

Original Article**Anatomical study of Supratrochlear foramen of Humerus**

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ABSTRACT

Background: The supratrochlear foramen (STF) of the humerus has been a neglected entity in standard anatomy and orthopaedics text-books. The knowledge of the presence of STF in a humerus may be important for preoperative planning for treatment of supracondylar fractures.

Aim: Aim is to study the anatomical variations in supratrochlear foramen of humerus.

Materials and Methods: The material consisted of 76 humeri of irrespective sex taken from the Department of Anatomy, Terna Medical College, Navi Mumbai.

Result: STF was present in 40.78% of total humeri, more frequently on the left side than on the right side. Most commonly observed shape was oval.

Conclusion: The anatomical knowledge of STF is beneficial for anthropologists, orthopaedic surgeons & radiologists in cases of supracondylar fractures of the humerus.

Key Words: Humerus, Supratrochlear foramen

INTRODUCTION

A thin plate of bone separates the olecranon and coronoid fossa which may become perforated in some cases to give rise to a foramen known as 'septal aperture' or 'supratrochlear foramen' (STF). It is situated between the two epicondyles hence known as intercondylar foramen. Since it is situated above the trochlea also called as epitrochlear foramen. The supratrochlear foramen in humerus was first reported by Meckel [1] in 1825. The incidence of foramen ranges from 6-60% in different races. Generally the shapes of supratrochlear foramen are oval, round, triangular and some are with sieve like apertures. Some bones are with translucent septum. Presence of such supratrochlear foramen in the distal end of humerus is due to absorption of translucent septum of the bone. There is a thin plate of bone situated between the olecranon fossa and coronoid fossa of humerus up to 7 years of age after which the bony septum occasionally becomes absorbed to form the supratrochlear foramen.

Due to high incidence of traumatic injuries and pathological fractures, there has been increased

incidence in intramedullary fixation of humerus. As supracondylar fractures are more common in children, it requires proper pinning technique, so the definite structure of Humerus and its variations play crucial role in treatment of supracondylar fractures of humerus to avoid operative errors.

MATERIAL AND METHODS

Study was conducted in 76 dried humerus specimens irrespective of sex, from the Department of Anatomy, Terna Medical College, Navi Mumbai, Maharashtra.

Each humerus was studied for:

1. Presence of STF
2. Shape of STF
3. Translucency of septum was observed by radiograph
4. The vertical and transverse diameter of the foramen was measured by the digital vernier calliper. Variations on the right and left side were also observed. All observations were recorded in a tabular form

RESULTS

Out of 76 humeri, clear cut STF was found in 31 (40.78%) humeri (Figure 1),

Fig 1: Supratrochlear foramen



out of which 19 were of left side and 12 of right side (Table 1).

Table 1: Presence of Supratrochlear foramen (STF) in humeri irrespective of sex

Sr. No	Side of humeri	STF present (N=31 out of 76 humeri)	Percentage
1.	Right	12	15.78%
2.	Left	19	25%

Most common shape of STF was oval 48.38 %, followed by round in 41.93%, triangular 6.45% and sieve like in 3.22% (Table 2).

Table 2: Shape of Supratrochlear foramen (STF)

Sr. No	Shape of STF	No. Of Humeri N= 31	Percentage
1.	Oval	15	48.38%
2.	Round	13	41.93%
3.	Triangular	2	6.45%
4.	Sieve	1	3.22%

Translucency of septum was observed by radiograph in 26.31%, Transverse diameter of STF in oval, round and triangular shaped STF ranged between 4 mm to 18 mm, with mean of 6.95 mm (Table 3). Vertical

Table 3 : Transverse diameter of supratrochlear foramen(STF)

Sr. No	Transverse diameter (mm)	Right side (n=12)	Left side (n=19)
1.	4 to 8	3	3
2.	8 to 12	6	12
3.	12 to 16	2	2
4.	16 to 18	1	2

Table 4 : Vertical diameter of supratrochlear foramen(STF)

Sr. No	Vertical diameter (mm)	Right side (N=12)	Left side (N=19)
1.	2.5 to 5	7	8
2.	5 to 7.5	4	10
3.	7.5 to 10	1	1

diameter of oval, round and triangular shaped STF ranged between 2.5 mm to 10 mm, with mean of 4.5 mm (Table 4). In 3.22% of humeri STF were sieve like so the dimensions could not be measured.

DISCUSSION

The anatomical knowledge of the presence of STF is beneficial for orthopaedic surgeons, radiologists and anthropologists. In the present study incidence of STF was found in 40.78% of the specimens out of which 12 (15.78%) of right sided and 19 (25%) were of left sided humeri. In 2007, Singal S et al [3] observed STF in 28% and in 2011; Mahajan A et al observed the incidence in 26% [4].

In the present study majority (48.38%) of foramens were oval. Next to oval, round shape being common was in 41.93%, triangular in 6.45% and sieve like in 3.22%. Veerappan V et al [2] observed oval shape in 42.85%, round shape in 37.71%, triangular shape in 14.28% and sieve like in 7.14% in their study.

Translucency of the septum was observed in 26.31% of specimens, radiographs were taken of all humeri those with and without foramen to see translucency of STF, and those humeri with translucency appeared radiolucent on radiograph in present study. In 2009,

Nayak SR et al [5] found the translucency in 56.7%; Veerappan V et al [2] observed such an incidence in 50%.

Presence of STF is associated with narrow intramedullary canal, so special attention may be required during intramedullary nailing procedures as the percentage of presence of STF in Indian population is high [2]. In the present study we observed that transverse diameter in oval, round and triangular shaped STF varied from 4 mm to 18 mm (mean= 6.95 mm) and vertical diameter varied from 2.5 mm to 10 mm (mean =4.5 mm).

In paediatric age group supracondylar fractures accounts for 75% of all injuries, the most common cause of this type of fracture is falling on outstretched hand in which the distal segment displaces posteriorly in more than 95% of fractures.

Non displaced supracondylar fractures (type 1) can be treated by closed reduction while the angulated fractures with moderate disruption (type 2) treated with closed reduction and percutaneous pinning procedure. Completely displaced malrotated and an angulated fracture (type 3) treated with open reduction [6].

In humerus with STF antegrade intramedullary nailing procedure can be performed instead of retrograde procedure.

As STF appears radiolucent area on plain radiograph which mimics like osteolytic or cystic lesion, this should be kept in mind while performing various orthopaedic, surgical and diagnostic procedures [2].

CONCLUSION

Present study of variation of STF (supratrochlear foramen) in the distal end of humerus may be helpful for anthropologists, orthopaedic surgeons and radiologists in day to day clinical practice.

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