ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

A Study on the supracondylar process of humerus- a case report.

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Manuscript Info

Manuscript History:

Received: 14 January 2016
Final Accepted: 19 February 2016
Published Online: March 2016

Key words:
supracondylar process
spur
ligament of struthers
supracondylar process syndrome

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Abstract

The supra condylar process (spur) is a curved spinous process that projects from the anteromedial surface of distal part of the shaft of humerus noticed during the routine osteology discussion for students. A fibrous band, the ligament of struthers connects the process with the medial epicondyle which occasionally compresses the median nerve and brachial artery and becomes a clinically significant anatomical variation. A wide knowledge about its morphology, incidence and clinical implications are very important for the radiologists, orthopaedicians, anaesthesiologists and surgeons during image interpretation, diagnosis and treatment of a supracondylar process syndrome.

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Introduction:-

The supra condylar process (spur) is a curved spinous process that projects from the anteromedial surface of distal part of the shaft of humerus. It is a relatively infrequent osseous anomaly (Spinner et al., 2002) which draws the attention of clinicians when it is attached to the medial epicondyle of humerus by a fibrous band called ligament of struthers. It may cause symptomatic compression of brachial artery (Narendranadh et al., 2015) and median nerve(Aydinlioglu et al .,2000 ; Subasi et al., 2002). Ulnar artery can also be compressed in case of high division of brachial artery (Standring et al., 2008).

The spur may be unilaterally or bilaterally present (Kessel et al., 1966; Subasi et al., 2002). This anomaly of the humerus bone was first reported by struthers in 1849. Its prevalence among different human races were documented by various anatomists since 18th century. The incidence reported among the Indian adults ranges from 0.097% to 1.25 % (Shivaleela et al., 2014 ; Mahima et al., 2014). Hence it has drawn the attention of radiologists, anatomists, surgeons and anthropologists.

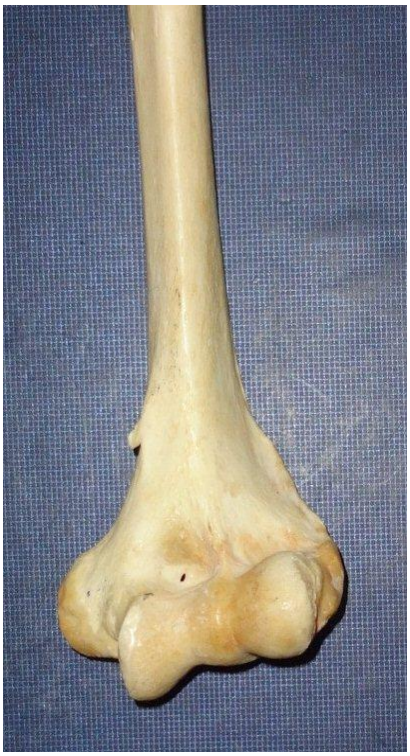
The tip of the supracondylar process is curved downwards and towards the elbow joint with no continuity with the cortex of the bone, thus differentiated from osteochondroma, which has similar features but curved upwards and away from the elbow joint (Subasi et al., 2002), continuous with the bone marrow space of the host bone and covered by a hyaline cartilage cap(Curtis et al., 1977 ; Mark et al., 2000). Median nerve compression and claudication of brachial artery (Curtis et al., 1977) may present as the symptoms of fracture of the supracondylar spur.

The present study emphasize the morphology, embryology and clinical importance of the supracondylar process of humerus.

Case report:-

A left humerus of unknown age and sex was noticed with an osseous projection (spur) from the distal end of the shaft. The measurements of the spur were recorded using a vernier caliper and photographed.

The length of the spur was 10mm. It makes an angle of 45° with the shaft of the humerus. The tip of the process was tongue shaped with rounded edges directed forwards and medially towards the trochlea. It has no sharp margins. The base was vertically 12mm long. The process was 60mm distance from the medial epicondyle. The total length of the humerus was 32 cm.



