AMSER Case of the Month
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12 y.o. F with right ankle pain

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Patient Presentation

12 y.o. F presents with right ankle pain after twisting her ankle while playing. No hx of previous injuries or trauma. Right ankle pain with weight bearing, denies numbness or weakness.

Physical Exam:
Musculoskeletal: ROM b/l, swelling and ecchymosis of right ankle, no deformity, laceration, normal pulse b/l. Tenderness at R lateral malleolus. Normal achilles tendon.
Imaging ordered

12 yo with acute trauma
Ottawa Ankle rules: 1 + 2

Radiography ankle was ordered by ER physician
XR ankle right 3+ view (labeled)

- Mortise view: Vertical fracture line extending to growth plate, Distal tibial epiphysis minimally displaced.
- AP view: Metaphysis, Soft tissue swelling.
- Lateral view:
Other Images ordered

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
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</thead>
<tbody>
<tr>
<td>MRI ankle without IV contrast</td>
<td>Usually Appropriate</td>
<td>0</td>
</tr>
<tr>
<td>CT ankle without IV contrast</td>
<td>Usually Appropriate</td>
<td>0</td>
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<tr>
<td>Radiography ankle Broden’s view</td>
<td>May Be Appropriate</td>
<td>0</td>
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<tr>
<td>US ankle</td>
<td>Usually Not Appropriate</td>
<td>0</td>
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<tr>
<td>MRI ankle without and with IV contrast</td>
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<td>Bone scan ankle</td>
<td>Usually Not Appropriate</td>
<td>0</td>
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</tbody>
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12 yo with acute trauma

Ankle XR showed fracture of epiphysis – needed to further evaluate fracture pattern and degree of displacement
Radiology Images (labeled)

Axial view
- Anterolateral tibial growth plate
- Distal epiphysis

Coronal view
- Displacement

Sagittal view
- Fracture across epiphysis to growth plate sparing metaphysis
- Tibiotalar joint
Differential Dx:

- Ankle sprain
- Tillaux fracture
- Triplane fracture
- Achilles tendonitis
- Fibular fracture
- Calcaneus fracture
Final Dx:

Juvenile Tillaux Fracture
Case Timeline

• Initial imaging showed minimally displaced fracture of lateral aspect of distal tibial epiphysis
• Significant for right tillaux ankle fracture, closed
• Orthopedic surgery was consulted, and patient was scheduled for closed reduction with percutaneous screw fixation 2 days later
Reduction of epiphysis gap

Post-op CT

Axial view

Coronal view

Sagittal view

Post screw fixation

Reduction of epiphysis gap
Case Discussion

- Tillaux fractures is a common traumatic injury, caused by external rotatory force
  - Leads to avulsion fracture of lateral distal bony epiphysis
- Presents in adolescents
  - Pattern of fracture requires partial closure of distal tibial physis
  - Normally occurs within 1 year of closure in adolescents
  - Pattern of physis closure: central -> anterior/medial -> anterior-lateral
  - Antero-lateral portion closes last and is susceptible to fracture
Case Discussion

• Salter-Harris Type III Fracture
  • Intraarticular
  • Enters through physis plane and exit through epiphysis

• 15% of juvenile long bone injuries involve epiphysis
  • Juvenile tillaux fractures occur near the end of physeal closure

• Premature growth arrest is rare
• Risk of early arthritis
Case Discussion

• Patient typically presents with tenderness and swelling at ant/lateral ankle
  • Symptoms similar to ankle sprain
• Requires x-ray to rule out fracture in this age group
• CT may be required to rule out triplane fracture
  • Also caused by external rotatory forces
  • Fracture extends to include metaphysis
• Displacement dictates type of treatment
  • Minimal displacement – non-op and stabilize with short cast
  • Displaced fracture with disrupted articular surface – possible operation with screw fixation or ORIF
References:


