

IS THERE A NEED FOR IMPROVED GUIDELINES FOR EARLY PREGNANCY SCANNING

V. Pelling, J. Smith, M. Mills, L. Harris,

Department of Radiological Sciences, Brighton & Sussex University Hospitals NHS Trust, Brighton, UK

Introduction:

Early pregnancy units (EPUs) can operate as independent services provided under a wider umbrella of obstetrics and gynaecology. Ultrasound scanning is undertaken by a range of professionals from specialist trainee to consultant medical grades, midwives and sonographers, largely dependent on availability at the time of presentation of the patient with symptoms. Currently there is no single guidance document encompassing management and image quality optimisation of early pregnancy scanning.

Quality assurance testing of ultrasound scanners is recommended under the guidelines covering some specialisms, but is not conducted universally for all imaging machines, particularly those outside Imaging departments. There are financial pressures to cut costs where there are no regulatory requirements to complete what are seen as non-essential tasks.

Aim:

- To review the quality of service provided at EPUs visited by BSUH NHS Trust Medical Physics staff
- To assess image quality of EPU machines with user reports of performance issues against newly commissioned machines
- To disseminate the possible need for more guidelines at a national level

Material and Methods:

- Retrospective audit of ultrasound service provision at time of previous quality assurance visits to three early pregnancy units
- Routine Medical physics quality assurance testing against contemporary scanners used in imaging department at BSUH NHS Trust, based on tests outlined in IPEM Report 102:

In air testing (recommended for user testing)

- Reverberation/sensitivity
- Noise

ATS 539 phantom

- Low contrast penetration

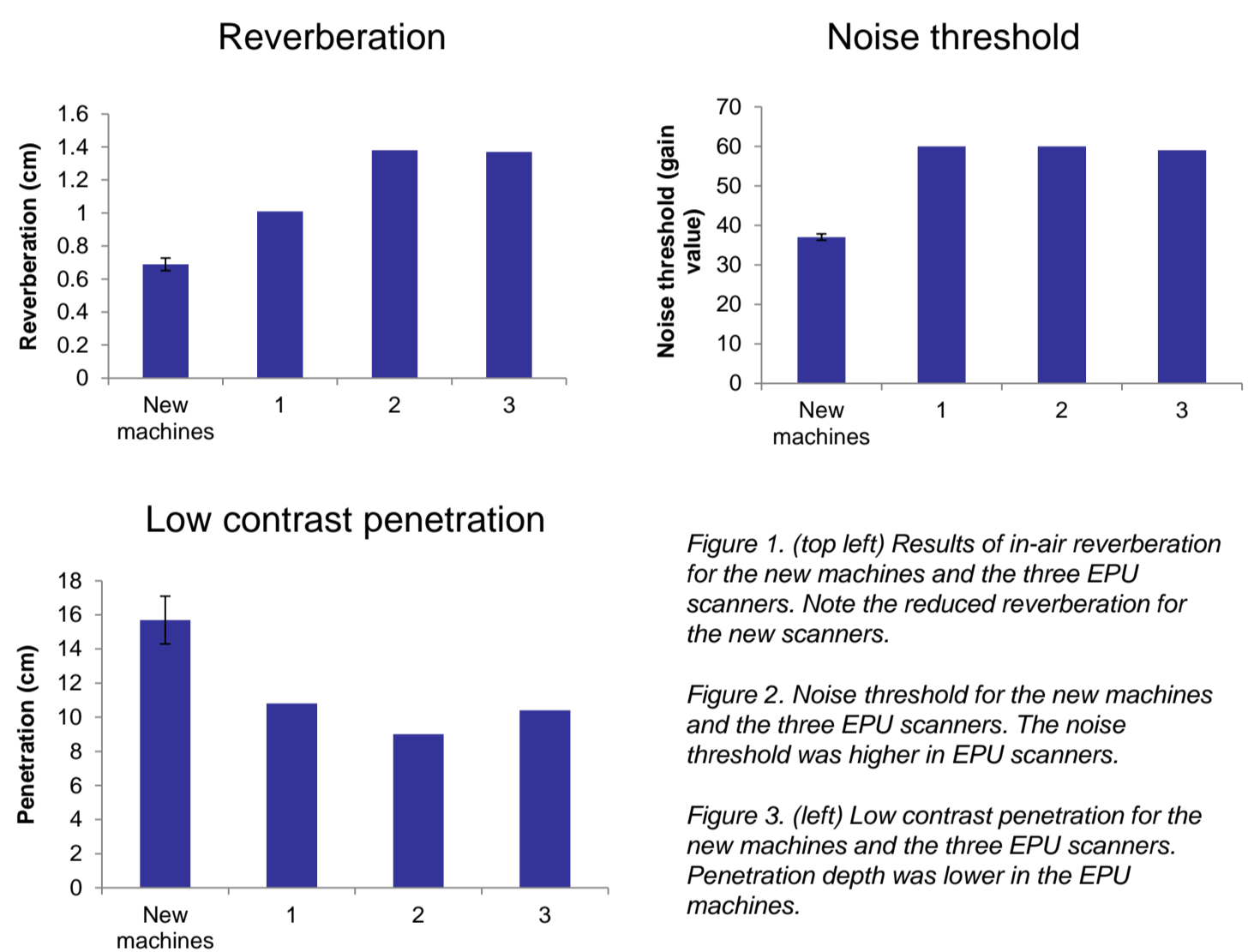
- Testing of all probes used for early pregnancy testing: curvilinear and TV.
- Machines are anonymised as there is no intention to assess absolute machine performance or to assess a particular EPU site.

Results:

Findings of audit:

- EPU machines are lower specification and older than those used in Imaging and other departments: outside RCR guidelines for replacement after 5 years
- No association with imaging department
- Images not all saved to PACS for review or audit
- Incorrect presets on machines, not the same across machines in same unit
- Poor treatment of probes and machines leading to repeat 'element dropout'
- Limited ultrasound expertise in management and lack of management structure for replacement and procurement
- The need for repeat scans due to poor machine performance
- Different levels of user expertise considered to be required to perform adequate scans.
- Quantitative difference in performance parameters

Quality assurance results:



	Reverberation (mm)	Noise	Low contrast penetration (cm)
New machines	6.9±0.5	36±4	5.1±0.6
1	10.3	59	7
2	13.4	64	4.3
3	15.2	56	7.6

Table 1. TV measurements showed higher levels of reverberation and noise threshold in EPU probes compared with those on new machines.

References:

- IPEM report 102: Quality Assurance of Ultrasound Imaging Systems
- Standards for the provision of an ultrasound service. Royal College of Radiologists
- Foetal Anomaly Screening Programme Guidelines
- AEP/RCOG Green-top Guidelines no.21. Diagnosis and management of ectopic pregnancy
- Diagnosing viable intrauterine pregnancy. NICE

Conclusion:

- Differences were shown in easy to evaluate parameters between new and EPU machines, showing the value of regular testing.
- The precise relationship between measurements and performance appears to be complex. Further testing including software based analysis and medical physics could provide a clearer picture of probe performance to assure imaging provision.
- If the small number of departments visits is representative of the national picture there is a need for improved national guidelines for EPU ultrasound provision to include quality assurance testing, knobology training and machine management. Broad guidelines similar to those used in other specialisms (e.g. FASP guidelines) should raise standards of EPU ultrasound scanning.

Please complete a short survey on EPU service provision to help us develop our work:
<https://www.surveymonkey.co.uk/r/BRX5BNG>