Introduction

Although much attention has been paid to avoid incidence of extensor tendon injuries by screw perforation through the dorsal cortex of the distal radius during fracture fixation with volar locking plate (VLP), we sometimes encounter situations with screw penetration through the dorsal cortex on plain lateral radiograph. Recent reports have emphasized on the high importance of dorsal tangential view (DTV) on detecting screw penetrations.

Purpose

To evaluate the relationship between the in vivo screw tip cortex distance (IV-STCD) and the postoperative STCD measured using DTV (DTV-STCD).

Material and Method

- 49 hands of 47 patients (male: 6, female: 41)
- Average age: 70.0 years old (16 – 95)
- Operated side: 19 right hands, 20 left hands
- Fracture classification: AO-A3; 13, C2; 12, C3; 24

Implant used: VLP (Stellar2; HOYA Technosurgical Corporation).

Result 1

<table>
<thead>
<tr>
<th>(screw)</th>
<th>100</th>
<th>80</th>
<th>60</th>
<th>40</th>
<th>20</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>shallow inserted</td>
<td>3</td>
<td>2</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td>deeply inserted</td>
<td>0</td>
<td>1</td>
<td>52</td>
<td>27</td>
<td>83</td>
<td>1</td>
</tr>
</tbody>
</table>

We inserted 364 screws for distal site of VLP. Most of screws (335/364) were measured by abutting the depth gauge to dorsal cortex, the others (29/364) were measured by hooking the dorsal cortex. Out of 364 inserted screws, there were 83 screws which showed positive discrepancy between IV-STCD and DTV-STCD.

Result 2

Screw directions

- Out of deeply inserted 84 screws, 52 were placed on ulnar to the Lister’s tubercle. The rate of deeply inserted screw on ulnar side was significantly greater than the other sites. *; p<0.05 by chi-square test

Result 3

The order of screw fixation

- We examined the relationship between the order of screw fixation and the discrepancy. The number of deeply inserted screw were significantly more in the distal first fixed cases.

Discussion

Extensor tendon rupture due to dorsal screw protrusion is one of the most serious complication of VLP. Sügün reported that the incidence of screw protrusion longer than 0.55mm was 59 out of 230.

Ozer similarly reported 11 out of 125 screws protrusion over 1mm. Although we determined the screw length by gauge abutment against the dorsal cortex in 335 out of 364 screws, we still observed many screw length discrepancy.

One of the explanation for this is that when we primary fix the distal screws, those distal screws may migrate deeper when the proximal screws are applied allowing firm compression of the plate against the cortex.

We observed only 6 screws (1.6%) with a discrepancy of more than 2mm. Thus, we suggest that upon selecting screws, 2mm under measurement by depth gauge should be chosen.

Reference