Discussion:-

The supracondylar process has a very low incidence among Indians. 90% of the supracondylar process was very common on the left side humerus and more common in male subjects (Natsis., 2008). Barnard et al (1946) reported high incidence of unilateral supracondylar process of humerus bone. Various authors referred the supracondylar process as supraepitrochlear, epicondyloid, epicondylic, supracondyloid and supracondylar spur (Curtis et al., 1977). It is an embryologic vestigial remnant of the supracondylar foramen or end epitrochlear foramen (Gupta et al., 2008) found in apes, monkeys, lining reptiles, most marsupials, members of the cat family especially jaguars (Kessel et al., 1966), occasionally present in orangutan, gorilla and normally present in climbing animals like lemurs (Parkinson,1954). Darwin described the ligament of struthers as a vestigial organ (Gupta et al., 2008). It represents the lower part of the tendon of latissmo-condyloideus, a vestigial muscle present in climbing mammals which extends from the insertion of latissmus dorsi to the medial epicondyle (Kessel et al. ,1966).The supracondylar spur and the ligament of struthers sometimes gives origin to the pronator teres muscle. In cat family, the process protects the neurovascular bundle which passes through the foramen and also gives a large area of attachment for pronator teres muscle (Gupta et al., 2008). A slip of pronator teres attached to the supracondylar spur was reported by Barnard et al (1946). The existence of the fibrous band in man is associated with the persistence of the lower third head of coracobrachialis. An ossified supracondylar foramen was reported by cunninghams (1899) in a full term still born infant (Spinner et al., 1994). Mittal and gupta (1978) reported a case in which the ligament of struthers instead of getting attached to the medial epicondyle, blends with the fascia anterior to the cubital fossa.

The supracondylar foramen or canal is a ring shaped passage formed by the process, fibrous band and the shaft of humerus through which the median nerve and brachial artery may be transmitted. Usually the supracondylar process is an asymptomatic anomaly but when the fibrous band attached to it compress the structures passing through the supracondylar foramen it may lead to exaggerated neurovascular symptoms. Bilecenoglu B et al (2005) observed an abnormal branching pattern of median nerve in the forearm of those with the supracondylar process and the fibrous band. An unusual case of median nerve, brachial artery and ulnar nerve compression were reported by

Mittal and Gupta (1978). The Ulnar nerve may be compressed with exaggerated symptoms when the forearm was flexed(Spinner et at 2002).

The clinical presentation of 'supracondylar process syndrome' are a palpable bony spur above the medial epicondyle with ischemic pain in the forearm associated with claudication, coldness and decreased radial or ulnar pulses. Compression of the nerve results in intense pain, loss of sensation, paresthesia muscular weakness and decrease in motor function of hand and fingers when the forearm was extended supinated (Mittal et al., 1978) or pronated (Barnard et al., 1946). Fracture of the supracondylar process may result in painful swelling on the medial aspect of the arm just above the elbow. Symptomatic supracondylar spur and the ligament of struthers may be surgically removed with the underlying periosteum to prevent the reoccurrence of the spur (Thompson et al., 2005). Myositis ossificans and Osteochondroma may mimic the supracondylar spur.

The supracondylar process on the anteromedial surface of the humerus may be best viewed and interpreted with an anteroposterior radiograph taken with a slight internal rotation (Lee et al., 2013) or an anterolateral radiograph and the diagnosis may be confirmed with electrophysiological studies and Doppler evaluation (Subasi et al., 2002).

Conclusion:-

The incidence of the supracondylar process is very low among Indians and it should be considered by the radiologists and clinicians while interpreting the plain radiographs and computed tomography scans of distal end of humerus for a patient with neurovascular symptoms of the forearm and hand. Hence a thorough knowledge about the incidence, variants, clinical investigations and interpretations of the supracondylar process is mandatory for the radiologists, anaesthesiologists, surgeons and the orthopaedicians.

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