

ULTRASOUND IN PRIMARY CARE

GPCME - ROTORUA 2010

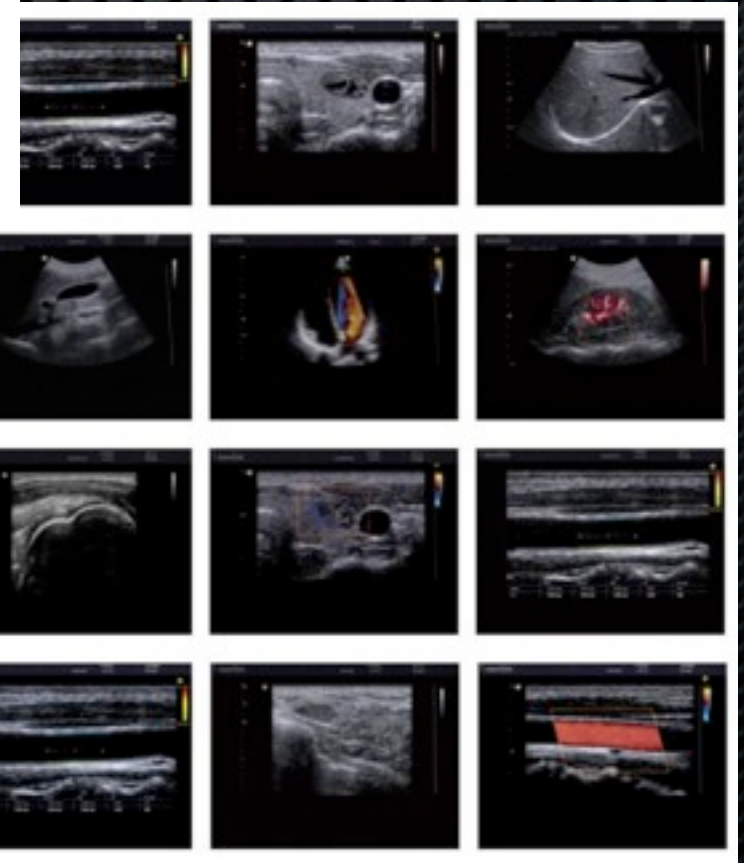
Dr Philip Weeks pweeks@middlemore.co.nz

AIMS & OBJECTIVES

- ✦ Overview
- ✦ Machine purchasing - choices and options
- ✦ Scope of practice - getting started
- ✦ Training -courses, clinical oversight, image sharing
- ✦ Integrating within your practice

ACKNOWLEDGEMENTS

see it all
MEDISON



ACKNOWLEDGEMENTS



USS WHO IS DOING IT?

- Sonographers
- Radiologists
- Rheumatologists
- Orthopaedic surgeons
- Sports Med physicians
- Physical therapists
- Breast surgeons
- Anaesthetists
- Intensivists
- Endocrinologists
- Cardiologists
- Cranial therapists
- Even monkeys in the zoo do it.....

USS WHERE ARE THEY DOING IT?

"THE FINAL FRONTIER"



To scan or not to scan

- ✦ Isolated/rural practice
- ✦ Developed MSK or other special interest eg O & G
- ✦ Adjunct to clinical evaluation
- ✦ Guidance of needles
- ✦ Steroid, local, blood patches, aspirations etc

Ultrasound Machines

- Start with an entry level platform
- Size investment to fit practice - you can invest more later
- Don't get conned into too many probes
- Local service and applications support
- On line servicing/ support vital if rural

Ultrasound Machines

- ✦ Simple is best - it should be easy to find basic functions
- ✦ Optimise buttons are handy
- ✦ Saving images and cineloops should be easy, multiple file formats for export
- ✦ Intuitive interface
- ✦ Easy probe connection - presets

BUYING A MACHINE - basics

- ✦ Central processing unit
- ✦ Transducers
- ✦ Pulse and gain controls
- ✦ Display
- ✦ Storage
- ✦ Output
- ✦ Connectivity

BUYING A MACHINE - features

- ✦ Software - it comes in packages
- ✦ Colour Doppler
- ✦ Tissue harmonics
- ✦ Compounding
- ✦ Optimisation
- ✦ Remote diagnostics



BUYING A MACHINE - vendor

- ✦ Warranty and service availability
- ✦ Established performer in your market segment
- ✦ Parts availability
- ✦ Contact
- ✦ Training support
- ✦ Product range - trading up

BUYING A MACHINE - service

- How much downtime can I afford?
- What are the repair replacement costs?
- What are the risks if I pay as I go?
- Where will I be in the response order?
- Preventative maintenance?

BUYING A MACHINE - costs

- ✦ \$10k basic unit
- ✦ \$20 - 50k extra features more processing
- ✦ \$70 - 120k will offer most top end features but basic form
- ✦ \$150 - 250k general and specialist hospital practice
- ✦ All will have the basic probes, software and connectivity to practice

BUYING A MACHINE - extras

- ✦ Maintenance agreement 10-15% of purchase per annum
- ✦ Additional training - some is part of purchase
- ✦ Extra probes \$1500 to \$20,000 (top end)
- ✦ Peripherals - DVD, cd, printers \$2-3K plus consumables
- ✦ Connection software \$ 1-3k for practice database
- ✦ Consumables - gel, warmers, linen, transducer covers
approved cleaners

BUYING A MACHINE - budget

- ✦ Make a budget
- ✦ Can you charge more?
- ✦ Procedures add time
- ✦ Longer consultations - less time to see patients
- ✦ Work in with your partners neighbouring practices
- ✦ Negotiate with the vendor to supply manage extra costs

TRAINING - learn to use the bloody thing properly!

