HYPOPLASIA OF THE TROCHLEA AND THE MEDIAL EPICONDYLE OF THE HUMERUS ASSOCIATED WITH ULNAR NEUROPATHY

REPORT OF TWO CASES

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Two cases are reported of an unusual association between hypoplasia of the medial portion of the distal part of the humerus and compression of the ulnar nerve by a ganglion. Several variations in the course of the ulnar nerve encountered in this condition are described and discussed in relation to the pathogenesis of ulnar neuropathy.

Ulnar neuropathy in the region of the elbow is not uncommon, but its association with hypoplasia of the trochlea and the medial epicondyle of the humerus is extremely rare. Probably the earliest description of this association was that of Saito in 1927, but few details of the ulnar neuropathy were given in his report. In 1963 Abematsu, Miyashita and Aoki added three patients with a similar condition of which one had been operated on for ulnar neuropathy. They noted the variation in the course of the ulnar nerve at the elbow which was due to poor development of the medial part of the lower end of the humerus, and suggested that friction might be the cause of the ulnar neuropathy. Five other cases have since been described in the Japanese literature (Tsukada and Shiba 1975; Oouchi et al. 1976; Osaka et al. 1976; Takahashi et al. 1976) among which are two instances of a ganglion causing compression of the ulnar nerve. Our search of the English literature, however, failed to reveal a similar case. In this paper we summarise the cases previously described (Table I) and report two more cases.

Table I. Summary of previously described cases

<table>
<thead>
<tr>
<th>Case number</th>
<th>Author</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Familial tendency</th>
<th>Side Skeletal anomalies</th>
<th>Ulnar neuropathy</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saito (1927)</td>
<td>33</td>
<td>Male</td>
<td>No</td>
<td>Right</td>
<td>Right</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>25</td>
<td>Male</td>
<td>No</td>
<td>Right</td>
<td>Right</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>Abematsu et al. (1963)</td>
<td>23</td>
<td>Female</td>
<td>No</td>
<td>Bilateral</td>
<td>Bilateral</td>
<td>Release and transposition</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>34</td>
<td>Male</td>
<td>No</td>
<td>Bilateral</td>
<td>Bilateral</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>26</td>
<td>Male</td>
<td>No</td>
<td>Bilateral</td>
<td>Left</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Tsukada and Shiba (1975)</td>
<td>44</td>
<td>Male</td>
<td>No</td>
<td>Bilateral</td>
<td>Bilateral</td>
<td>Release and transposition</td>
</tr>
<tr>
<td>7</td>
<td>Takahashi et al. (1976)</td>
<td>18</td>
<td>Male</td>
<td>No</td>
<td>Bilateral</td>
<td>Left</td>
<td>Release and transposition</td>
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<tr>
<td>8</td>
<td>Oouchi et al. (1976)*</td>
<td>41</td>
<td>Female</td>
<td>No</td>
<td>Bilateral</td>
<td>Left</td>
<td>Excision of the ganglion and transposition</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>46</td>
<td>Female</td>
<td>No</td>
<td>Bilateral</td>
<td>Left</td>
<td>Release and transposition</td>
</tr>
<tr>
<td>10</td>
<td>Osaka et al. (1976)</td>
<td>27</td>
<td>Male</td>
<td>Yes†</td>
<td>Right</td>
<td>Right</td>
<td>Excision of the ganglion</td>
</tr>
</tbody>
</table>

* Of five cases reported, three were excluded because of double reporting.
† The elder brother was found to have unilateral hypoplasia of the trochlea but no ulnar neuropathy.
Case reports

Case 1. A man aged twenty-two had a three-month history of pain on the inner side of the right elbow radiating to the ring and little fingers, associated with weakness of the hand and numbness of the fingers. He had noticed swelling of his right elbow for the same period. There was no history of injury.

On examination there was reduced sensation to pin-prick in the cutaneous distribution of the ulnar nerve to the right hand. The muscles innervated by the ulnar nerve rated fair to good on muscle testing. There was a visible and palpable mass on the inner side of the elbow, palpation of which caused paraesthesia in the ring and little fingers. Both elbows lacked 5 degrees of full extension.

