Postoperative Correction Loss in Patients with Distal Radius Fracture over 50 Years of Age, In Association with Osteoporosis.

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[Objective]
Volar locking plate (VLP) fixation generally leads to satisfactory postoperative outcomes in patients with distal radius fracture (DRF), but correction loss occurs occasionally. The purpose of this study was to investigate association between correction loss after open reduction and internal fixation (ORIF) and osteoporosis.

[Methods]
Patients who performed ORIF for DRF using VLP between April 2016 and July 2017 were evaluated.

1. **Inclusion criteria**
   - Over 50 years of age
   - Measurements of bone mineral density (BMD) and serum levels of bone metabolism marker (PINP and TRACP-5b) at the time of injury
   - Measurements of ulnar variance (UV), volar tilt (VT) and radial inclination (RI) at the postoperative period as well as 3 months later

35 patients (32 females; 3 males) were included. Mean age at the time of the surgery was 68 years (range, 50-86 years).

2. **Statistical analysis**
   - Mean loss of correction of UV, RI, VT were 0.95 mm, 0.2 degrees and 0.5 degrees, respectively (Table 1). We assessed correction loss of UV because it is clinically effective ¹).

   Three steps analysis was conducted.
   - **First: univariate analysis**
     The patients were divided into two groups based on degree of loss of correction above 1 mm or less. Age, sex, BMD and bone metabolism markers were compared between two groups using Mann-Whitney U test.
   - **Second: logistic regression analysis**
     This was performed to identify independent factors associated with loss of correction adjusted for other covariates.
   - **Third: receiver-operating characteristic (ROC) curve analysis**
     ROC curve analysis was performed to assess the cutoff values and area under the curve (AUC) values of the predictive factor.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group (mm)</th>
<th>Probability</th>
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<tbody>
<tr>
<td>UV</td>
<td>pre: 0.85</td>
<td>0.95</td>
</tr>
<tr>
<td>RI</td>
<td>17.1</td>
<td>0.2</td>
</tr>
<tr>
<td>VT</td>
<td>7.8</td>
<td>0.5</td>
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Table 1: Mean loss of correction of UV, RI, VT. Loss of correction of UV and VT were slight, and we assessed UV.

* Average VT of Colles type fractures.

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<th>Variable</th>
<th>Group</th>
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<tr>
<td>%YAM of lumbar spine</td>
<td>77.6%</td>
<td>0.25 (0.3)</td>
</tr>
<tr>
<td>%YAM of femoral neck</td>
<td>74.0%</td>
<td>0.04 (11.4)</td>
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Table 2: Result of univariate analysis.

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<th>%YAM of femoral neck</th>
<th>AUC = 0.83</th>
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Table 3: Result of logistic regression analysis. Lower %YAM of femoral neck was a risk factor for correction loss of UV.

[Discussion]
Although association between BMD and degree of dislocation of DRF has been mentioned ³), Shannom described there is no association between BMD and correction loss ⁴). But Webber and Seebeck mentioned about association among BMD of femoral neck, thickness of cortical bone of distal radius and holding strength of screws ⁵, ⁶). This study revealed that there is association between BMD of femoral neck and correction loss of UV. The patients whose %YAM of femoral neck are below 63 %, there is 85.7 % chance of correction loss of UV.

[Conclusions]
Osteoporosis had a negative effect on correction loss after volar locking plate fixation of distal radius fracture. For patients whose %YAM of femoral neck are below 63 %, surgeons should identify high-risk patients and ensure stable internal fixation, close monitoring and careful postoperative therapy.

[References]