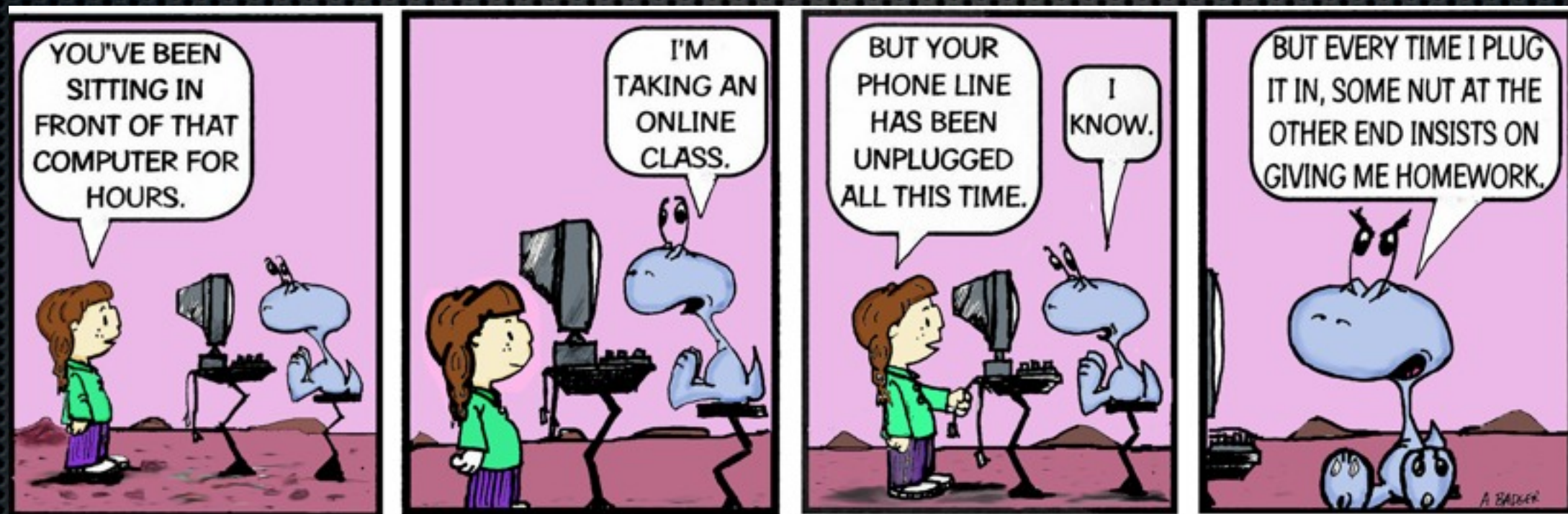
- ✦ Ultrasound is a practical skill set
- ✦ Know the patient
- ✦ Know the anatomy
- ✦ Know the physics - artefacts abound
- ✦ Know the machine
- ✦ **KNOW WHEN YOU DON'T KNOW**

TRAINING

- ✦ Participate in a formal course
- ✦ Scan something with known anatomy/pathology
- ✦ Guide a familiar procedure you do by palpation
- ✦ Save and label your images
- ✦ Compare them with others, and teaching examples
- ✦ Make friends - radiologists, sonographers, applications specialists - anyone you can learn from

RESOURCES & COURSES

LEARNING AT A DISTANCE



RESOURCES & COURSES

University of Otago (Department of General Practice, Dunedin School of Medicine)	E: raelene.abernethy@otago.ac.nz P: (64 3) 4667971
Course	CCPU Units
Post Graduate Certificate in Clinician Performed Ultrasound	FAST AAA Early Pregnancy DVT Renal

- **Postgraduate Certificate in Clinician-Performed Ultrasound (PGCertCPU)**

- http://dnmeds.otago.ac.nz/departments/gp/teaching/rural_cert.html

RESOURCES & COURSES

Ultrasound Training Solutions (U-T-S)	www.u-t-s.com.au
Course	CCPU Units
Emergency Ultrasound for Remote &	Acute Gynaecology

Accredited courses

Physics, Instrumentation and Safety Courses

ASUM CCPU Online Physics Tutorial

www.asum.com.au

AIU Ultrasound Physics

www.aiu.edu.au

These tutorials fulfil the pre-requisite for the CCPU.



RESOURCES & COURSES

ultrasound training for healthcare professionals

ultrasound
guides

Search our site... search

Subscribe via [Email](#) | [RSS](#)

[home](#) [latest news](#) [about us](#) [our training](#) [taster test](#) [contact us](#)

welcome to our website

Tuesday, May 19th, 2009 at 2:41 pm



Ultrasound Guides is a comprehensive of dedicated ultrasound practitioners pas modality. Our sp years of frontline placed to meet y

Formed in respo ultrasound traini professionals, w emergency, strol critical care and

We can provide on or offsite instruction at various levels from be

Whatever your ultrasound training requirements, we're here to h

SHARE   

Filed under: [Ultrasound Guides](#)

ALOKA
illuminate the change

[ALOKA PRODUCTS](#) | [APPLICATIONS](#) | [SUPPORT](#) | [NEWS & EVENTS](#) | [ABOUT US](#) | [CASE STUDIES](#)

Case Studies Overview

Overview

Case Studies

You are about to leave the Aloka website to view an extensive collection of Case Studies done with Aloka equipment. This site contains over 3000 case studies with more than 15,000 grey scale and color images and is growing larger every day. When you have finished viewing [ultrasoundcase.info](#), simply close the page to return to [www.aloka.com](#).

