Pediatric Hip PoCUS

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Case

- A 6 year old boy healthy before
- Limping since morning with worsening right hip discomfort
- Cold symptoms for the last 3 days associated with documented low grade fever
- No trauma
- O/E: Febrile and not bearing weight with decrease ROM of right hip because of pain
- He had WBC of $14.4 \times 10^3$ and ESR of 50

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Anatomy of the Pediatric Hip

- The ED Physician should readily identify the sonographic landmarks of the pediatric hip.
- These landmarks include the femoral head and neck, acetabulum, joint capsule and iliopsoas muscle.
Anatomy of the Pediatric Hip

1. Acetabulum
2. Femoral head
3. Femoral neck
Anatomy of the Pediatric Hip

1. Femoral Head
2. Articular Cartilage
3. Acetabulum
4. Labrum
5. Overlying Muscles
6. Femoral Neck
7. Joint Capsule
Technique

- Supine position
- Position the leg in slight abduction and external rotation
- High frequency linear probe
- Align probe along femoral neck by rotating 45° oblique
- Identify the anatomy of the hip
Ultrasound Findings

- Measure the maximal distance between the anterior surface of the femoral neck and the posterior surface of the iliopsoas muscle
Ultrasound Findings

- Criteria for a pediatric hip effusion is:
  - A capsular-synovial thickness of 5 mm measured at the concavity of the femoral neck, from the anterior surface of the femoral neck to the posterior surface of the iliopsoas muscle
  - OR a 2-mm difference compared to the asymptomatic contralateral hip

- The cause of effusion cannot be differentiated by ultrasound
ED physicians with a high confidence in US accuracy

- Sensitivity of \textbf{90\%}
- Specificity of \textbf{100\%}
- Positive predictive value of \textbf{100\%}
- Negative predictive value of \textbf{92\%}
Ultrasound-guided hip arthrocentesis

- Anterior approach.
- Patient supine with leg extended and hip in neutral position
- High frequency linear probe
- Align probe along femoral neck by rotating 45° oblique
- Identify the anatomy of the hip
Ultrasound-guided hip arthrocentesis

- Prep the skin
- Local anesthesia
- An 18 or 20 gauge needle and a 10 or 20 ml syringe
- Visualize the needle in long axis as it enters the fluid collection and aspirate while advancing
Predictors associated with risk of Septic Arthritis

- Fever
- Non-weight-bearing
- ESR = 40 or more
- Serum WBC = 12,000 or more

Probability of Septic Arthritis based on number of Predictors

- 0 Predictors – <0.2 %
- 1 Predictor – 3.0%
- 2 Predictors – 40.0%
- 3 Predictors – 93.1%
- 4 Predictors – 99.6%

0 or 1 Predictors – close follow-up / observation

2 Predictors – Aspiration via fluoroscopy/ultrasound

3 or 4 Predictors – Aspiration in OR with likely arthrotomy and drainage.
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Pediatric orthopedic consultation was obtained, and ED arthrocentesis was deferred as the patient was immediately taken to the operating room for hip joint aspiration and irrigation.

The patient received intravenous antibiotics empirically.

The cell count was 102,000 WBC/mm³ while Gram stain revealed Gram-positive cocci in clusters. Synovial fluid culture grew Staph aureus within 24 h.
References

- https://www.sonositeinstitute.com/