Session I – 8:15 – 8:30 am

Outcomes: Should we even be operating?
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1 (Biomet);
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Tibial Plafond Outcomes – Should we even be operating?

1. Introduction
   a. Fascinating group of diverse articular, metaphyseal and occasionally diaphyseal injuries that comprise this fracture group
   b. Most all of them have significant associated soft tissue injuries
   c. Assessing the factors important for optimal outcome for a given patient is difficult and challenging
      i. Biologic response of articular cartilage
      ii. Treatment factors
      iii. Patient factors
      iv. Unpredictable

2. Axial loading tibial plafond fractures vs. rotational ankle fractures
   a. Outcomes after rotational ankle fractures are generally good and the factors that affect good vs. poor outcome are well known.
      i. Patient factors
         • Age
         • diabetes
         • obesity
      ii. Injury factors
         • open
         • osteochondral fractures
         • number of malleoli
      iii. Treatment factors
         • accuracy of reduction of the ankle mortise
   b. After high energy axial loading plafond fractures outcomes are less good and the important factors are less well understood
      i. For instance what is the effect of an anatomic articular reduction?
      ii. What is the effect of severity of injury?

3. Questions with partial answers that will be discussed
   a. What can be expected at one year?
   b. Two years?
   c. Five to ten years?
   d. What is the time line for recovery?
   e. What is the effect of the severity of injury?
   f. The type of skeletal stabilization device?
   g. The quality of reduction?
h. What about other injury and patient demographic factors?

4. What do we know about patient outcome?
   a. Complications create disasters!!! (infection, wound breakdown, nonunion, malunion, amputation)
      i. Incidence has decreased but complications still occur

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ii. Factors leading to decreased complications
   - Prioritize the soft tissue injury
   - Delay to definitive surgery
   - Use of temporary spanning fixation
   - Use of definitive external fixation
   - Use of lower profile implants
   - Use of indirect reduction techniques
   - Use of percutaneous techniques for reduction and placement of implants

b. Early outcomes are not great!!!
   i. Multiply injured patients with foot and ankle trauma have poor outcomes compared to similar patients without foot and ankle trauma\(^1\,\,^2\)
   ii. Patients with tibial plafond fractures have worse outcomes than patients with high energy tibial plateau fractures\(^3\,\,^4\)
   iii. These injuries have a measurable affect on general health status at 2-4 years after injury and at 5-11 years after injury. This long lasting negative effect appears to be irrespective of treatment technique since it has been seen in series treated with plates and series treated with external fixators\(^5\,\,^8\)

5. What can be expected one and two years after injury?
   a. Illustration of treatment technique used in the patient outcomes that will be discussed
      i. Spanning external fixator for three months
      ii. Percutaneous or limited approach reduction and screw fixation of the articular surface
      iii. Reduction assessed fluoroscopically
   b. Most patients show significant improvement for at least two years after injury
   c. In this time frame most patients can expect\(^5\,\,^8\)
      i. To still have some pain
      ii. To have returned to work
      To have a significant negative effect on recreational activities
      iii. After two years at least 50% will have early signs of posttraumatic arthritis
      iv. Arthrodesis is unusual

6. What can be expected in the second five years after injury?\(^3\)
a. SF – 36 still shows a significant effect for physical function, role physical function and bodily pain compared to age matched controls
b. Ankle scores (AOS) dramatically different than controls
c. Most can not run or play sports
d. Most have some ankle pain
e. The vast majority of ankles show secondary arthritic changes
d. But most are satisfied with their result
e. Most return to work
e. Most do not require late arthrodesis (2/3 (5.4%) in one series
f. Most patients improve for a long time (At least two years)

7. Case examples
8. Factors important for outcome
   a. Patient demographics
      i. In one study females and white collar workers had better outcomes at two to four years after injury
      ii. These results were not seen in another study at 5-11 years after injury
   b. Severity of injury and quality of articular reduction do not seem to have as close a link to patient outcome as traditional thinking would expect
      i. In two studies using the same assessment of reduction one had 14% fair reductions and resulted in 9% arthrodesis while another had 30% fair or poor reductions but resulted in only 3% arthrodesis
      ii. Two other studies that looked specifically at quality of reduction and severity of injury found these variables were associated with arthrosis but not with clinical outcome
   c. Cases to illustrate difficulty of predicting clinical outcome
   d. Clinical implications of these lack of associations
      i. Do not be quick to suggest arthrodesis based on severity of initial injury or quality of articular reduction.
      ii. Remember most patients improve for a long time and most do not require arthrodesis
      iii. Complications must be avoided since they produce bad outcomes and the extent that outcome is improved with aggressive surgery is at best unclear

8. Summary and Conclusions
   a. Tibial plafond fractures have a long lasting negative effect on patient general health status and a greater effect on ankle pain and function
   b. Many ankles begin to show arthrosis by two years after injury and most have significant posttraumatic arthrosis in the second five years after injury. The effect of these x-ray findings on clinical outcome is not clear.
   c. Complications must be avoided since they lead to repeat surgeries and poor patient outcomes.
   d. The factors that effect the variation in outcome are uncertain
   e. The severity of injury and the quality of articular reduction do not have as close an association with subsequent clinical outcome as has generally been thought.
REFERENCES


