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ORIGINAL RESEARCH

Morphological Study of the Supracondylar Process of the Humerus and Its Clinical Implications

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ABSTRACT

Background: Supracondylar process or spur is a hook shaped projection from the anteromedial surface of the lower part of humerus. Its pointed apex is connected to medial epicondyle by a fibrous band known as Struther's ligament (in approximately 1% individuals) which completes a foramen through which median nerve and brachial artery is transmitted.**Materials and method:** 200 dried humeri were studied in the Department of Anatomy, Ballari Medical College and Research Centre, Ballari. Bones were examined for supracondylar process. The measurements were recorded and photographs were taken.**Results:** Out of 200 dried humeri examined three humeri were found to have supracondylar process. The incidence calculated was 1.5%.**Conclusions:** The supracondylar process is often mistaken for pathological conditions like osteochondroma or myositis ossificans. Even though it is usually clinically silent, sometimes it becomes symptomatic due to compression of median nerve and claudication of brachial artery. There may be pain in medial epicondyle, tingling sensation over area supplied by median nerve. Ulnar artery is rarely involved in case of high division of brachial artery.

Keywords: Supracondylar process; Struther's ligament; Median nerve; Brachial artery; Osteochondroma; Myositis ossificans; Ulnar artery.

INTRODUCTION

A hook shaped process of bone, the supracondylar process, ranging from 2 to 20mm in length, occasionally projects from the anteromedial surface of the shaft, approximately 5cm proximal to the medial epicondyle. It is curved downwards and forwards. Struther's ligament is a ligamentous muscular structure (often an extension of the humeral head of pronator teres), passing between the medial epicondyle and supracondylar process of the humerus in approximately 1% of individuals. The foramen completed by this fibrous band usually transmits the median nerve and brachial artery, but sometimes encloses only nerve, or the nerve plus the ulnar artery (in cases of high division of brachial artery). A groove that lodges the artery and nerve usually exists behind the process.[1]

The origin of the process with regard to the borders of the humerus is also constant. It arises from the internal surface of the bone, midway between the internal and anterior borders, or a little nearer to the latter.[2]

The present study helps in the better understanding of incidence of the supracondylar process as well as its clinical importance.

MATERIALS AND METHODS

The study was done with the convenient sampling of 200 dried humeri, 100 right (figure 1) and 100 left humeri (figure 2) which were preserved in the Department of Anatomy, Ballari Medical College and Research Centre, Ballari.Bones were observed for the presence of supracondylar process. The distance from medial epicondyle to process was measured by taking the measurement from upper edge of the prominence of medial epicondyle to middle of the base of the process. Length of the process is measured from middle of the base to apex of the process. The measurements were taken with the help of Vernier Callipers.

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Figure 1: 100 right humeri

Figure 2: 100 left humeri

RESULTS

Out of 200 humeri observed, supracondylar process was seen in three humeri (figure 3). One on right side (figure 4) and two on left side (figure 5,6). The incidence calculated was 1.5%. A prominent groove was present behind all the processes.

The measurements of distance from spur to medial epicondyle and length of the spur are shown in table 1.

