SUPRACONDYLAR SPUR OF THE HUMERUS

LIPMANN KESSEL, LONDON, ENGLAND, and MERCER RANG, KINGSTON, JAMAICA

From the Fulham Hospital, London

Pressure upon a peripheral nerve or artery may occur at a number of sites in the upper limb: at the intervertebral foramen, the thoracic outlet, the elbow, the wrist and the hand. The exact site of involvement may usually be detected by careful examination, supported by radiography, arteriography and nerve conduction tests, and the condition can be relieved in most cases. One of the least common causes of neurovascular impediment is a supracondylar spur and associated ligament above the elbow.

Supracondylar spur was described by Struthers (1849) who wrote: "A few instances have been recorded in which the humeral artery and median nerve continued downwards in a direction towards the internal condyle, above which, in order to gain their usual position in front of the elbow, they passed around a peculiar process, there developed from the humerus, as if for the purpose of affording them protection... It may be added, that the bony prominence was very readily felt before the dissection of the parts was begun, in the subjects in which it occurred in my rooms, even in the instance in which it was shortest; and the detection of this—in preliminary examination, in a case where operation was about to be performed—would, together with the situation of the pulsation of, and the effect of pressure on, the artery or arteries, at once indicate the existence of the variety in question to one whose attention had been called to its occasional occurrence" (Fig. 1).

We have come across five patients with this condition. In two cases it caused striking symptoms of neurovascular obstruction; one patient had an unrelated carpal tunnel syndrome on the same side; the remaining two patients were symptom-free.

CASE REPORTS

Case 1—A girl of twelve who, at the age of eleven, had had a few weeks of unexplained pain in the right wrist. The following year the pain recurred and extended up the front of the forearm, which ached by day and night; it was aggravated by all movements of the upper limb. She complained of numbness of all the fingers and said that her hand felt weak and that she could not hold things.

On examination she held the fingers closed and the elbow flexed. All movements caused pain and in particular she resented any attempt to extend the forearm, wrist or fingers. A bony mass could be palpated two inches above the elbow at the medial border of the brachialis muscle and pressure on it caused pain. There was no objective sign of peripheral nerve damage.
At this time we were not yet aware of the possibility of vascular obstruction, which was therefore not tested in detail. Radiographs confirmed the presence of a supracondylar spur (Fig. 2).

At operation (Figs. 3 and 4) a spur arising from the humerus was found at the medial border of the brachialis muscle. A thin ligament about three-eighths of an inch wide extended from the apex of this spur to the medial epicondyle and passed over the median nerve and brachial artery. From the anterior surface of the ligament arose fibres of pronator teres.

After the ligament had been removed it was apparent that the nerve, though not compressed, became tight against this spur when the elbow was extended. The artery was narrowed as it passed under the ligament. After the spur was removed the neurovascular bundle moved laterally to occupy its normal position.

After operation she lost all pain in the arm, but one month later developed similar symptoms in the other arm. On this occasion the radial pulse was examined in varying
positions of the arm and it was found that extension and full supination obliterated the pulse. This manoeuvre caused much pain. The patient’s dislike of passive wrist and finger extension was strongly reminiscent of that seen in early threatened Volkmann’s ischaemia of the forearm.

At exploration the median nerve and vessels passed over the apex of the spur. The pronator teres muscle arose from the spur, but there was no true ligament to be seen. On extension of the wrist, fingers or elbow the neurovascular bundle became tightly stretched across the apex of the spur. Removal of the spur completely relieved her symptoms and the radial pulse could no longer be obliterated.

Case 2—A woman of twenty-two gave a three months’ history of pain and paraesthesiae radiating from the inner side of the right elbow into the ulnar fingers, occurring during activity.

She also had attacks—two or three times a day—when the right hand became mauve and painful. These attacks were brought on by doing her hair or hanging the arm by her side.