Radiographs of the elbows (Figs. 1 to 3) revealed hypoplasia and increased obliquity of the trochlea. The development of the medial epicondyle of the humerus was so poor that the ulnar groove was not seen in the axial view. There was also a deformity of the trochlear notch of the ulna which articulated with the hypoplastic trochlea. The humeroradial articulation was normal.

Operation. The right ulnar nerve was explored at the elbow and found to be displaced anteriorly and markedly compressed by an underlying ganglion, arising from the joint, just proximal to its passage through the cubital tunnel (Fig. 4). Immediate relief of pain occurred after removal of the ganglion. Ten months later neurological examination showed normal findings.

Case 2. A man aged twenty-nine complained of numbness in the right ring and little fingers over a period of five months. He could not recall a specific injury to the limb but had noticed that he had been unable to extend both elbows fully since childhood.

Examination revealed decreased sensibility to pin-prick and light touch in the ulnar nerve distribution to the right hand but there was no weakness nor wasting of muscles innervated by the ulnar nerve. On palpation, both ulnar nerves could be felt immediately beneath the skin of the anteromedial aspect of the elbow. Pressure over the ulnar nerve at the right elbow caused paraesthesia in the ring and little fingers.
fingers. Both elbows showed a flexion deformity, with a range of movement from 10 to 140 degrees on the right and from 10 to 135 degrees on the left.

Radiographs of each elbow (Fig. 5) showed a normal humero-radial articulation but an abnormal humero-ulnar joint with hypoplasia of the trochlea and medial epicondyle. The obliquity of the trochlea was markedly increased. The ulnar groove was absent in the axial view.

Operation. Surgical exploration of the ulnar nerve at the right elbow was undertaken. The nerve was found to be dislocated anteriorly and adherent to the surrounding tissues. A ganglion arising from the medial capsule of the joint was found to be compressing the ulnar nerve against the aponeurosis bridging the two heads of the flexor carpi ulnaris. There was a slight fusiform thickening of the nerve trunk immediately proximal to the site of compression. The ganglion was excised and the aponeurosis divided. The patient showed complete recovery after seven months.

Two years and nine months after operation, he complained of occasional pain radiating from the left elbow to the ring and little fingers which he had had for about a month. There was no detectable weakness of the intrinsic muscles and no evidence of sensory disturbance. Surgical exploration was recommended, but refused.

DISCUSSION

Hypoplasia of the trochlea and medial epicondyle of the humerus is a rare condition which is not even mentioned in some standard texts of skeletal radiology. Although somewhat different from this condition, aplasia of the trochlea has been reported by Mead and Martin (1963) and Hirotani (1975). The exact nature of the pathological process that causes the disturbance of growth of the medial part of the lower end of the humerus is unknown.

As shown in Table I, the elbow may be affected unilaterally or bilaterally. None of the cases, except the one reported by Osaka and his colleagues, showed a familial tendency. The affected elbow usually shows a slight cubitus varus and limitation of full extension. The condition, however, is not detected at childhood because of the minimal functional disability.

Several variations in the course of the ulnar nerve at the elbow have been encountered. Surgical exploration has uniformly shown the ulnar nerve to be displaced anteriorly because of the absence of the ulnar groove and its fibrous arch. It may pass normally between the two heads of the flexor carpi ulnaris, and then penetrate the forearm passing deep to the pronator teres or between the flexor carpi radialis and the palmaris longus.

The similarity with recurrent dislocation of the ulnar nerve led to the suggestion that a frictional irritation was involved in the pathogenesis of ulnar neuropathy. As the elbow is flexed and extended repeatedly a degree of stress—depending upon the obliquity of the humero-ulnar articulation—may be transmitted to the anteromedial aspect of the elbow. Whether the nerve is more liable to friction in the fully dislocated position is debatable, however, because the medial epicondyle across which the nerve rubs is hypoplastic. The concept accepted in the past that ulnar neuritis at the elbow was a frictional or stretch neuritis has been replaced by the theory that it is due to compression (Osborne 1970). It is our opinion that compression of the ulnar nerve at the entrance to the forearm (Abematsu et al. 1963; Tsukada and Shiba 1975) is directly responsible for ulnar neuropathy. The ganglion shown in each of our cases is an additional cause of compression of the ulnar nerve. Release of the nerve from the compression results in excellent recovery of function.

REFERENCES


