ORIGINAL RESEARCH ARTICLE

INTERNATIONAL JOURNAL OF ANATOMY PHYSIOLOGY AND BIOCHEMISTRY

http://www.eternalpublication.com

IJAPB: Volume: 2; Issue: 9; September 2015 *ISSN(Online):2394-3440*

Study of Supratrochlear Foramen of Humerus

Published online on 7th September 2015©www.eternalpublication.com

DR. DHANALAKSHMI V.[1]
DR. SANTHI B.[2]
DR. MANOHARAN C.[3]
DR. FLORA JUANITA E.[4]
1 Assistant Professor, Dept. of Anatomy, Thoothukudi Medical College, Thoothukudi, Tamilnadu
2 Associate Professor, Dept. of Anatomy, Madras Medical College, Chennai, Tamilnadu
3 Associate Professor, Dept. of Forensic Medicine, Thoothukudi Medical College, Thoothukudi, Tamilnadu
4 Associate Professor, Dept. of Radiology, Thoothukudi Medical College, Thoothukudi, Tamilnadu

Corresponding Author:

Dr. Dhanalakshmi V.
Assistant Professor
Dept. of Anatomy
Thoothukudi Medical College
Thoothukudi (Tamilnadu, India)
+919443671671
drlakshmidhana@gmail.com

Received: 26th August 2015; Accepted: 2nd September 2015

How to cite this article: Dhanalakshmi V, Santhi B, Manoharan C et al. Study of supratrochlear foramen of humerus. International Journal of Anatomy Physiology and Biochemistry 2015; 2(9):4-7.

Abstract:

Background: The thin plate between olecranon and coronoid fossa is sometimes perforated forming supra trochlear or inter condyloid foramen. This study is conducted to observe the morphology and to analyze the incidence of the Supratrochlear foramen (STF) in human humeri as it is more common in prehistoric bones and in lower races and is also clinically significant. **Methods and Materials:** The study was carried out on 160 dried humeri (76 right and 84 left) from the Department of Anatomy and Forensic Medicine, Government Medical College, Thoothukudi, Tamilnadu. Size and shape of the foramen were noted and its distance from epicondyle was measured. Intramedullary canal diameter was measured from the X-ray of the humeri with supratrochlear foramen. **Observation:** Out of 160 bones studied, STF was found in 55 humeri with incidence of 34.4%. The shape of the foramen varied from oval to round. The mean transverse diameter on right and left were 6.18mm and 6.97mm respectively. The mean vertical diameters were 4.5mm on right and 4.63mm on left side. The mean distance from medial epicondyle was 25.3mm on right and 24.24mm on left side and from lateral epicondyle was 26.23 mm on right and 25.3mm on left side. Translucency of bony septum was observed in 56 humeri. Humerus with multiple perforations in coronoid fossa was also observed. 41.8% of humeri with STF showed narrow medullary canal. STF may mimic an osteolytic lesion in plain radiographs. Septal aperture can be associated with narrow canal diameter. Unusual fractures can occur in the presence of supratrochlear foramen. **Conclusion:** Anatomical knowledge of STF will be beneficial to orthopedic surgeons, radiologists and anthropologists.

KEY WORDS: supratrochlear foramen, STF, humerus, fracture, epicondyle

Introduction:

In the lower end of humerus above the trochlea, the bone is thinned by the presence of coronoid fossa in front and olecranon fossa behind into which parts of ulna fit during flexion or extension. The thinned plate is sometimes perforated forming supra trochlear or intercondyloid foramen and is more common in lower races.[1] STF can be oval, round, triangular, sieve-like or irregular.

Supratrochlear foramen of the humerus was demonstrated in dog, pig and hyena. Bilateral occurrence is common and high incidence in second decade was reported.[2] Intramedullary canal

diameter of humerus with supratrochlear foramen will be narrow with less than 4mm.[3]

The present study of the STF aims to highlight its incidence, morphological features and clinical importance which may be beneficial for anthropologists, orthopaedic surgeons, and radiologists in day-to-day clinical practice.

Material and Methods:

The study was carried out in 160 dried humeri (76 right and 84 left) irrespective of sex from the Department of Anatomy and Forensic Medicine, Thoothukudi Medical College, Tamilnadu. Shape of the foramen was noted and the size measured with digital vernier caliper. The distance of the foramen from medial and lateral epicondyle was also measured. The humeri were also subjected to radiological assessment to measure the intramedullary canal below surgical neck of humerus, middle of the shaft and above the coronoid fossa.

Results:

Out of 160 bones, 76 right and 84 left humeri studied, supratrochlear foramen (STF) was found in 55 humeri with incidence of 34.4% among which 22 were right and 33 were left with incidence of 13.75% and 20.6% respectively [Fig.1]. The shape of the foramen varied from oval, round to triangular. Most of the foramen was oval in shape (in 48 humeri) among them with the long axis transverse was seen in 28 humeri, round in 5 and triangular in 2 humeri. The mean transverse diameter on right and left were 6.18+/-2.3 mm and 6.97+/-2.13 mm respectively. The mean vertical diameter was 4.5+/- 1.93 mm on right and 4.63+/-1.42 mm on left side. The mean distance from medial epicondyle was 25.3+/-2.91 mm on right and 24.24 +/-3.15 mm on left side and from lateral epicondyle was 26.23 +/-3.08 mm on right and 25.3 +/-2.88 mm on left side. Translucency of bony septum was observed in 56 humeri (35%) with equal incidence of both right and left side [Fig.2]. Humerus with multiple perforations in coronoid fossa was observed in 2 humeri (1.3%) [Fig.3].

