UNTREATED INTRA-ARTICULAR ENTRAPMENT OF THE MEDIAL HUMERAL EPICONDYLE

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Six children with entrapment of the medial epicondyle in the elbow after closed reduction of a posterior dislocation were seen an average of 14 weeks after injury. The elbows were painful and the average range of flexion was 22°. Two children had ulnar nerve involvement which recovered after operation. The epicondyle was removed from the joint and either reattached to the humerus or excised, and the muscles reattached. Two children had anterior transposition of the ulnar nerve, one for pre-operative hyperaesthesia, and the other to relieve tension on the nerve. At follow-up, at an average of 15 months after operation, flexion had increased fivefold, none of the children had pain and all were leading normal lives.

Dislocation of the elbow in a child is frequently accompanied by avulsion of the medial epicondyle which may be trapped in the joint after reduction. This complication may be missed because the fragment is small and is often hidden behind the distal humerus on a radiograph. Pain and limitation of movement ensue. This paper reports the treatment of six children in whom the diagnosis was missed.

CLINICAL REVIEW

Six boys aged between 10 and 15 years were treated at Le Centre d’Orthopédie in Tunis between 1965 and 1980 (Table I). Every child had had a dislocation of the elbow treated elsewhere by closed reduction and a cast (Figs 1 to 4). In five children the injury was on the right side. They presented at the centre an average of 14 weeks (3 to 35 weeks) after the initial injury. In every case radiographs showed that the dislocation was reduced but the medial epicondyle was entrapped within the elbow, lying between the trochlea and the sigmoid notch of the ulna and preventing complete reduction of the joint (Figs 3 and 4). The average range of flexion of the elbow was from 54° to 72°, an arc of 18°. Supination was normal in every child, but two (Cases 5 and 6) had limitation of pronation. One child (Case 5) had diminished sensory and motor function of the ulnar nerve, and another (Case 6) had hyperaesthesia in the ulnar nerve territory.

TREATMENT

In every child the epicondyle with its attached flexor muscles was removed from the joint through a medial incision. Closed manipulation was not attempted. The epicondyle had slightly damaged the articular cartilage of the ulna and trochlea in three children and in one instance there was an erosion to subchondral bone on the sigmoid notch of the ulna (Case 2). In three cases the epicondyle was replaced in its normal position and either held with Kirschner wires (Cases 3 and 4) or sutured to the periosteum with catgut (Case 6). In the remaining three patients the fragment was excised and the flexor muscles themselves were sutured to the distal humeral metaphysis. In two children the ulnar nerve was transposed anteriorly, one because of hyperaesthesia before operation (Case 6), the other because the nerve was stretched tightly behind the epicondyle when the joint was flexed.

A long-arm cast with the elbow flexed to a right angle and the forearm in neutral rotation was applied in every case, and was removed with the Kirschner wires at three weeks. Restricted movement of the elbow was then allowed for a further three weeks. None of the children had physiotherapy. There were no complications.

RESULTS

The children were last seen by us between 9 and 23 months after operation (average 15.5 months). The average arc of flexion was from 15° to 125° (Figs 5 and 6); forearm rotation was normal in every child except one (Case 5) who lost 40° of pronation. Every elbow was clinically stable. Both children (Cases 5 and 6) with pre-operative ulnar nerve symptoms had full recovery. Cases 1 and 6 had premature closure of the distal humeral growth plate (Figs 7 and 8) and the epicondyle was ununited in Case 6. No patient complained of pain, and all were leading normal lives.
DISCUSSION

The association of dislocation of the elbow and avulsion of the medial epicondyle is well documented (Granger 1818; Kocher 1896; Watson-Jones 1930; Fairbank and Buxton 1934; Roberts 1934; Aitken and Childress 1938; Smith 1972; Bede, Lefebvre and Rosman 1975; Wilson 1982). When the dislocation is reduced the epicondyle may be sucked in and trapped between the trochlea and the sigmoid notch of the olecranon, thus preventing complete reduction and limiting flexion of the elbow (Watson-Jones 1930; Purser 1954; Masse 1955; Rosen-dahl 1959; Marion and Faysse 1962; Linscheid and Wheeler 1965; Smith 1972).

