Point of Care Knee Ultrasound

Robert Lindsay PGY-2
UMASS Emergency Medicine
Overview of Knee Ultrasound

• Fast, non-invasive technique
• Common in sports medicine and orthopedics
• Many possible uses and diagnosis in the ED
  • Assessment of effusion and safer arthrocentesis
  • Tendon injury assessment
  • Ligamentous injury assessment
  • Meniscal injury
Technique

- High frequency linear transducer
- 5 basic views
  - Suprapatellar (longitudinal and transverse)
  - Infrapatella (longitudinal and transverse)
  - Medial
  - Lateral
  - Posterior
Technique: Suprapatellar View Longitudinal
Technique: Suprapatellar View Transverse

Anterior knee: Quadriceps tendon transverse
Technique: Infrapatellar View Longitudinal

Anterior knee: Distal patellar tendon longitudinal
Technique: Infrapatellar View Transverse

Anterior knee: Proximal patellar tendon transverse
Technique: Medial Knee Longitudinal

Medial side of the knee: Medial collateral ligament and meniscus longitudinal
Technique: Lateral Knee Longitudinal
Technique: Posterior Knee Transverse

Posterior knee: Popliteal fossa with popliteal vessels and nerve transverse
Study Objectives

• Knee pain: 1.3 million visits yearly
• X-rays are frequently ordered for knee pain
  • Even when fracture not clinically suspected
  • Poor diagnostic yield
• Bedside ultrasound proven in other areas: FAST, cardiac, lung, RUQ
  • Can we bring MSK ultrasound to the bedside?

• Our study question: “Is the diagnostic yield of bedside ultrasound superior to x-rays in the emergency department”
Methods

• All ultrasounds done in the emergency department stored
• Retrospective review on all knee ultrasounds done over 18 month period
• Ultrasound images reviewed by two emergency department ultrasound faculty for pathology
• Chart review on each patient to identify traumatic vs atraumatic injury
• If x-rays performed, formal radiology read was reviewed
• Comparison of diagnostic yield of POC knee ultrasound vs knee x-rays
Results

• 69 patients with external trauma (37%) and low impact trauma (63%) were imaged over 18 month period
• 43% of these patients also underwent plain radiographs
• Ultrasound identified pathology in 68% of patients
  • Most common pathology were joint effusions and bursitis
• No acute fractures identified in our study group by either method
• In patients who had both an ultrasound and x-ray, ultrasound was more likely to pick up pathology
Our Results: Group with X-Ray and Ultrasound

**Ultrasound**
- Negative: 8
- Effusion: 13
- Tendon Rupture: 3
- Tendonitis: 2
- Baker's Cyst: 1
- Meniscal Tear: 3
- Bursitis: 9

**X-Ray**
- Negative: 17
- Patella tendon rupture: 1
- Soft tissue swelling: 4
- Degenerative changes: 6
- Bursitis: 1
- Effusion: 9
Examples of Pathology
Examples of Pathology

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Examples of Pathology
Examples of Pathology
Examples of Pathology
Discussion and Future Directions

• Areas of improvement for our study
  • Increased volume of knee ultrasound
  • More significant trauma

• Prospective study options
  • X-ray vs ultrasound: Patients without clinical concern for fracture
  • Ultrasound vs no ultrasound: All patients receiving a knee x-ray

• Should you integrate knee ultrasound into your practice?
  • Yes!
  • Currently a useful augmentation tool
  • Increase patient satisfaction
  • Decrease time for referral
  • Potentially avoid a missed diagnosis
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