41.8% of humeri with STF showed narrow medullary canal of less than 4mm [Fig.4]. Mean diameter of intramedullary canal of humerus with supratrochlear foramen below surgical neck was 5.2mm, at the middle of the shaft was 4.5mm and above coronoid fossa was 4.2mm. Mean diameter of intramedullary canal of humerus without supratrochlear foramen was > 6mm at all levels [Fig.5].

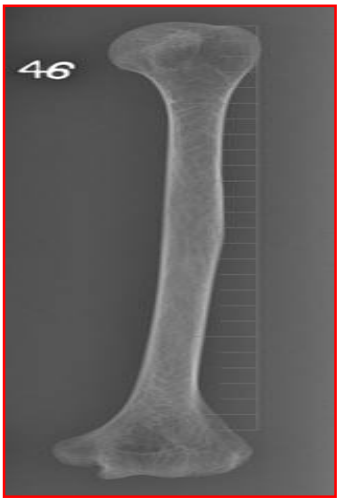
Fig.1: Humerus showing supratrochlear foramen

Fig.2: Humerus showing translucency of the septum

Fig.3: Humerus showing multiple foramina

Fig.4: X- ray of humeri with supratrochlear foramen showing narrow medullary canal

Fig.5: X- ray of humerus with normal medullary canal



Discussion:

Though supratrochlear foramen was reported by many authors, it was first described by Meckel in 1825.[4] Robert Ndou et al reported the incidence of STF as 32.4% with preponderance to left side and in females.[5] Juna et al stated that the incidence of STF was 2.5 greater in females than in males.[6] Nayak et al reported the incidence of STF as 34.3% and translucency of bony septum was 56.7% with more incidence on right side and the common shape was oval.[7]

Seth Hirsch stated that the supratrochlear foramen is not present at birth and it is observed after 6 years and when large, the foramen is actually in an open state and may be covered by membrane when it is small. Septal aperture occurs due to excessive cancellous bone resorption in distal humerus.[8] The possible reason for the presence of the STF in animals is the posture adapted by them during tearing of foods. Edward V. Glanville stated that the higher frequency of perforation of the septum was associated with greater range of movement at the elbows.[9]

The bony defect may act as a stress riser and cause alteration in fracture patterns and even low energy trauma can cause fracture. Septal aperture is associated with decreased robustness, smaller humeral diameter and narrow canal diameter[10] which may cause difficulty in intramedullary fixation. As STF can occur bilaterally, contralateral limb should be evaluated to make the patient to be cautious.

Presence of STF may be misleading in interpreting radiographs and can be mistaken as an osteolytic or cystic lesion. Evolutionary relation of STF is significant for anthropologist.

Conclusions:

From our study, we conclude that there is equal incidence of STF and translucency. STF is more common on left side and the common shape being oval with long axis transverse and intramedullary canal diameter is narrow in humerus with

supratrochlear foramen. Knowledge of presence of STF is essential for interpretation of radiographs and also for pre-operative planning for treatment of supracondylar fracture of humerus.

References:

1. Bryce TH. Osteology and Arthrology. Quain's elements of Anatomy. Volume IV, part I.11th edition. Edited by Longmans.London: Green &Co; 1915:144.
2. Koyun N, Aydinlioglu A, Gumruketioglu F. Aperture in coronoid-olecranon septum: A radiological evaluation. Indian J Ortho 2011;45(5):392-5.
3. Veerappan VG, Thotakura B, Aruna S et al. Study of Intercondylar Foramen of Humerus-Clinical and Radiological Aspect. IOSR Journal of Nursing and Health Science 2013;2(4):24-7.
4. Kumaresamy SA, Subramanian M, Gnanasundaram V et al. Study of intercondyloid foramen of humerus. Rev Arg de Anat Clin 2011;3(1):32-6.
5. Ndou R, Smith P, Ryan G et al. The supratrochlear foramen of the humerus in a South African dry bone sample. Clinical Anatomy 2013;26(7):870-4.
6. Juna B, Park M, Kim K et al. Sex-Specific Nutritional Stress on Humeri among the Crystal River Archaeological Population in Central Florida. Korean J Phys Anthropol 1998; 11(1):111-6.
7. Nayak SR, Das S, Krishnamurthy A et al. Supratrochlear foramen of the humerus: An anatomico-radiological study with clinical implications. Ups J Med Sci. 2009;114(2):90-4.
8. Seth HI. On a Foramen in the Lower Extremity of the Humerus. Radiology 1928;10(3):199.
9. Glanville EV. Perforation of the coronoid-olecranon septum humero-ulnar relationships in Netherlands and African populations. American Journal of Physical Anthropology 1967;26(1):85-92.
10. Sahajpal DT, Pichora D. Septal aperture: an anatomic variant predisposing to bilateral low-energy fractures of the distal humerus. Can J Surg 2006;49(5):363-4.