The epicondyle is small and when displaced it is difficult to see on the anteroposterior radiograph as it may be overlapped by the distal humeral metaphysis, or it may be confused with one of the ossification centres of the trochlea (Aitken and Childress 1938; Patrick 1946; Chessare et al. 1977; Martini et al. 1978). Martini et al. (1978) point out that if the distal humerus appears symmetrical on an anteroposterior radiograph, then the epicondyle must be displaced, and Patrick (1946) says that if the epicondyle can be seen on the lateral radiograph, then the fragment is in the joint. Silberstein...
Table I. Children with untreated displacement of the medial epicondyle into the elbow

<table>
<thead>
<tr>
<th>Case</th>
<th>Age at injury (years)</th>
<th>Delay between injury and operation (weeks)</th>
<th>Treatment</th>
<th>Range of movement (degrees)</th>
<th>Follow-up after operation (months)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Before operation</td>
<td>After operation</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Extension/ flexion</td>
<td>Supination/ pronation</td>
<td>Extension/ flexion</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>35</td>
<td>Excision of epicondyle and suture of muscles</td>
<td>70/90</td>
<td>90/70</td>
<td>20/120</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>11</td>
<td>Excision and suture</td>
<td>30/35</td>
<td>90/70</td>
<td>15/130</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>26</td>
<td>Epicondyle pinned</td>
<td>60/90</td>
<td>90/60</td>
<td>10/115</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>3</td>
<td>Epicondyle pinned Ulnar nerve transposed anteriorly</td>
<td>75/90</td>
<td>85/80</td>
<td>25/130</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>6</td>
<td>Excision and suture</td>
<td>20/25</td>
<td>90/20</td>
<td>10/120</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
<td>6</td>
<td>Epicondyle sutured Ulnar nerve transposed anteriorly</td>
<td>70/100</td>
<td>90/40</td>
<td>10/135</td>
</tr>
</tbody>
</table>

All the children were boys, and the injury was to the right elbow in all except Case 5.

et al. (1981) have shown, however, that the epicondylar epiphysis may normally lie posteromedial to the distal end of the humerus. In this position the epicondyle may be partly hidden by the humerus on an anteroposterior radiograph and partly visible on the lateral view. Radiographs of the normal elbow for comparison will help only if the physician consciously looks for the epicondyle (Cotton 1929; Smith 1972). The diagnosis is missed probably because one does not think of it.

When the child is seen later, the elbow is stiff and painful, and radiographs show persistent subluxation of the olecranon and the intra-articular epicondyle (Cotton 1929; Watson-Jones 1930; Schmier 1945; McDonnell and Wilson 1948; Purser 1954; Rosendahl 1959; Marion and Faysse 1962; Linscheid and Wheeler 1965; Martini et al. 1978; Sisk 1980). Patrick (1946) and Eid (1975) say that it is best to leave the fragment in the joint because, after a delay in diagnosis, the subluxation cannot be rectified and the elbow joint will be unstable. According to other authors the epicondyle should be removed from the joint and either reattached, or excised and the flexor muscles sutured to the humerus (Cotton 1929; Fairbank and Buxton 1934; Schmier 1945; Marion and Faysse 1962; Silva 1972). In our series, the fragment was excised in half the patients and reattached in the other half. There was no significant clinical difference in the results between the two groups, although one patient had an asymptomatic pseudarthrosis and two had early closure of the growth plates.

The ulnar nerve turns around the medial epicondyle and is vulnerable when this is avulsed and the elbow is dislocated, particularly when the lesion is treated late (Granger 1818; Cotton 1929; Watson-Jones 1930; Roberts 1934; Higgs 1936; Aitken and Childress 1938; Marion and Faysse 1962; Wilson 1982). Some authors advocate anterior transposition of the ulnar nerve at the time of open reduction (Higgs 1936; Aitken and Childress 1938; Marion and Faysse 1962), others only if there were symptoms or signs of nerve damage before operation (Watson-Jones 1930; Fairbank and Buxton 1934; Linscheid and Wheeler 1965; Papavasiliou 1982; Wilson 1982). Roberts (1934) says that ulnar nerve lesions usually recover spontaneously, and Patrick (1946) and Wilson (1982) do not recommend transposition even in the presence of neurological signs. Two patients in our series had anterior transposition of the nerve, one because it was under tension after reduction, the other for pre-operative hyperaesthesia (this symptom disappeared after operation). The patient (Case 5) with hypoaesthesia and muscle weakness pre-operatively recovered without transposition. We agree with Roberts (1934), Patrick (1946) and Wilson (1982) that transposition is probably unnecessary even when signs of nerve compression are present.

In two patients the distal humeral epiphysial plate closed prematurely. Ogden (1982) states that this is not a handicap because these children are generally near the end of growth, and a little shortening of one humerus is barely noticeable.

The results in our patients were surprisingly good...
considering the delay between injury and operation. The children regained an average of 80% of the normal range of flexion, and only one had some limitation of pronation. None complained of pain, there were no neurological sequelae and function of the limb was satisfactory in all. These results compare well with those of other authors (Cotton 1929; Fairbank and Buxton 1934; Schmier 1945; Patrick 1946).

This review was conducted while Dr. J. V. Fowles was the Senior Medical Officer with CARE—Medico et Tunisia.

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