RECURRENT POSTERIOR DISLOCATION OF THE HEAD OF THE RADIUS IN POST-TRAUMATIC CUBITUS VARUS

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Four patients who had injured the lower end of the humerus in childhood with resulting cubitus varus developed recurrent posterior dislocation of the head of the radius after further injury to the elbow. Dislocation occurred when the forearm was supinated and spontaneous reduction took place on pronation.

At operation the lateral ligament complex was seen to be lax and elongated. After tightening of the ligament and with a supracondylar osteotomy of the humerus to correct the cubitus varus the recurrent dislocation was eliminated.

Received 12 July 1994; Accepted 25 October 1994

Recurrent posterior dislocation of the elbow is well described (Osborne and Cotterill 1966; Hassmann, Brunn and Neer 1975; Symeonides et al 1975; Beaty and Donati 1991). The concept of posterolateral rotatory instability of the elbow was introduced by O’Driscoll, Bell and Morrey in 1991, but we have not seen any reports of recurrent posterior dislocation of the head of the radius.

PATIENTS AND METHODS

Between 1980 and 1992 we have seen four patients with recurrent posterior dislocation of the head of the radius associated with post-traumatic cubitus varus deformity. All had sustained an injury to the distal end of the humerus during childhood and had developed a gunstock deformity. Radiographs were available for one patient (case 2) which confirmed a supracondylar fracture. In the other three the primary lesion was unknown, but was thought to be either a supracondylar fracture or an epiphyseal separation of the distal humerus. In all patients the initial injury had been treated conservatively elsewhere.

When first seen by us, all patients had recently sustained a further injury to the elbow. One (case 3) had an isolated dislocation of the radial head which was confirmed by the radiographs at the time of injury. He had been treated by closed reduction and a plaster cast. The other three had not been troubled sufficiently to see a doctor. All had fallen on the elbow and experienced acute pain and swelling which had subsided within a few weeks. Further discomfort developed in the elbow a few months after this injury. We first examined them 4 to 18 months later; their complaint was a feeling of instability of the elbow when lifting objects and pain on supination or pronation of the forearm. Details of the patients are shown in Table I.

When examined all the patients had a marked cubitus varus deformity. The carrying angle, which was measured at the intersection of the axes of the upper arm and the forearm with the elbow in full extension and the forearm in supination, averaged -24.8°. Instability was noticed when the elbow was stressed medially in full extension. On supination of the forearm the radial head dislocated posteriorly sometimes with crepitus and pain (Fig. 1), reducing

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0301-620X/95/4998 $2.00

Fig. 1
Case 3. Preoperative photograph showing marked prominence (white arrow) due to posterior dislocation of the head of the radius during supination.

THE JOURNAL OF BONE AND JOINT SURGERY
spontaneously on pronation. No patient had general joint laxity.

The range of motion of the involved elbow was normal in two patients. Both flexion and extension were limited in one and flexion alone in another. Pronation and supination of the forearm were normal in all patients.

**Radiological findings.** In all four patients the anteroposterior view showed a varus deformity, a hypoplastic trochlea, a shallow ulnar groove and medial deviation of the radius and ulna (Fig. 2a). Stress radiographs showed widening of the humeroradial joint space. On the lateral view the head of the radius articulated with the capitellum in pronation (Fig. 3a), but dislocated posteriorly on supination (Fig. 3b).

**Operative treatment.** A longitudinal incision was made in the lateral aspect of the elbow and the common extensor origin divided. The radial collateral ligament complex bulged posteriorly. It was incised longitudinally and elevated from the lateral epicondyle by sharp dissection. The scarring and elongation of the ligament complex were present in all patients, and in two the origin of the ligament complex was detached from the lateral epicondyle. Erosion and/or degeneration of the cartilage was seen at the anterior part of the head of the radius and at the back of the capitellum. The head dislocated posteriorly in supination and was reduced in pronation (Fig. 4).

In two patients (cases 1 and 2) we trimmed a few millimetres of tissue from both incised edges of the laxed lateral ligament complex. With the elbow held in valgus the ligament was pulled up and the capsule plicated. In the other two patients (cases 3 and 4) three or four small holes were drilled at the epicondyle. Non-absorbable sutures were passed through these and through the lateral ligament complex to fix the ligament securely to the bone. In all patients posterior dislocation of the radial head was successfully eliminated.

After completion of the repair, the incision was extended proximally and a supracondylar closing-wedge osteotomy performed to correct the cubitus varus deformity. The osteotomy was fixed with tension-band wiring and an additional crossed pin (Fig. 5).

