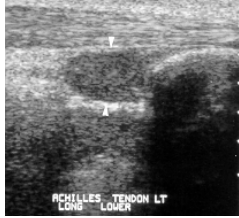


Week 6, Lecture 3

Ultrasonography



Lecture Outline

1. Introduction
2. Uses
3. Ultrasound production
4. Examples
5. Summary

1. Introduction

- ∅ Becoming more widely used
- ∅ No radiation dose
- ∅ Relatively cheap
- ∅ Performed relatively fast
- ∅ Few limitations
- ∅ Real-time viewing (i.e. can view movement)

2. Uses

- ∅ Demonstrates boundaries between soft tissue structures
- ∅ As well as internal structure
- ∅ High resolution ⇒ superficial structures
- ∅ Muscles, tendons, ligaments & vessels
- ∅ Poor for bone lesions

Use in the foot and ankle

- ∅ Tendon pathology
 - tendon tears
 - tendonitis, peritendonitis, tenosynovitis
- ∅ Plantar fasciitis/plantar fascial rupture
- ∅ Neuromas
- ∅ Bursitis
- ∅ Ligament injuries

3. Ultrasound production

- ∅ Similar to vascular Doppler ultrasound
- ∅ 7.5-10 Mhz transducer
- ∅ Sound waves emitted
- ∅ Higher frequency gives higher resolution
- ∅ However, attenuated more easily

Image production

- ∅ Ultrasound waves interact with different tissues
- ∅ Reflected back (echo)
- ∅ Returning echoes converted to a grey scale (1-64 shades of grey)
- ∅ Projected onto a monitor (image is also converted to a static film)

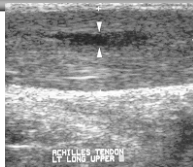
Terminology

- ∅ Echo-free vs. echogenic
 - Fluid is echo-free (dark grey/black)
 - Tissue is echogenic (light grey/white)
 - Mixed lesions \Rightarrow mixed echogenicity
- ∅ Hypoechoic \Rightarrow low echogenicity
- ∅ Hyperechoic \Rightarrow high echogenicity

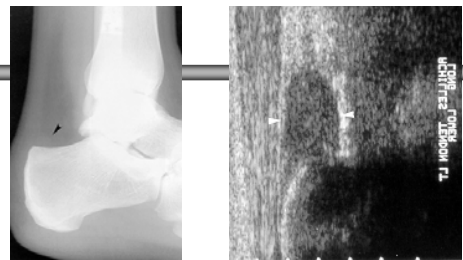
4. Examples



Achilles tendonitis
Note: swelling of
Achilles tendon



Achilles tendonitis complicated
by either cystic degeneration
or an intrasubstance tear
Note: hypoechoic area



Note: retrocalcaneal bursitis on
plain film and ultrasound

Sensitivity and specificity

- ∅ Kainberger et al (1990), *Am J Radiology*
 - Assessed diagnostic potential of Ultrasonography for Achilles tendon injury
 - Sensitivity 0.72, Specificity 0.83
 - Swelling, abnormal structure, rupture, peritendinous lesions

5. Summary

- ∅ Increasingly accepted and used for soft tissue injuries
- ∅ Good sensitivity and specificity for foot and ankle soft tissue injuries
- ∅ In particular, appropriate for tendon injuries of the foot and ankle
- ∅ Relatively cheap and easy to access