

Study of Supratrochlear Foramen of Humerus and Its Clinical Importance

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Abstract: Supratrochlear foramen (STF) is located on the bony septum that separates the olecranon fossa from the coronoid fossa, at the lower end of the humerus. The present study was conducted on 85 humeri (44 left, 41 right) of unknown sex collected from the department of anatomy, A.J. Institute of Medical Sciences, Mangalore. The presence of a STF was noted; its shape was observed and transverse and vertical diameter were measured by using digital Vernier caliper. STF was observed in 22 (25.88%) bones. Oval shape was more predominant seen in 13 cases followed by round in 9 cases. The mean transverse and vertical diameter of right side was 4.46 mm and 3.13 mm and the mean transverse and vertical diameter on the left side was 4.60 mm and 3.08 mm respectively. The knowledge of STF is important for orthopaedician and radiologists in their day to day clinical practice

Key words: bony septum, coronoid fossa, humerus, olecranon fossa, supratrochlear foramen,

I. Introduction

The lower end of humerus has coronoid fossa anteriorly and olecranon fossa posteriorly, which are separated by a thin plate of bone. Sometimes this thin plate of bone may be perforated to form a foramen known as supratrochlear foramen¹. As this foramen lies between the two humeral condyles, it is also known as intercondylar foramen. The incidence of supratrochlear foramen varies between 6-60% in different races of humans².

The detailed knowledge of supratrochlear foramen is important for surgeons during the pre-operative planning for treatment of most common supracondylar fracture of humerus. The presence of supratrochlear foramen is also important for radiologists and orthopaedicians for proper interpretation of x-rays as they appear radiolucent and may be mistaken for cystic or osteolytic lesions³. The knowledge of foramen is of great help to anthropologists who claim it as one of the points in establishing relationship between man and lower animals⁴. The present study is an attempt to learn the incidence and different shapes of supratrochlear foramen of humerus.

II. Materials And Methods

A total of 85 (41 right, 44 left) human dried humeri of unknown sex and age, free from any pathological changes were obtained from the bone bank of the department of anatomy, AJ Institute of Medical Sciences, Mangalore. The presence of STF was noted. The shape of each foramen was noted and classified into two types as round and oval. The vertical and transverse diameter of the foramen were measured by using digital Vernier caliper. The obtained data were analysed statistically.

III. Results

Out of 85 bones studied, clear cut STF was found in 22 humeri, showing the incidence of 25.8%. The incidence of STF on the right side was 21.9% (9 out of 41) and on the left side was 29.5% (13 out of 44), showing left side predominance. The STF was oval shaped in 14 bones and round shaped in 8 humeri. The mean transverse and vertical diameter of right side was 4.46 mm and 3.13 mm respectively. The mean transverse and vertical diameter of left side was 4.60 mm and 3.08 mm respectively.

Side	Vertical diameter (mm)	Transverse diameter (mm)
Right	3.13	4.46
Left	3.08	4.60

Table 1: Showing mean vertical and transverse diameter of STF.

IV. Discussion

The high incidence of presence of STF of humerus has been the subject of many studies. The presence of STF was first described by Meckel in 1825 followed by which numerous studies were conducted on different species of animals and it was observed in most mammalian species with high incidence among apes^{5,6}.

Number of hypothesis were proposed regarding the cause of supratrochlear foramen. Some opine that it may be a racial anomaly or atavistic⁷. Darwin mentioned STF in humans as one of the characteristic that shows man's close relationship to lower forms⁸. According to Hirsh, the thin plate of bone is always present between olecranon and coronoid fossa upto 7 years after which the bony plate occasionally becomes absorbed to form the STF⁹. Mays suggested that the perforation is the result of hyperflexion of elbow joint which resorbs the humeral septum when the coronoid process of ulna make contact with it¹⁰.

The global statistics shows an incidence of 4.2% in White Americans, 18.4% in American Negroes, 8.8% in Germans, 18.1% in Japanese, 21.7% in African Negroes, 43.9% in Egyptians and 9.4% in Italian populations. The incidence is also different in different parts of Indian population, 27.4% in Eastern Indians, 32% in Central Indians, 27.5% in North Indians and 28% in South Indians¹¹. The incidence of STF in the present study is 25.88%. In the present study, majority of STF were oval shaped followed by round which coincides with the results of study by Asha Krishnamoorthy and Soubhagya .R.Nayak.

The supracondylar fracture of the humerus is most common fracture seen in paediatric age group which requires a proper pinning technique for stable fixation¹². The presence of STF makes it more difficult to plan out proper surgical procedures. The medullary canal is narrow in the region of STF which makes the retrograde nailing more difficult and increases the chance of secondary fracture of distal end of humerus. Also the medullary canal of the humerus with a foramen ends more proximally than the humeri without the canals¹³. Hence antegrade route has been advocated rather than a retrograde method in individuals with STF¹⁴.

V. Conclusion

On the basis of results of present study it is concluded, oval shaped STF is more common than round and it is mostly seen on the left sided humeri. This study will be helpful for anthropologists, surgeons, orthopaedicians and radiologists.

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Fig1: Showing round (1,3) and oval (2,4) shaped supratrochlear foramen.