Ultrasoundcases



[Click here to visit the Ultrasoundcases.info site](#)

© 2010 Aloka, Inc. All rights reserved. [Site Map](#)

Created by **PixelMEDIA, Inc.**

RESOURCES & COURSES

LEARNING AT THE COALFACE



WEBSITES

- ✦ [**Sonosite Training and Education**](#)

[**www.sonositelearning.com/**](http://www.sonositelearning.com/)

- ✦ <http://www.aloka.com/case-studies/index.asp>

- ✦ [**www.compareultrasound.com/**](http://www.compareultrasound.com/)

- ✦ [**radiographics.rsna.org/**](http://radiographics.rsna.org/)

- ✦ [**www.asum.com.au/**](http://www.asum.com.au/)

WEBSITES

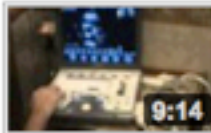
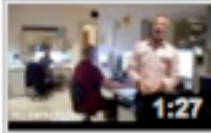
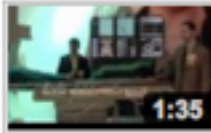
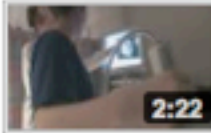
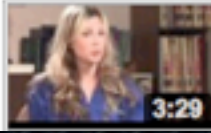
You Tube [Browse](#) [Upload](#) selmer01 [Sign O](#)

 **Training non-radiologists on ultrasound**
[greatdoctorstv](#) 127 videos



3:26 / 8:57 360p   

[greatdoctorstv](#) — February 25, 2010 — *no description available*  **43** 
views

-  **Academy of Ultrasound, LLC Video I.avi**
496 views
[academyofultrasound](#)
-  **Radiology Technician Education : Radiology Tech...**
4,872 views
[eHow](#)
-  **Patients and Radiologists: video by ACR**
169 views
[imaginghealthcare](#)
-  **Las Vegas MRI & Radiology Labs West Valley Imaging**
216 views
[yellowpages](#)
-  **ECR - Interventional Radiology - Innova 4100**
355 views
[gehealthcare](#)
-  **BryanLGH General Sonography Program**
2,160 views
[jrhathaw](#)
-  **Ultrasound Technology Career.mov**
1,119 views
[Zarahak](#)

WEBSITES



THE HEALTHCARE CHANNEL

MAKE YOURSELF BETTER

- ✦ Formally record your findings
- ✦ Keep a log book
- ✦ Audit yourself or join others (peer review)
- ✦ Scan normal people - with permission of course.
Saying something is normal is way harder than pathology!
- ✦ This how you learn

KNOW WHEN TO QUIT

- Some people are just not very good at ultrasound
- Every programme kicks out students who just don't get it
- This means doctors as well
- Just because you went to medical school you won't be brilliant at everything.....

Artifacts Classification Gent

- 1. Attenuation – shadowing, enhancement, edge shadow
- 2. Beam dimension – beamwidth, slice thickness, side lobes, grating lobes
- 3. Depth of origin – reverberation, ringdown, comet tail, velocity, range ambiguity
- 4. Beam path – refraction, reflection, mirror, multipath
- 5. Equipment – electronic
- TGC effects
- Multiple focal zone
- Movement
- Noise

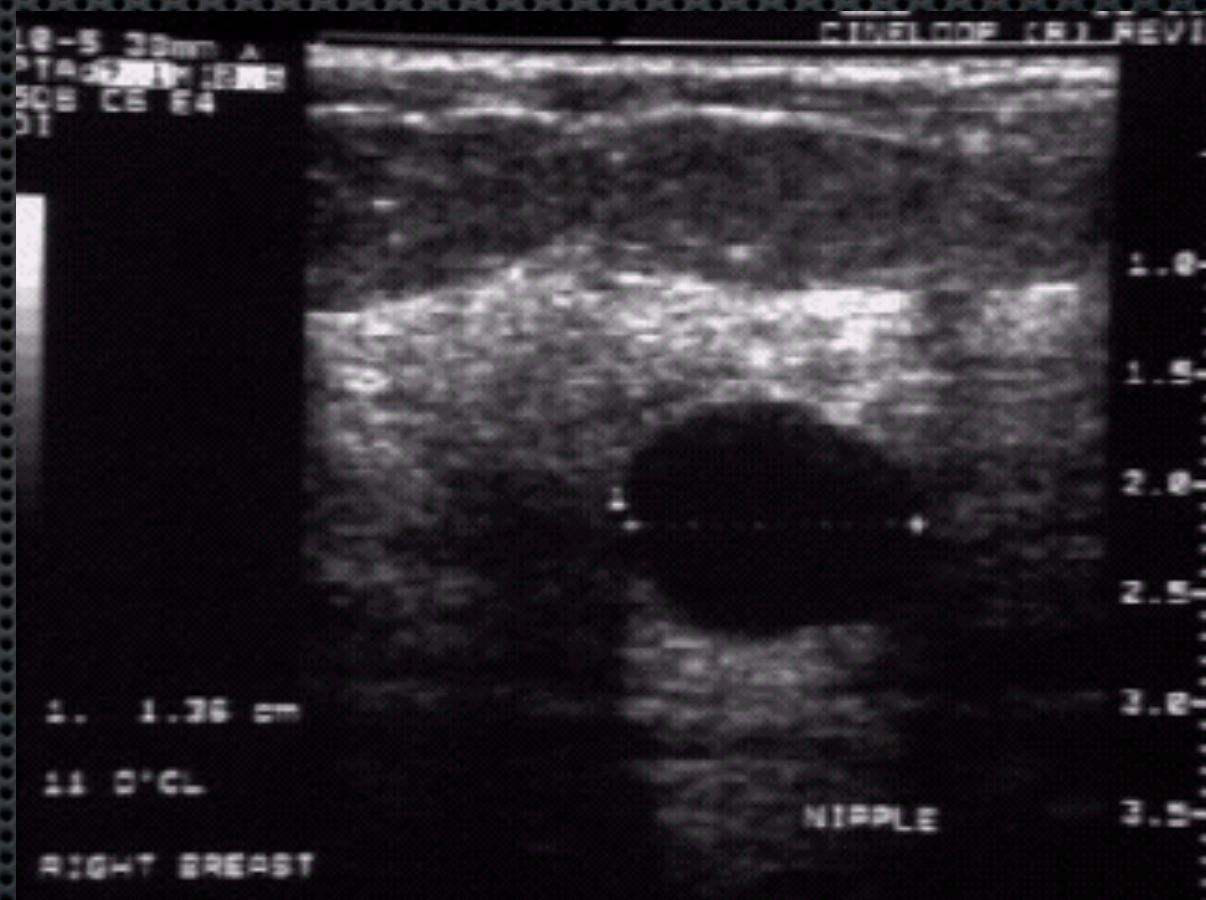
ARTIFACTS

- HELPFUL
 - Infill the image - speckle
 - Confirm cyst - enhance
 - Detect – calcium, scirrhous masses which shadow
- MISLEADING
 - Fake pathology
 - Obscure pathology
 - Mislead interpretation

MOST IMAGES CONTAIN MULTIPLE INTERACTING ARTIFACTS

Enhancement – through transmission

- Increased brightness
- Inaccurate TGC – time gain compensation
- Common deep to low attenuating – fluid structures



Shadows

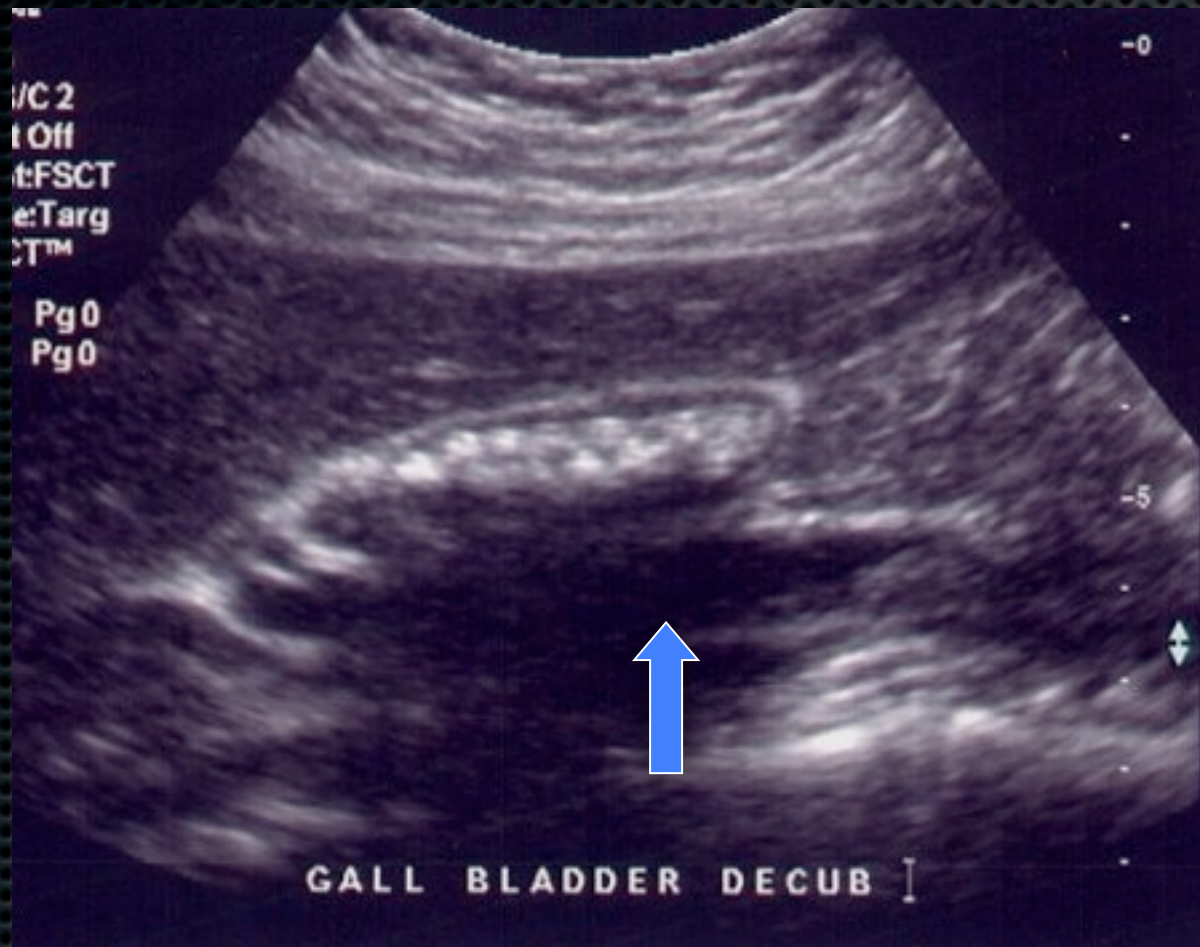


Image A

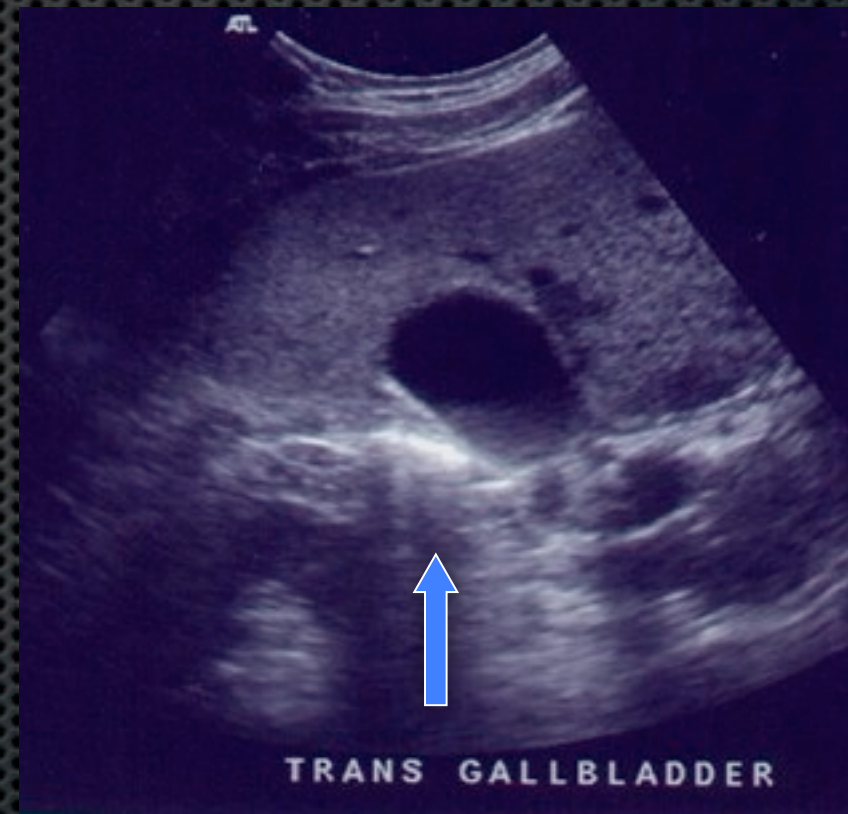
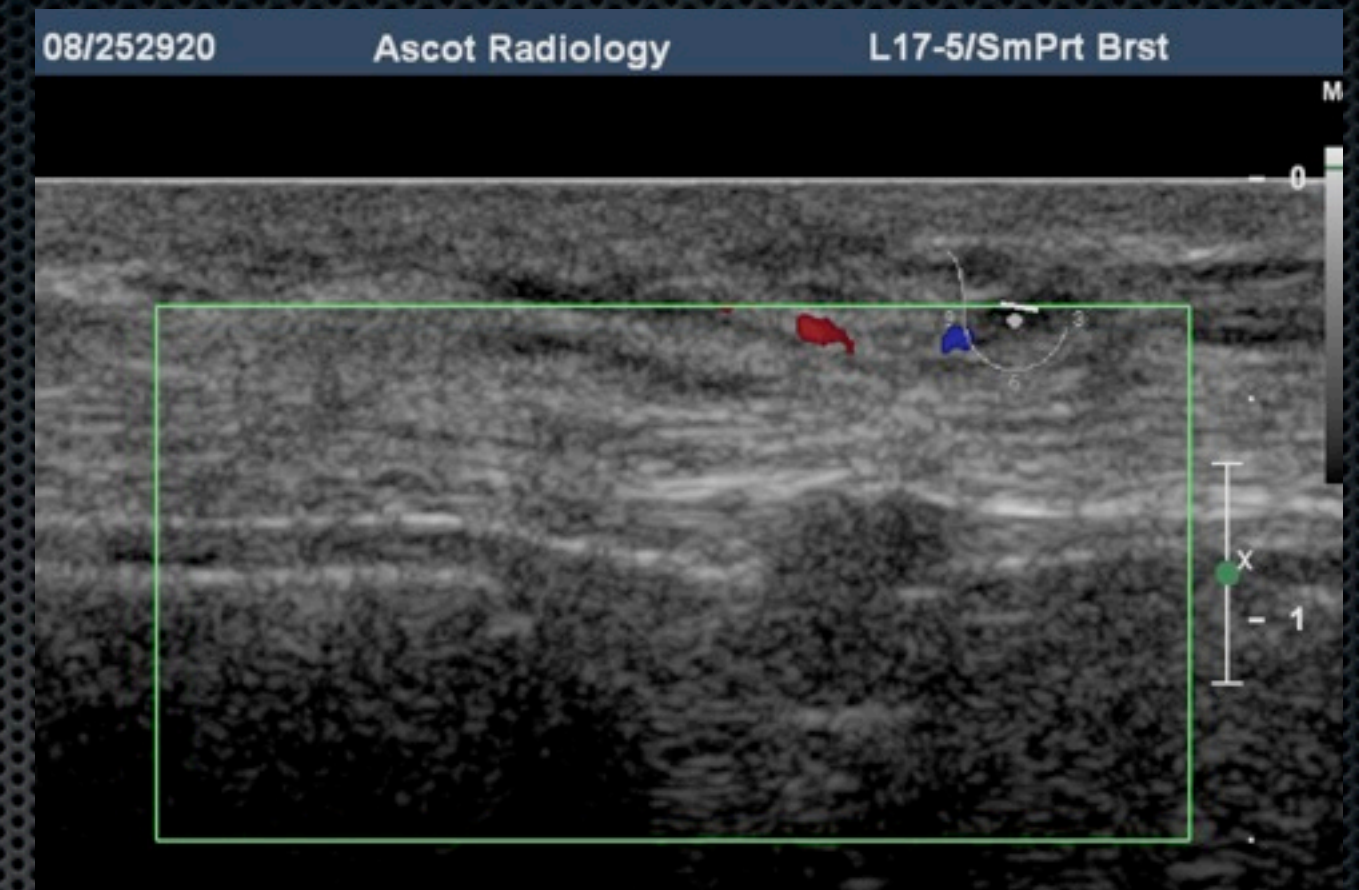
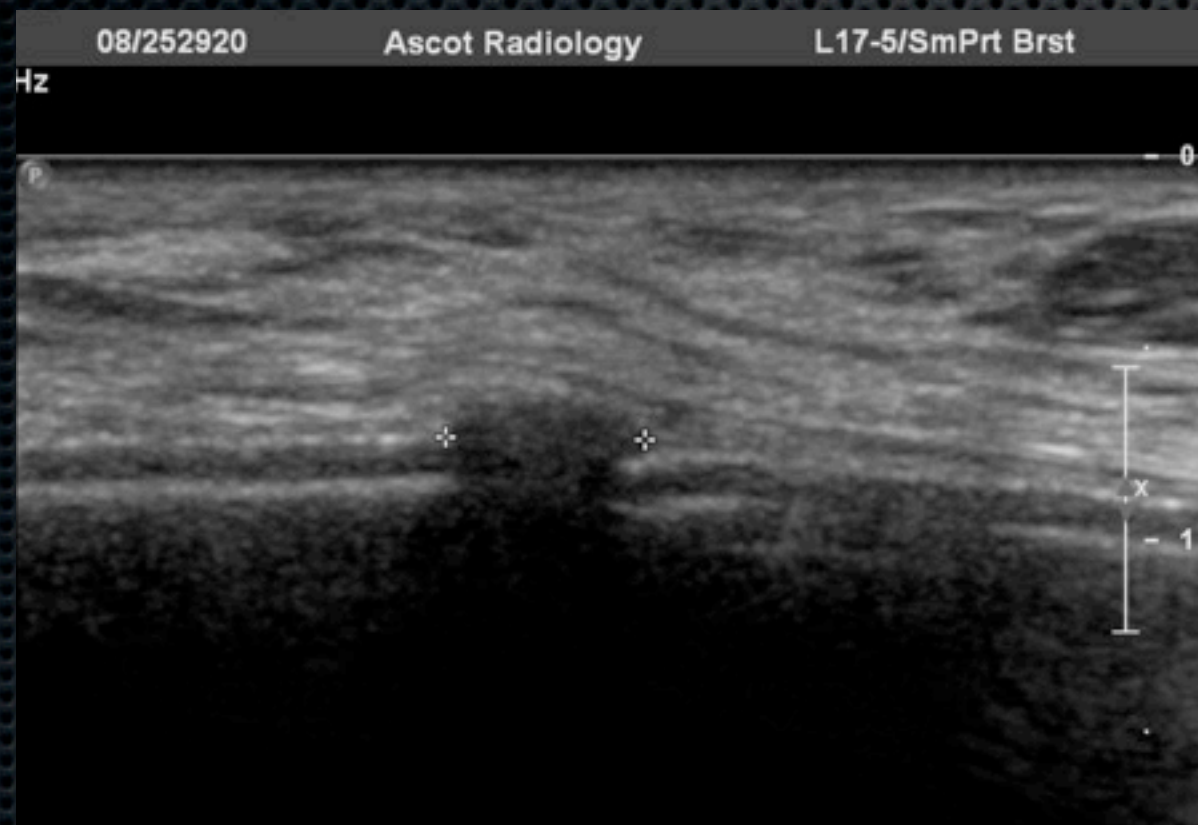


Image B

Complexity



Multipath

During this Paediatric Renal Ultrasound Scan a cystic lesion (blue star) was transiently seen deep to the urinary bladder. The lesion strangely seemed to come and go as gas in the bowel deep to the bladder peristalsed around. When the patient emptied their bladder, careful scanning showed no cyst in the pelvis.