The elbow was immobilised in 90° of flexion and neutral rotation of the forearm for five to six weeks. Flexion-extension and pronation-supination exercises were encour-

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**Table 1. Details of four patients with recurrent posterior dislocation of the radial head**

<table>
<thead>
<tr>
<th>Case</th>
<th>Sex</th>
<th>Side</th>
<th>Age (yr)</th>
<th>Carrying angle (degrees)</th>
<th>Range of motion (degrees)</th>
<th>Follow-up (mth)</th>
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<tr>
<td>1</td>
<td>M</td>
<td>L</td>
<td>12</td>
<td>-27</td>
<td>0/125</td>
<td>100</td>
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<tr>
<td>2</td>
<td>M</td>
<td>L</td>
<td>9</td>
<td>-29</td>
<td>0/140</td>
<td>14</td>
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<td>3</td>
<td>M</td>
<td>L</td>
<td>10</td>
<td>-23</td>
<td>0/140</td>
<td>44</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>L</td>
<td>9</td>
<td>-20</td>
<td>-10/115</td>
<td>33</td>
</tr>
</tbody>
</table>

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**Fig. 2a**

**Fig. 2b**

**Fig. 3a**

**Fig. 3b**

Case 3. Preoperative radiographs. Figure 2a – Anteroposterior radiograph showing post-traumatic cubitus varus deformity, a hypoplastic trochlea and a shallow ulnar groove. Figure 2b – Stress radiograph showing widening of the humeroradial joint space. Figure 3a – Lateral radiograph in pronation showing nearly normal articulation of the humeroradial joint. Figure 3b – Lateral radiograph in supination showing posterior dislocation of the head of the radius. There is normal humeroulnar articulation.
Fig. 4

The radial head dislocated posteriorly in supination (a) and was reduced in pronation (b).

Fig. 5a

Case 3. Radiographs five months after operation showing satisfactory correction of the cubitus varus deformity and solid union. The lateral radiograph (b) shows that posterior dislocation of the radial head in supination is eliminated.

Fig. 5b

aged without protection, but varus stress was avoided for three months after surgery. No complications were encountered.

RESULTS

All patients were followed for an average of 48 months (14 to 100). Posterior dislocation of the radial head was eliminated in all. Although none complained of medial instability of the elbow, in two (cases 1 and 2) slight widening of the humeroradial joint was observed in stress radiographs. The carrying angle was corrected to more than 0°. Medial shift of the radius and ulna was improved in all patients. Most regained elbow movement to at least the preoperative range within six months. One patient (case 4) had slight stiffness when last seen.

DISCUSSION

Isolated posterior dislocation of the radial head without associated fracture of the ulna is rare in adults and, to our knowledge, recurrent dislocation has not been described.
In 1991, O'Driscoll et al reported five cases of postero-lateral rotatory instability of the elbow as a new entity. Four patients had initially sustained a dislocation of the elbow which required reduction. Subsequently, they had experienced between 6 and 100 episodes of instability of the injured elbow. Routine physical examination was normal and the elbow was stable clinically, except that when full extension was attempted by the examiner, with the forearm fully supinated the patient showed apprehension as if the joint was about to dislocate. Varus and valgus stress radiographs were normal, but after the posterolateral rotatory instability test was performed they showed posterolateral dislocation of the radial head with widening of the ulnohumeral articulation. There was no varus deformity.

Our patients had cubitus varus deformity and medial instability was shown on stress radiographs (Fig. 2). The radial head easily dislocated posteriorly during supination. Abnormality of the humeroulnar joint was not seen. At operation the findings suggested that incomplete healing of a ligamentous tear had led to medial instability of the elbow and posterior instability of the radial head. The severe cubitus varus deformity exposes the lateral collateral ligament to excessive varus stress which may prevent the torn or detached ligament from healing well. During supination, the biceps tendon becomes lax, the ligament of Denucé becomes taut anteriorly (Spinner and Kaplan 1970) and the radial head tilts posteriorly, thus allowing posterior dislocation if the retaining structures are unsound.

Repair of the attenuated capsular ligament together with a supracondylar closing-wedge osteotomy will eliminate posterior dislocation of the radial head and medial instability of the elbow. In the two earlier patients (cases 1 and 2) in whom the lax lateral ligament complex was pulled up proximally and imbricated with capsular plication, slight medial instability persisted in stress radiographs. Suture of the capsular ligament direct to the epicondyle was undertaken in the last two patients (cases 3 and 4).

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES