Coronal Fracture of the Lunate in Kienböck Disease: a 3 cases series with a minimum 1 year follow up

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Introduction

- Kienböck Disease
- Avascular necrosis of the lunate
- Treatment - according to Lichtman each stage

- Lichtman stage IIIc
- A complete coronal plane split regardless of the lunate
- Poor treatment outcome and prognosis despite revascularization
- Recommended proximal row carpectomy (PRC), scaphocapitate fusion

- Successful reports of union in Lichtman stage IIIc
  - Key hole revascularization; Havulinna et al.: J Hand Surg Am. 2016
  - 5 patients – ORIF with bone graft; Chou et al.: J Hand Surg Am. 2019

- No established treatments for patients with young age or resistance to salvage procedures

Materials and Methods

- From June 2017 to September 2020
- 3 patients with diagnosis of Lichtman stage IIIc of Kienböck Disease

Demographics of patients

<table>
<thead>
<tr>
<th>Patient</th>
<th>Sex/age</th>
<th>Side</th>
<th>Diagnosis</th>
<th>Treatment</th>
<th>F/U period</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M/33</td>
<td>Right</td>
<td>Lichtman stage IIIc</td>
<td>Key hole 4.5 ECA VBG</td>
<td>34 months</td>
<td>Factory worker</td>
</tr>
<tr>
<td>2</td>
<td>F/59</td>
<td>Right</td>
<td>Lichtman stage IIIc</td>
<td>Key hole 4.5 ECA VBG</td>
<td>25 months</td>
<td>Agriculturist</td>
</tr>
<tr>
<td>3</td>
<td>M/54</td>
<td>Right</td>
<td>Lichtman stage IIIc</td>
<td>Key hole 4.5 ECA VBG + Screw fixation</td>
<td>19 months</td>
<td>Construction worker</td>
</tr>
</tbody>
</table>

Materials used: Key hole 4.5 ECA VBG

Results

- Radiologic results at last F/U

<table>
<thead>
<tr>
<th>Patient</th>
<th>Union</th>
<th>Carpal height ratio</th>
<th>Ståhl index</th>
<th>Radiocarpal angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
<td>0.49</td>
<td>0.29</td>
<td>68</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>0.50</td>
<td>0.25</td>
<td>57</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>0.51</td>
<td>0.32</td>
<td>69</td>
</tr>
</tbody>
</table>

Case 1

Initial X-ray, CT, MRI

Case 2

Initial X-ray, MRI

Case 3

Initial X-ray, CT, MRI

Case 1: X-ray at the last F/U

Case 2: X-ray at the last F/U

Case 3: X-ray at the last F/U

ROM at the last F/U

Grip strength at the last F/U: 95% of contralateral side

Grip strength at the last F/U: 92% of contralateral side

Grip strength at the last F/U: 60% of contralateral side

Conclusion

- PRC and fusion were recommended as the treatment of stage IIIc
- However, if the patient is young or resistant to salvage treatments, aggressive treatment could be attempted.
- Because of the poor clinical outcomes and the paucity of studies and reports about stage IIIc, studies on the fixation method, the need for additional surgery such as VBG or RSO, and the fixation period are thought to be necessary.