Juvenile Osteochondritis Dissecans: Correlation of Findings on Histopathology and MRI

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Purpose

• To correlate histopathological specimens with the appearance of juvenile osteochondritis dissecans (JOCD) lesions on MRI
Materials and Methods

• Retrospective collection
• 5 patients diagnosed with JOCD
  – 2 girls, 3 boys; ages 12-13 years
  – ICRS OCDI and OCDII
  – All underwent biopsy at time of surgical intervention for JOCD
Materials and Methods

• 5 knees
  – 2 no previous intervention
  – 3 prior retrograde drilling and bone grafting
    • Ranging from 3 months – 4 years prior to biopsy

• Time interval between MRI and biopsy
  – 1 week – 5 months
Materials and Methods

• Independent review of histopathology - single pathologist

• Determination of location of prior biopsy site on MRI
  – 3 knees: Follow-up MRI/CT
  – 2 knees: Surgical reports, intra-op photos/videos

• Biopsy – MRI overlay determined by consensus
Biopsy Overlay

B = Bone

F = Fibrovascular tissue

C = Cartilage
Biopsy Overlay
Biopsy Overlay

16.1 mm
<table>
<thead>
<tr>
<th>Patient</th>
<th>Core length (mm)</th>
<th>Cartilage length (mm)</th>
<th>Chondrocyte cloning</th>
<th>Bone/cartilage separation</th>
<th>Fibrovascular (FV) tissue</th>
<th>Length FV tissue (mm)</th>
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<td>16</td>
<td>5</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>5-10</td>
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<tr>
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<td>5</td>
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<td>Y</td>
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<td>Y</td>
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</table>
Results

• Abnormal structural relationship between bone and cartilage
  – Abundant fibrovascular tissue and abnormal cleft spaces near the bone-cartilage interface
  – Bone necrosis and inflammation were not a predominant feature

• Location and appearance of fibrovascular tissue corresponds with high T2 signal rim and “cysts” on MRI
Patient 2

Green arrows = fibrovascular tissue; Black arrow = cleft space
Patient 1

Green arrow = fibrovascular tissue; Black arrow = cleft space
Discussion

• Excellent visual correlation between histopathological and MRI findings
Future Imaging Goals

- Predict which patients are more likely to not heal prior to development of gross instability at surgery
- Aid with triage of patients into surgical and conservative treatment plans
Limitations

• Small sample size
• 3/5 cases had prior surgical intervention
  – However all cases had similar histopathological findings
• Determination of location of biopsy on MRI could have been incorrect
Conclusion

• Distinct correlation between histopathological and MRI findings of JOCD
• Ultimate goal of imaging is to help with establishing a prognosis and therapeutic plan for children and adolescents with JOCD