TWO PATHS - TWO OBJECTS

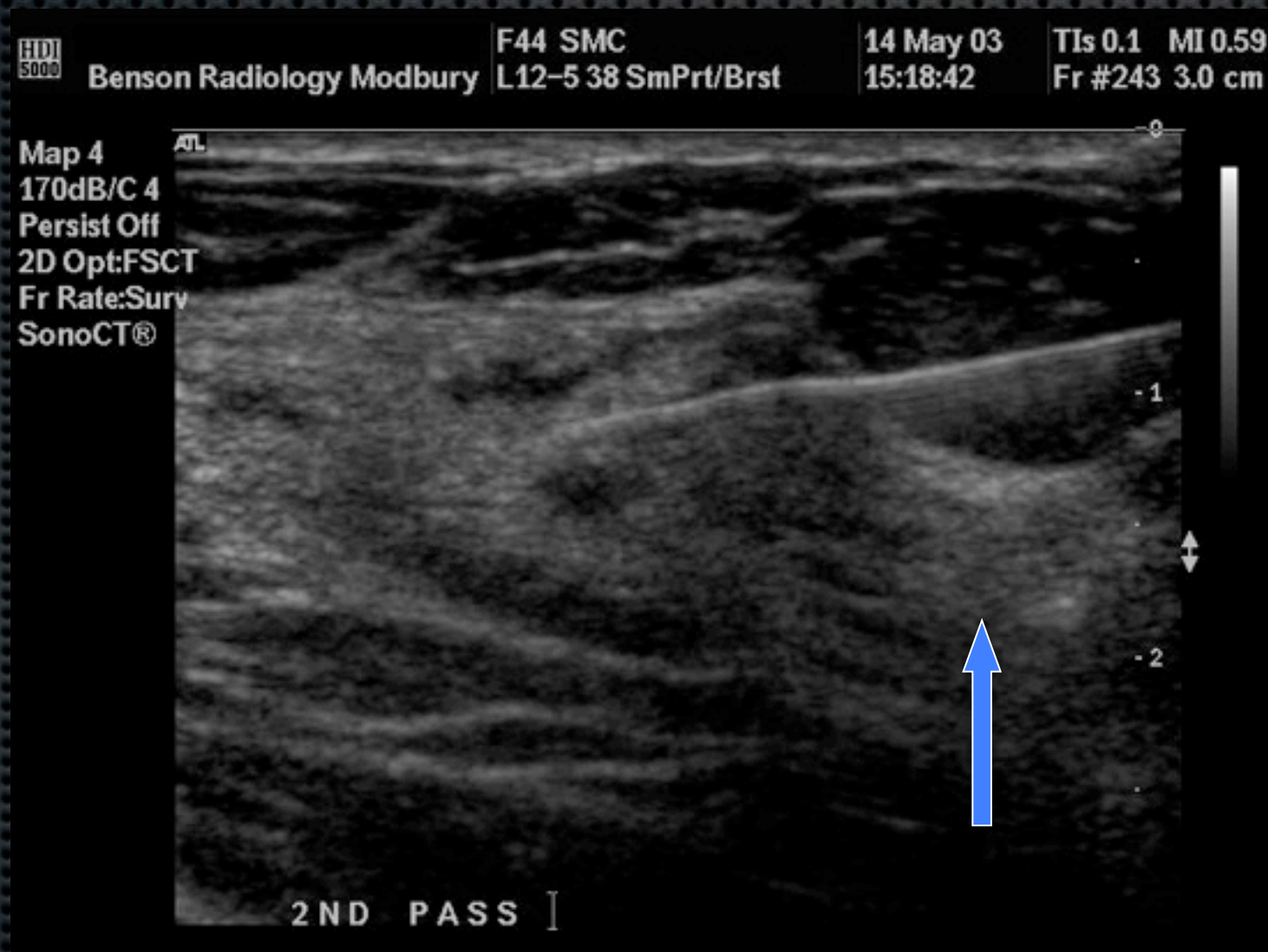


From most angles there seems to be only one calculus in the left VUJ, but when scanning in the midline there at times appears to be two. Explain.

