Update on DDH: Imaging and treatment

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DDH epidemiology

• 1 (unscreened)-66 (screened) per 1000 births

• Spectrum of dislocated hip, subluxable hip, or a located hip within a shallow acetabulum

• Risk factors: (female gender, breech/oligohydramnios, family history, teratogenic/neurogenic, infant swaddling)
DDH

1000 newborns

US, X-Ray

10 DDH

US, X-Ray

990 no DDH

Treatment

Pavlik harness
<6 months

Closed reduction with
SPICA < 2 years

Open reduction
and SPICA
> 1.5 years

SPICA MRI
Rationale for MRI after SPICA

- Radiographs cannot visualize cartilage while in SPICA
- US is time consuming, user dependent, and requires SPICA cast manipulation
Rationale for MRI after SPICA (rather than CT)

• Evaluate reduction without radiation

• SPICA will hold child in place, limiting the need for sedation

• MR can visualize intrinsic and extrinsic causes of failed reduction
SPICA protocol

• FOV 12-16 cm

• No hardware:
  - PD FS axial
  - PD coronal
  - post-gd T1 FS coronal and axial

• Hardware:
  - PD FS axial. Check.
  - PD coronal
MRI with appropriate reduction; enlarged ligamentum teres
3 simple things to look for on any SPICA MRI

• 1. Femoral head location in both the coronal and axial plane

• 2. Ligament/soft tissue interposition

• 3. Capital femoral epiphyseal enhancement
3 simple things to look for on any SPICA MRI

• 1. Femoral head location in both the *coronal* and *axial* plane
s/p reduction mild subluxation; pulvinar
Posterior subluxation s/p reduction
• Reduced but incongruent due to acetabular anteversion and large pulvinar
Posterior dislocation

SPICA MRI with a crying child
3 simple things to look for on any SPICA MRI

• 2. Ligament/soft tissue interposition
Intrinsic causes of failed reduction

• Ligamentum teres/transverse ligament hypertrophy
• Enlarged pulvinar
• Inverted labrum
Inverted superior labrum, thick transverse ligament
1. Inverted superior labrum
2. Thick ligaments
3. Thick pulvinar
Inverted posterior labrum
Inverted anterior labrum
3 simple things to look for on any SPICA MRI

• 3. Capital femoral epiphyseal enhancement
Contrast imaging

1 day later after SPICA change
With hips in less abduction
Contrast imaging may predict epiphyseal osteonecrosis 1 year later
To fat sat or not to fat sat?
Turn fat sat off if there is too much metal artifact

- 4 yo with acetabular osteotomy and femoral foreshortening osteotomy
Try fat sat first

- 1 yo with closed reduction with femoral derotational osteotomy

Fat sat imaging does better job with cartilage
<table>
<thead>
<tr>
<th>CT</th>
<th>MRI</th>
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<tbody>
<tr>
<td>- Head location in coronal and axial plane</td>
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<tr>
<td>- No sedation</td>
<td>- No sedation</td>
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<td></td>
<td>- Soft tissue interposition</td>
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<td>- Capital femoral epiphyseal enhancement</td>
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<td>- No radiation exposure</td>
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Summary

• SPICA MRI: know the check list:
  - 1. Head location (coronal and axial planes)
  - 2. Interposition
  - 3. Head enhancement
Thank you for your attention!