

Original article:

Supratrochlear Foramen of Humerus – A Morphometric Study

Jaswinder kaur*, **Zorasingh****

*Associate professor, Adesh Institute of Medical Sciences & Research, Bathinda

**Professor & Head, GGS Medical College, Faridkot

Corresponding author: jaswindpreet@gmail.com

ABSTRACT:

Introduction: The knowledge of the presence of supratrochlear foramen (STF) in a humerus may be important for preoperative planning for treatment of supracondylar fractures. The presence of STF may also result in erroneous interpretation of radiographs.

Material & Methods: The presence of STF was studied in 80 dry adult humeri of unknown sex from the department of Anatomy. The presence & shapes of the STF were established by visual observations. The supracondylar foramen is seen in 27.5% of total humeri.

Results: It was present more frequently on the left side (30%) than on the right side (25%). The oval shape was more common.

Conclusion: The anatomical knowledge of STF is beneficial for anthropologists, orthopaedic surgeons & radiologists. In cases of humeral fractures of the supratrochlear foramen, the surgeon must keep in mind that it is better to perform an antegrade medullary nailing than a retrograde one; as there is higher chance of a secondary fracture, due to the extreme narrowness of the canal at the distal portion of humerus.

Key Words: Humerus, Supratrochlear

Introduction

A thin plate of bone separates the olecranon & the coronoid fossa which may become perforated in some cases to give rise to a foramen known as “septal aperture” or “supratrochlear foramen” (STF)¹. A thin plate of bone between the olecranon & coronoid fossa is always present until the age of seven years, after which the bony septum occasionally becomes absorbed to form the STF². Individuals with this anatomic variation may be able to overextend the elbow joint³. The anatomical structure of the humerus may play an important role in the intramedullary fixation thereby stressing the need of prior anatomical knowledge & preoperative planning in the presence of variations like STF in the distal end of the humerus⁴.

Material & Methods

The material consisted of 80 randomised humeri taken from the Department of Anatomy, Adesh Institute of Medical Sciences & Research, Bathinda. The bones which were freed of any pathological changes were taken. All these bones were carefully observed & screened. The incidence of the supratrochlear foramen was found on the right & left side.

Results

A clear cut supratrochlear foramen was found in 27.5% of humeri. Left cases showed the 30% & the right sided humeri showed it in 25% of cases. Septal apertures were more common on the left humeri than the right ones.



Fig.-1. showing the supratrochlear foramen of humerus

Discussion

The observation of the septal aperture was considered by Desmoulins⁵ as the racial anomaly or atavistic⁶. It was absent in Hare, Dog & some Lemures¹. It was absent or rare on embryonal or infantile humeri & the youngest humeri & the youngest humeri out of the 436 examined by Akabori⁷ was a female of 9 years old. He found that the incidence was very low after the age of 60 years. No such correlation was found by Trotter⁸. Some authors considered it to be due to the

mechanical pressure during the hyperextension or by large olecranon process has been blamed by some workers to be responsible factor for producing these supratrochlear apertures, but Hrdlicka contraindicated & said that the intermittent pressure would cause the hyperaemia resulting in strengthening of the bone instead of becoming weak. Mechanical hypothesis say that it should be more in the old age which is not. Incidence found was more on left side as compared to right side.

Table-1. Incidence of supratrochlear foramen in 80 humeri

Right Side	%age	Left Side	%age	Total	%age
10	25	12	30	22	27.5

Septal aperture was found more in the left humerus which is in line with the findings of the other races (Table 2).

Table-2. Comparative data (in %) of septal aperture in humerus

Race	Right	left
Central Indians	28	35
Eastern Indians	22	35
Japanese	25	27
Korean	06	13
Present Study	25	30

So present study correlates with the studies done by other authors.

Clinical Importance

Racial incidence of the septal aperture is shown in (Table- 3)

Table-3 Comparative data (in %) of septal aperture in humerus, race-wise

Race	%age
Australians	46.5
Egyptians	43.9
Mexicans	38.7
Central Indians	32
American Indians	29.6
Eastern Indians	27.4
Eskimos	19.8
American Negroes	18.4
Japanese	18.1
Koreans	11
Italians	9.4
Germans	8.8
American whites	6.9
Present study	27.5

It represents evolutionary aspects of the foramen in addition to its surgical & orthopaedic significance⁹. The supratrochlear foramen of the humerus has been a neglected entity in standard anatomy & orthopaedics text-books. The knowledge of the presence of STF in a humerus may be important for preoperative planning for treatment of supratrochlear fractures. The presence of STF may also result in erroneous interpretation of radiographs¹⁰. Due to the high incidence of STF in the Indian population it requires special attention during intramedullary humeral nailing procedures in the distal portion of humerus. Some authors have opinion that the occurrence of the foramen is attributed to atrophy of the bone after

ossification, with the impact of pressure in cases of the extension of the arm in straight – line direction¹¹. The study had advocated the compression of neurovascular structures due to the presence of such variations¹². Supratrochlear fractures account for 75% of all injuries in the paediatric age group¹³.

Conclusions

The present study focused on the STF which is an important variation in the distal end of the humerus. The anatomical knowledge of STF may be beneficial for anthropologists, orthopaedic surgeons & radiologists in day to day clinical practice.

References:

1. Kate BR &Dubey PN. A note on the septal apertures in the humerus of central Indians. Eastern anthropologist, 1970; 33:105-110.
2. Hirsh SI. (1927) cited in Morton SH &Cryslar WE. Osteochondritisdissecans of the supratrochlear septum. J Bone Joint Surg, 1945; 27-A: 12-24.

3. De Wilde V, DeMaeseneer M, Lenchik L, Van Roy P, Beeckman P, Osteaux M. Normal osseous variants presenting as cystic or lucent areas on radiography & CT imaging: a pictorial overview. *Eur J Radiol*, 2004; 51:77-84.
4. Akpınar F, Aydınlioğlu A, Tosun N, Dogan A, Tuncay I, Unal O. A morphometric study on the humerus for intramedullary fixation. *Tohoku J Exp Med*. 2003; 199:35-42.
5. Desmoulins (1826). Cited by Comas J (1960). In manual of physical Anthropology. P 421. USA, C. Thomas.
6. Hardlicka A. The humerus septal apertures. *Anthrologie*, X (Prague), 1932; P.34-96.
7. Akabori E. Septal apertures in the humerus in Japanese, Ainu & Koreans. *Am J Phys Anthropol*, 1934; 18:395-400.
8. Trotter, M. Septal aperture of humerus. *Am J Phy Anthropol*, 1935; 19:213-227.
9. Singhal S & Rao V. Supratrochlear foramen of the humerus. *Anat Sci Int*, 2007; 82:105-107.
10. Nayak SR, Das S, Krishnamurthy A, Prabha LV, Potu BK. Supratrochlear foramen of the humerus: An anatomico-radiological study with clinical implications, 2009; 114(2):90-94.
11. Lamb DS. The olecranon perforation. *Am Anthropologist* 1890; 3:159-174.
12. Varlam H, St Antole D, Chistol RO. Supratrochlear process & supratrochlear foramen of the humerus: a case report & a review of the literature. *Morphologie*, 2005; 89:121-125.
13. Houshian S, Mehdi B, Larsen MS. The epidemiology of elbow fracture in children: analysis of 355 fractures with special reference to supratrochlear humerus fractures. *J Orthop Sci*, 2001; 6:312-315.

Date of submission: 28 March 2013
Date of Provisional acceptance: 17 April 2013
Date of Final acceptance: 28 April 2013
Date of Publication: 03 June 2013
Source of Support: Nil ; Conflict of Interest: Nil