On examination she had no objective neurological signs. A spur was palpable. The radial pulse could not be obliterated. The ulnar artery was not examined. She was seen during an acute attack when she experienced paraesthesiae all over the palm of the hand. The hand and forearm were paler and colder on the right side. Subclavian arteriography showed high division of the brachial artery. The ulnar artery, which passed under the ligament of Struthers, filled less well when the elbow was extended (Fig. 5).
At operation (Figs. 6 and 7) a spur and ligament were found. The radial artery passed lateral to the spur and was in no way impeded by it, but the ulnar artery accompanied the median nerve under the ligament and both were obviously obstructed. The spur was removed (Fig. 8) and after operation she had no symptoms.

**COMPARATIVE ANATOMY**

The supracondylar spur is present in about 1 per cent of the human population (Hrdlička 1923, Barnard and McCoy 1946) and is often bilateral. It is normally present in climbing animals, such as lemurs (Goulon, Lord and Bedoiseau 1963). In members of the cat family the process forms a roof making a foramen (Fig. 9), through which the neurovascular bundle passes. It serves to protect the bundle and provide a large muscular attachment for the pronator teres muscle.

When a spur is present in man the ligament of Struthers passes from the spur to the medial epicondyle of the humerus. This ligament represents the lower part of the tendon of a vestigial muscle—latissimo-condyloideus—which is present in climbing mammals and extends from the tendon of insertion of the latissimus dorsi muscle to the medial epicondyle. It is usually represented in man by a fibrous band between the tendons of latissimus dorsi and the long head of triceps and it belongs to the same muscle sheet as coraco-brachialis.

**DISCUSSION**

Quain (1844) illustrated specimens of the brachial artery passing under the ligament and a high division with only the ulnar artery involved. Knox (1841), of resurrectionist fame, found this condition in a performing jaguar that died in Edinburgh; he subsequently looked for it in humans and discovered one. Sir John Struthers (1849) drew attention to the ligament and his name has been associated with it since.

Since then about two dozen clinical reports have appeared. Some of them have aspects of particular interest. Solieri (1929) described a case with median nerve hypoesthesia; after removal of the spur it re-formed. Later authors have emphasised that the spur should be removed with the periosteum. Mandruzzato (1938) described two cases both with symptoms very similar to our first case, but one had objective median nerve hypoesthesia and weakness and the other developed symptoms only after fracture of the spur. De Moraes (1950) described a typist with this syndrome which improved when she stopped typing. Goulon, Lord and Bedoiseau (1963) described two cases, one with median nerve symptoms in which the median nerve was described as hanging on the spur like a coat tag on a coat hook. In the second case there were episodes of ulnar nerve paraesthesia associated with objective weakness of the flexors of the little finger and ulnar sensory impairment. At operation the ulnar nerve was in a groove on the back of the spur, but did not pass under the ligament.

**FIG. 8**
Case 2—The excised spur.

**FIG. 9**
Right humerus of a cat, showing the normal supracondyloid foramen.
CONCLUSIONS

Symptoms due to a supracondylar spur of the humerus, although rare, are common enough to make it the subject of routine examination of a patient with pain and disturbance of sensibility of the hand. It can mimic the carpal tunnel syndrome; it may produce ulnar nerve symptoms. Irritation or compression of either the brachial artery or, if there is a high division of it, the ulnar artery, may cause episodes of ischaemic pain in the forearm. The clinical features of a supracondylar spur causing symptoms are: symptoms of median nerve compression; forearm claudication; a palpable spur about two inches above the medial epicondyle; and disappearance of the radial or ulnar pulse on full extension and supination of the forearm.

We should like to thank Mr L. C. Vaughan of the Royal Veterinary College for his interest and loan of the cat’s humerus; Miss Patricia Turnbull of the Medical Photographic Department of Charing Cross Hospital for the illustrations; and Mrs Ruth Wollerton for help in the preparation of the paper.

REFERENCES


