Axial-Ulnar Carpal Dislocation – The Pincer Sign and Treatment with Capito-Hamate Arthrodesis

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Introduction
Axial disruptions of the carpus are rare injuries and have been previously classified into axial-ulnar, axial-radial and axial-ulnar-ulnar types. 3 patients with dorsal-palmar crushing injury to the carpus resulting in axial-ulnar carpal dislocations are presented here.

Case Series
Details of the patients, treatment and outcome at 6 months are summarized here:

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Gender</th>
<th>Diagnosis</th>
<th>Associated Injuries</th>
<th>Treatment</th>
<th>Grip (%)</th>
<th>ROM (h)</th>
<th>Pain (At rest)</th>
<th>Pain (Activity)</th>
<th>Return to work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36</td>
<td>M</td>
<td>Perilunate, perilunate</td>
<td>Burst laceration over dorsum of hand and 1st web space with protruding adductor muscles</td>
<td>K-wire fixation; free flap coverage. No fusion done.</td>
<td>33%</td>
<td>88%</td>
<td>2/10</td>
<td>7/10</td>
<td>Light duties at 1 year</td>
</tr>
<tr>
<td>2</td>
<td>33</td>
<td>M</td>
<td>Perilunate, perilunate</td>
<td>Burst laceration over 1st web space with protruding adductor muscles</td>
<td>Initial K-wire fixation. Fusion of capito-hamate joint 6 months later.</td>
<td>72%</td>
<td>87%</td>
<td>0/10</td>
<td>0/10</td>
<td>Light duties at 6 weeks, normal duties at 4.5 months</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>M</td>
<td>Transcapitate, perilunate</td>
<td>Ulnar styloid fracture: comminuted, intra-articular distal radius fracture</td>
<td>Fasciectomy; Primary fusion of 3rd and 4th MC base and capito-hamate joint. ORIF distal radius and ulnar styloid.</td>
<td>46%</td>
<td>50%</td>
<td>0/10</td>
<td>0/10</td>
<td>Light duties at 6 weeks, normal duties at 3 months</td>
</tr>
</tbody>
</table>

Patient 2 had persistent pain at the triquetral-hamate joint with divergent 3rd and 4th ray after the primary fixation. The patient was unable to return to his original work 6 months post-injury. He underwent capito-hamate arthrodesis subsequently.

Discussion
Axial-ulnar carpal dislocations can present in a spectrum of clinical condition, from closed, dynamic axial-ulnar instability to open injuries with vascular compromise. X-ray features of this condition can be very subtle. In patient 1, widening of the joint space between the capitate and hamate and between 3rd and 4th metacarpal base was not seen. Instead, there was an overlap of the capitate and hamate bones, which was missed on the initial evaluation. The clue that led to the clinician suspecting a more severe bony injury was the divergence of the 3rd and 4th ray. This sign, which we termed the pincer sign, was found in all 3 patients.

Historically, treatment of axial carpal dislocation involves reduction and casting or pinning with Kirschner wires, and results from these patients are variable (1). We carried out fusion of the capito-hamate joint in patients 2 and 3 using cannulated, headless compression screws. The distal carpal row moves as a single unit and there is minimal motion between the capitate and hamate. Primary fusion allows better apposition of the dissociated joint surfaces, restores the distal carpal arch, permits earlier loading across the CMCJs and avoids the potential situation of dynamic axial instability. In addition to good wrist motion and grip strength, we have shown that these 2 patients were able to return to their original duties early, as a machinery repairman and a welder, respectively.

Conclusion
The pincer sign is a useful sign in picking up axial-ulnar dislocations. In addition, the results from fusion of the capito-hamate joint was promising. Primary capito-hamate arthrodesis is an attractive option in the treatment of axial-ulnar carpal as it provides predictable and good early functional outcomes and allows faster return to work.

References