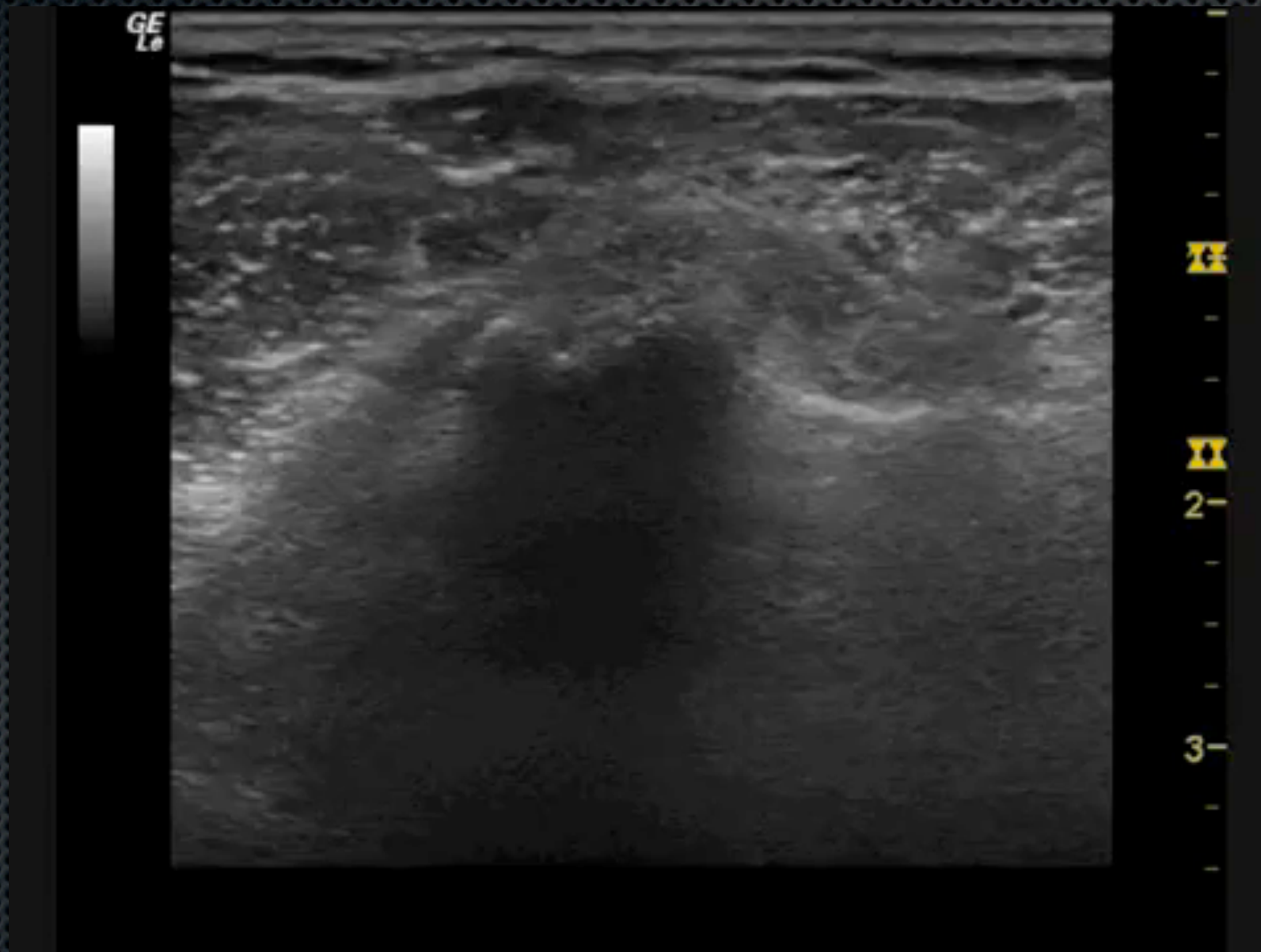
MIDLINE SCAN

Refraction

A subtle but appreciable bend appears to have occurred in the needle as it passes from subcutaneous fat to breast tissue during this FNAB. When the procedure was complete the needle was examined carefully and appeared completely straight.



Needle precision



APPLICATIONS - MSK

- ✦ Trauma - tendon, bony cortex, haematoma
- ✦ Regional pain eg groin
- ✦ Arthritis
- ✦ Imaging guided intervention
- ✦ Masses - cystic vs solid



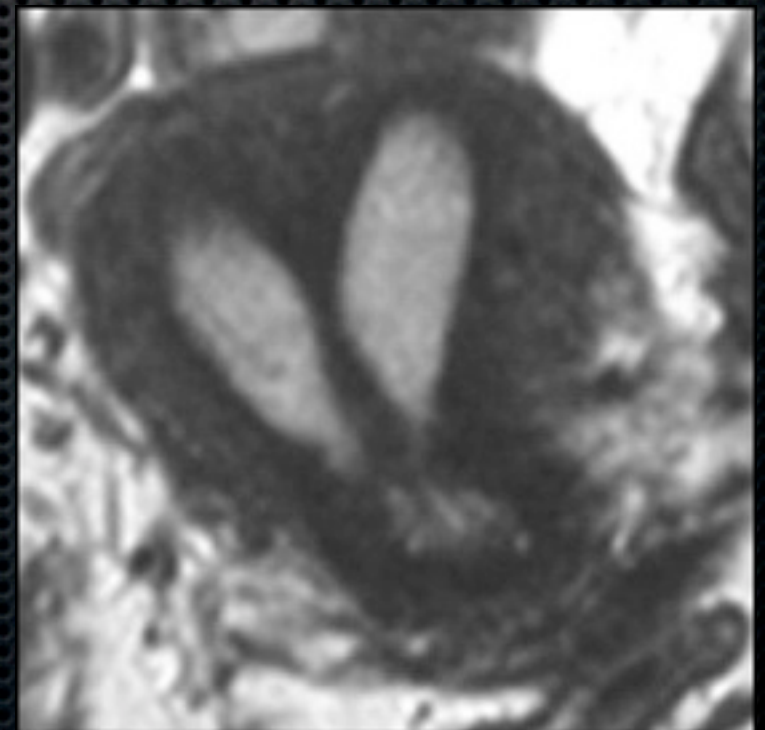
APPLICATIONS - abdomen

- Trauma fluid - fast scanning
- AAA
- Quadrant/flank pain - more advanced



APPLICATIONS - pelvis

- ✦ Pregnancy - first trimester viability
- ✦ Growth & liquor
- ✦ Acute gynaecology



SUMMARY

- ✦ Make a considered investment of time and money
- ✦ Match your ambition to scope of practice
- ✦ Formal training
- ✦ Support networks - vendor, academic, other practitioners
- ✦ Logbook and audit
- ✦ HAVE FUN