Entrapment of median nerve by supracondylar process of the humerus

Case report

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The supracondylar process of the humerus has been described by anatomists and anthropologists in man and lower animals. Infrequently this process may cause compression of the median nerve. We are presenting such a case along with a brief review of the literature. Excision of the bone process led to immediate disappearance of symptoms.

Key Words • supracondylar process • median nerve • entrapment neuropathy

The supracondylar process of the humerus has been viewed with considerable interest by anthropologists and anatomists. The existence of such a process in man and lower animals was mentioned by Coiter as early as the 16th century. Much later, its significance as a potential source for compression of the median nerve was recognized in clinical practice. The process has been variously called supracondylar, supracondyloid, supraepitrochlear, or epicondylar, and it is said to occur in 0.7% to 2.7% of the population.

In 1854, Struthers gave a detailed account of the development and variation of supracondylar process in man. The hook-shaped process is a spur of bone that arises from the anteromedial aspect of the humerus and extends downward and anteriorly, usually about 3 to 6 cm above the medial epicondyle. Oftentimes it is bilateral. The length of the process may vary, but usually does not exceed 2 cm. A fibrous or fibro-osseous ligament may extend from the tip of the supracondylar process to the medial epicondyle of the humerus; occasionally only the ligament may be present (Fig. 1). The median nerve, often accompanied by the brachial, radial, or ulnar artery, travels underneath the hook or the ligament and may be compressed by either. Occasionally, the pronator teres muscle may have an anomalous origin from the bone spur or the ligament or both. Genetic or familial occurrence of the spur has also been described. In lower animals, the bone process may form a supracondyloid canal.

Case Report

This 29-year-old steel mill worker had suffered pain along with paresthesias in the middle finger of the left hand for the last 6 months. He also noted weakness of the left...
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FIG. 1. Artist’s drawings show anatomical variations of the supracondylar process. Left to right: supracondylar eminence, supracondylar process, supracondylar process with Struthers’ ligament, and calcified Struthers’ ligament.

hand grip. The symptoms became progressively worse. The pain was aggravated by forceful extension of the wrist, and occasionally radiated toward the wrist and forearm.

In 1966, he had sustained multiple shrapnel injuries that had required splenectomy and removal of metal fragments from the left leg, right arm, and back. During the same year, he had also suffered a fracture of the left clavicle and a closed fracture of the shaft of the left humerus. The family history was unremarkable.

Examination. He was a well developed, muscular man. The general physical and neurological examinations were unremarkable. The symptoms could be elicited by forceful extension of the left wrist. Clinically, carpal tunnel syndrome or irritation of the median nerve by a metal fragment in the hand was suspected. Routine tests including chest x-ray film and electrocardiogram were normal, as were radiographs of the cervical spine and shoulder. Radiographs of the hand and wrists revealed a small metal fragment in the thenar eminence of the right hand. An electromyogram of the left arm showed evidence of C7-8 radiculopathy with normal distal latencies. An x-ray film taken to look for possible metal fragments elsewhere in the left upper limb showed a supracondylar process of the humerus (Fig. 2). The bone process could not be felt clinically. The conduction velocity of the median nerve was delayed at the elbow, but the somatosensory evoked potentials were within normal limits.

Operation. At operation, the median nerve was superficial to the brachial artery and was found to be compressed by the spur of bone that measured about 1.5 cm (Fig. 3). A fibrous sheath extended from the tip of the process and blended with the sheath of the pronator teres muscle. The latter did not arise from the spur. Upon removal of the spur along with the periosteum, a constriction was evident in the median nerve at the site of the compression. Postoperatively, the patient had immediate and complete disappearance of symptoms.

FIG. 2. Radiograph of the left humerus shows the supracondylar process.
FIG. 3. Operative photograph shows the removal of the spur of bone. A = spur; B = median nerve; and C = brachial artery.

Discussion

Compression of the median nerve at the region of the elbow may result from a number of causes. One possible cause is the pronator syndrome, where the nerve is compressed by kinking against the fibrous bridge of sublimis or hypertrophy of pronator teres muscle. Others are traumatic aneurysm of the brachial artery, Struthers' ligament, or the supracondylar process. Except for the pronator syndrome, these causes are rare.

The supracondylar process may remain asymptomatic and be discovered incidentally by the patient or on examination as a bony lump; infrequently it produces symptoms and signs referable to median-nerve compression. The clinical picture usually consists of pain, paresthesias, hypesthesia, weakness, or combinations thereof in the distribution of the median nerve. Weakness of the pronator teres muscle may help to differentiate compression of the median nerve above the elbow from the pronator syndrome. Commonly, the bony process is palpable, though it may escape detection by palpation in individuals with well developed musculature, as was noted in our case. It is interesting to note that the pain and paresthesia in this patient were localized only to the middle finger of the left hand, without any evidence of weakness or sensory deficit.

The radiograph of the left arm was intended to discover the possible presence of a metal fragment, but led to the demonstration

### TABLE 1

**Summary of course of 14 patients with symptomatic supracondylar process**

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>No. of Cases</th>
<th>Asymptomatic Cases</th>
<th>Symptomatic Cases</th>
<th>Side Involved</th>
<th>Spur Palpable</th>
<th>X-ray Study</th>
<th>Clinical Findings</th>
<th>Operation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solieri, 1929</td>
<td>1</td>
<td>1</td>
<td></td>
<td>left</td>
<td>+</td>
<td>+</td>
<td>pain, severe paresthesia of hand and fingers</td>
<td>yes relief, but mild recurrence after 6 mos</td>
<td></td>
</tr>
<tr>
<td>Mandruzzato, 1938</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1 left</td>
<td>+</td>
<td>+</td>
<td>pain, paresthesia, hypesthesia, weakness</td>
<td>yes relief</td>
<td>yes relief</td>
</tr>
<tr>
<td>Barnard &amp; McCoy, 1946</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1 left</td>
<td>+</td>
<td>+</td>
<td>pain, numbness, no motor or sensory deficit</td>
<td>yes relief</td>
<td></td>
</tr>
<tr>
<td>Witt, 1950</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>left</td>
<td>+</td>
<td>+</td>
<td>mild pain, forearm &amp; hand</td>
<td>no</td>
<td>yes relief</td>
</tr>
<tr>
<td>Crespi, 1962</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>painful hard lump medial aspect of arm 1 in. above elbow</td>
<td>yes relief</td>
<td></td>
</tr>
<tr>
<td>Crisci, 1963</td>
<td>1</td>
<td>1</td>
<td>right</td>
<td>+</td>
<td></td>
<td></td>
<td>pain, numbness, and weakness</td>
<td>yes relief</td>
<td></td>
</tr>
<tr>
<td>Laha, et al., 1977</td>
<td>1</td>
<td>1</td>
<td>left</td>
<td>+</td>
<td></td>
<td></td>
<td>pain and paresthesia of middle finger</td>
<td>yes relief</td>
<td></td>
</tr>
</tbody>
</table>
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of the supracondylar process. In some cases, a tangential or an oblique view of the humerus may be necessary as antero-posterior and lateral films may not show the spur.1,7 At operation, it is important to remove the spur of bone along with the periosteum since regeneration of the process may lead to recurrence of symptoms.1,8 Table 1 summarizes the features of symptomatic supracondylar processes as reported by different authors. In all reported cases, the symptoms were relieved following excision of the process. In suspected cases of median-nerve entrapment, a careful palpation about the elbow, x-ray study of the elbow, and determination of conduction velocity of the median nerve may help the clinician in diagnosis.

Acknowledgments

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References

2. Coiter V: quoted in reference 7
3. Crespi M: quoted in reference 4

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