Analysis of Clinical Outcomes and Prognostic Factors in Bosworth Fractures of Ankle Joint

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Disclosure

NO CONFLICT TO DISCLOSURE

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Our disclosures are in the Final AOFAS mobile App. We have no potential conflicts with this presentation.
Bosworth Fx. in ankle joint

✓ Described in 1947
✓ Rare ankle Fx. pattern
✓ Ext. rotation force (SER)
✓ Distal Fx. fragment → fixed post. dislocation
✓ Proximal Fx. fragment → locking behind tibia
✓ Empty fibular sulcus
Treatment results in Bosworth Fx.

✓ Case reports
✓ Careful initial clinical & radiological evaluation
✓ Early surgical treatment (OR/IF)
✓ Post-traumatic arthritis
✓ Compartment syndrome
✓ Extensive ankle ligaments injury
Purpose

The retrospective study to evaluate the clinical and radiographic outcomes, prognostic factors in Bosworth fractures of ankle joint.
Demographics

- April, 2007 ~ May, 2013  CBNUH
- 12 cases (12 pts) with Bosworth Fx. dislocation
- Follow-up > 1 year after OR/IF by one surgeon
- Age / Sex: mean 39.2 yrs, M / F (11 / 1)
- Follow-up: mean 38.4 months
- Combined Fx.
- Our hospital(9), transferred(3)

Medical malleolus Fx: 11
Posterior malleolus Fx: 9
Metatarsus Fx: 2
Distal radius Fx: 1
Prognostic factor analysis

- Age of patients (≤ 40 years : > 40 years)
- Fixation method (1/3 tubular : locking plate)
- Interval to operation (≤ 24 hours : > 24 hours)
- Post. malleolar Fx (combined : not combined)
- Shape of fibular Fx (long oblique : short comm.)
- Syndesmotic screw (one screw : two screws)
- Frequency of CR trial (1 time : ≥ 2 times)
**Pre & postop. Radiographs (mean)**

<table>
<thead>
<tr>
<th></th>
<th>Preop</th>
<th>POD 6Mo</th>
<th>Final F/U</th>
<th>Diastasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tibiofibular gap</td>
<td>N/A</td>
<td>3.8 mm</td>
<td>3.4 mm</td>
<td>2 cases</td>
</tr>
<tr>
<td>Medial clear space</td>
<td>N/A</td>
<td>3.3 mm</td>
<td>3.2 mm</td>
<td>1 case</td>
</tr>
<tr>
<td>Tibiofibular overlap</td>
<td>N/A</td>
<td>11.2 mm</td>
<td>10.3 mm</td>
<td>2 cases</td>
</tr>
<tr>
<td>Displacement of fibula</td>
<td>28.6 mm</td>
<td>1.4 mm</td>
<td>N/A</td>
<td>p &lt; 0.001</td>
</tr>
</tbody>
</table>

- All cases achieved union: mean **12.6 weeks**
- Post-traumatic arthritis: **2 cases**
## Prognostic factor analysis

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>No.</th>
<th>AOFAS</th>
<th>Olerud</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>≤ 40 years</td>
<td>6</td>
<td>88.4</td>
<td>90.5</td>
<td>0.898</td>
</tr>
<tr>
<td></td>
<td>&gt; 40 years</td>
<td>6</td>
<td>86.8</td>
<td>88.9</td>
<td></td>
</tr>
<tr>
<td><strong>Fixation method</strong></td>
<td>1/3 tubular</td>
<td>5</td>
<td>86.1</td>
<td>89.6</td>
<td>0.772</td>
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<tr>
<td></td>
<td>locking plate</td>
<td>7</td>
<td>89.1</td>
<td>89.8</td>
<td></td>
</tr>
<tr>
<td><strong>Interval to operation</strong></td>
<td>≤ 24 hours</td>
<td>6</td>
<td>92.5</td>
<td>93.5</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>&gt; 24 hours</td>
<td>6</td>
<td>82.7</td>
<td>85.9</td>
<td></td>
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<tr>
<td><strong>Post. malleolar Fx</strong></td>
<td>Yes</td>
<td>9</td>
<td>85.7</td>
<td>87.5</td>
<td>0.554</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3</td>
<td>89.5</td>
<td>91.9</td>
<td></td>
</tr>
<tr>
<td><strong>Shape of fibular Fx</strong></td>
<td>long oblique</td>
<td>6</td>
<td>89.2</td>
<td>90.4</td>
<td>0.811</td>
</tr>
<tr>
<td></td>
<td>short comm.</td>
<td>6</td>
<td>86</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td><strong>Syndesmotic screw</strong></td>
<td>1</td>
<td>7</td>
<td>87.8</td>
<td>90.3</td>
<td>0.985</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4</td>
<td>87.4</td>
<td>89.1</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency of CR trial</strong></td>
<td>1 time</td>
<td>7</td>
<td>91.2</td>
<td>93.2</td>
<td>0.011</td>
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<tr>
<td></td>
<td>≥ 2 times</td>
<td>5</td>
<td>84</td>
<td>86.2</td>
<td></td>
</tr>
</tbody>
</table>
Perioperative complications

- ROM limitation > 20°: 2 cases
- Post-traumatic arthritis: 2 cases
- Wound skin necrosis: 2 cases → compartment syndrome → recovered at 6-8 wks with conservative Mx. (VAC)
- Superficial peroneal nerve injury: 2 cases → spontaneously recovered at 4-6 months
- Tibio-fibular synostosis: 1 case
- No additional operation (mean 38.4 months F/U)
Conclusions

- Less satisfactory clinical & radiological outcomes
- Higher incidence of perioperative complications
- Careful evaluation of the initial X-ray and P/E…CT
- Accurate diagnosis and immediate OR / IF
- Prevention of missed Dx. and repeated reduction

Bosworth fracture dislocation of ankle joint
References