

Introduction

Advantages:

- Does not involve ionising radiation
- Used quite freely for antenatal scanning, children
- Safe for repeated examinations
- No evidence that it break chromosomes, damages tissues or predisposes to malignancy
- Non-invasive
- Painless
- Equipment much cheaper than MRI scanners and more portable
- Possibly the best imaging modality for soft tissues.
- Has some therapeutic uses too - soft tissue injury etc

Background

- Ultrasound relies on reflection of very high frequency sound waves by tissue interfaces.
- This frequency is typically 2.5 to 10MHz. Higher freq ↑resolution but ↓penetration.
- At interfaces sound waves may be absorbed, reflected to varying degrees back to the probe, or transmitted through the tissue at different velocities.
- Displayed image depends on detecting the variously attenuated reflected sound waves.
- Uniform substances such as water or urine, produce no echoes (black)
- A gel or oil is employed to give a non-reflective acoustic interface between probe & skin.
- A full bladder for transabdominal pelvic scans.
- Acoustic shadowing if very reflective interface (tissue/bone, calculi) or scattering (gas).
- Scans performed at other sites: transrectal (prostate), trans-vaginal (gynae), and TOE.
- Technical advances include: ↑resolution, realtime scanning, colour Doppler, '3D' imaging.

Many uses (including):

- Abdominal organs (Liver, Kidney, Spleen, Pancreas)
- Biliary tree (ED)
- Renal tract calculi (ED)
- Appendicitis
- Bladder filling ED
- Gynaecological
- Pregnancy/ectopic ED
- FAST ED
- DVT (Doppler)
- Echocardiology ED
- Abdominal aorta ED
- Subcutaneous FB ED
- Central line placement ED

ED - Increasingly performed by ED physicians