterior border, oval shaped, directed parallel to the long axis of the bone. The foramen measured 4mm transversely on superior surface, 3.5mm on inferior surface and 1mm anteroposteriorly. It was located 6.5cm from the acromial end with the total length of the clavicle of 15.3cm measured from sternal to acromial end.

Fig1. Photograph of a right sided clavicle, superior view showing a bony canal marked by a probe



DISCUSSION:

Table 2: Table showing incidence of bony canal in clavicle as reported by different authors

Author	Number of cases or specimen	Total incidence
Papadatos et al	10/254 cadaveric cases	4%
Boorman and Sommerland	1/94 cadaveric cases	1%
Jelev and Surchev	6/130 bone specimen	4.6%
Skarby	15/1000 radiological findings	1.5%
Natsis et al	2/77 cadaveric cases	2.6%
Santos	30/450 bone specimen	6.6%
Present study	1/54 bone specimen	1.8%

K. L. Moore states that occasionally, the clavicle is pierced by a branch of the supraclavicular nerve.[2] L. Jelev in his study of 130 clavicles in Bulgarian population found six clavicles with canals (an incidence of 4.6%) resulting from variant passage of supraclavicular nerves.He found the canals were established more frequently in left clavicles than in right clavicles. [3] Papadatos et al mentions that in 10 out of 254 cases, (an incidence of 4%) the clavicle was perforated by the middle branch of supraclavicular nerve. They traversed the bone in intraclavicular canals and were visible on X-ray films. [4] Boorman and Sommerland found an incidence of 1% in 94 cadaveric cases that they dissected. [5] The overall incidence ranges between 1% and 6.6% according to studies done earlier based on surgical, post- mortem and radiological findings. Natsis K has reported an incidence of 2.6% in their study. [6] In our study in Jharkhand population, we found an incidence of 1.8%. Georgi Georgiev and Lazar Jelev presented a case report wherein they found supraclavicular nerve passing through an osseous canal of

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the clavicle during routine anatomical dissection. A branch from the intermediate nerve group pierced the clavicle, between its lateral and middle third. In our study, the neural canal was seen located between the lateral and middle third of the clavicle. Different authors have described the variant bony canals piercing the clavicle with terms like "intraclavicular canal, "transclavicular canal", "canalis clavicularis". Tubbs et al (2006) reported a male cadaver with the right intermediate branch of the supraclavicular nerve piercing the clavicle. [7] Symptoms related to this finding were rare but most commonly involved the intermediate branch of supraclavicular nerve. Symptoms could be alleviated by surgical decompression of the entrapped nerve. R. H. Gelberman reported a case of supraclavicular nerve entrapment neuropathy.[8] Since the reporting of supraclavicular nerve entrapment syndrome by Gelberman et al, a number of clinical cases of this specific neuropathy have been reported. In all these cases, the nerve injury was attributed to the location of the supraclavicular nerve in a narrow canal in the clavicle. It also becomes vulnerable to injury during fracture.

CONCLUSION:

This study is of clinical importance to physicians, surgeons and radiologists. The existence of bony neural canal in clavicle is an anatomic entity which can lead to supraclavicular nerve entrapment, to be considered in the differential diagnosis of shoulder pain. Also, the presence of the canal at the junction of middle and lateral third of the shaft, raises the possibility of further weakening the bone at a site which is already the weakest part of the clavicle.

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