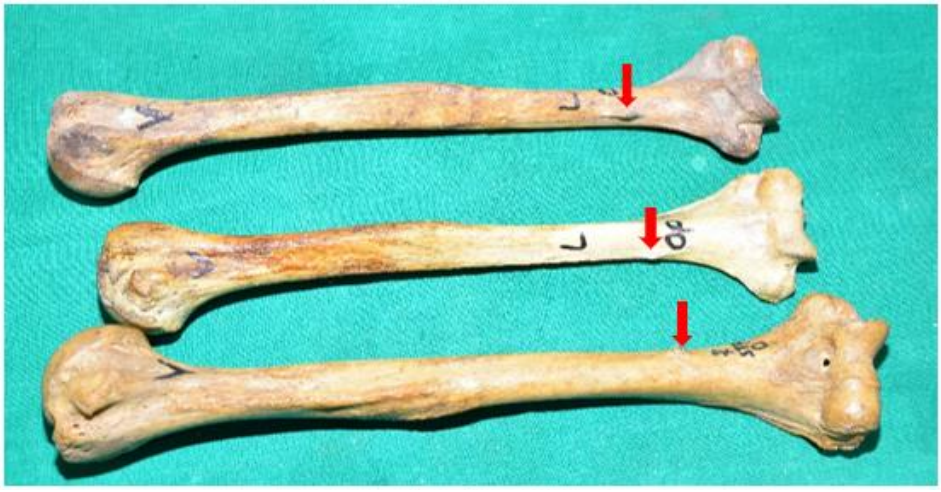

Figure 3: Three humeri with spur (red arrow indicates spur)

Figure 4

Figure 5

Figure 6

Figure 4:Right humerus with spur (specimen no. 1)
Figure 5:Left humerus with spur (specimen no. 2)
Figure 6:Left humerus with spur (specimen no.3)

Table1: Showing distance from spur to medial epicondyle and length of the spur

Sr No	Side	Distance from spur to medial epicondyle	Length of the spur
1	Right (specimen no. 1)	5.8cm	0.4cm
2	Left (specimen no. 2)	4.3cm	0.6cm
3	Left (specimen no.3)	4.6cm	0.3cm

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DISCUSSION

Supracondylar process is a hook-shaped process, which is occasionally developed on the inner surface of the humerus, two inches above the internal condyle [2]. Reported incidence of supracondylar spur is 0.3% to 2.7% in the general population [3]. The comparison of incidence of spur among different authors and the present study was done (see table 2). The comparison of the length of spur is shown in table 3.

A supracondylar humeral spur causing limb ischemia is a rare cause of neurovascular compression syndrome. It should be considered in the differential diagnosis of upper limb ischemia, especially in young patients with a palpable bony spur and weak or absent pulses [4]. A supracondylar process should be differentiated from osteochondroma. Heterotopic bone such as myositis ossificans may also mimic a supracondylar process. The anteroposterior radiographic view is most important since the lateral view may fail to show the spur on the anteromedial surface of the humerus [5].

The clinical features of a supracondylar spur causing symptoms are: symptoms of median nerve compression, forearm claudication, a palpable spur about 2 inches above medial epicondyle, and disappearance of the radial or ulnar pulse on full extension and supination of the forearm [6].

Table 2: Showing comparison of incidence of spur

Sr No	Authors	Incidence
1	A Aydinlioglu (2010) [7]	1%
2	M Mahima Sophia (2014) [8]	1%
3	Shivaleela C (2014) [9]	0.41%
4	Dinesh K Patel (2017) [10]	8.3%
5	DrIrungbamDeven Singh (2019) [11]	1.4%
6	Present study	1.5%

Incidence of the present study is close to the findings of the author [11].

Table 3: Showing comparison of length of spur

Sl No	Authors	Length of the spur	Distance from spur to medial epicondyle
1	M Mahima Sophia (2014) [8]	8mm	5.4cm
2	DrIrungbamDeven Singh (2019) [11]	1cm	5cm
3	Dhruv Airon (2022) [12]	1.3cm	4.4cm
4	Present study	Specimen no.1: 0.4cm Specimen no. 2:0.6cm Specimen no.3: 0.3cm	Specimen no.1: 5.8cm Specimen no.2: 4.3cm Specimen no.3: 4.6cm

The present study has similar result (length of spur) with the author [8] and it is similar to authors [8, 11, 12] in the measurement of distance from spur to medial epicondyle.

CONCLUSION

Supracondylar process is a rare variation which can be considered as a differential diagnosis for myositis ossificans, osteochondroma and upper limb ischemia. The knowledge of its presence is essential for Anatomists, Radiologists and Orthopedists when the patient presents with complaints of mass above the medial epicondyle, claudication pain and symptoms of median nerve compression. The symptoms can be relieved completely by excision of spur.

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