BMUS

EXTENDING THE PROVISION OF ULTRASOUND SERVICES IN THE UK

Ultrasound Service Provision in the UK - Summary

In the UK, increasing demand for ultrasound services and inadequate resources have led to long waiting lists with subsequent frustration of hospital clinicians, general practitioners and their patients.

Dangers of Inadequate Service Provision

Several options have been examined to improve patient access to ultrasound services. Amongst these is the provision of ultrasound services outside conventional ultrasound departments. The increasing availability of low cost scanners and the perception that ultrasound is easy to perform encourages this approach, which may appear superficially attractive.

There are, however, several potential problems which may lead to a poor quality diagnostic service with consequent detrimental effects on patient care.

Examinations performed by staff not specifically nor adequately trained in ultrasound scanning and interpretation may be misleading and dangerous to patients.

A high quality ultrasound service is dependent on:

Staffing

- The use of unqualified staff has adverse implications for diagnostic accuracy and potentially significant medico-legal consequences. Ultrasound scans must be performed by qualified, properly trained personnel, to reduce the risk of misdiagnosis.
- Staff must have access to regular continuing professional development.
- There is currently a national shortage of qualified staff,1, 2. Providing ultrasound services outside conventional ultrasound departments such as in out-patient clinics, primary care trusts (PCTs) and diagnostic & treatment centres (DTCs) requires careful consideration. Organisation of a service should make the most effective use of qualified staff.
- Training of additional staff is essential but places additional burdens on clinical departments undertaking it.

Equipment

- Equipment purchased must be suitable for the work required. Equipment must be regularly maintained, serviced and safety checked.
- Facilities for timely replacement of obsolete or inadequate scanners should be in place.
- Equipment usage should be maximised where possible, for cost effectiveness.

Environment

- The scanning room/suite must be suitable for the purpose

Diagnostic Accuracy and Quality Control

- A system should be in place for regularly assessing the quality of the service and ensuring an acceptable level of diagnostic accuracy.
- Protocols should be in place to ensure standards of scanning practice are maintained and should be reviewed regularly to maintain best practice.

Mechanisms

- Must be in place to act appropriately on the results of ultrasound scans and clear lines of onward referral to secondary and tertiary care should be identified and agreed.

Extending Ultrasound Services – Introduction

Background

Over the last 20 years, ultrasound imaging has become a vital diagnostic tool for an increasing number and range of clinical conditions, leading to an ever increasing number of requests from both the primary care sector and from within the hospital setting. Ultrasound services are provided by a variety of hospital departments including Radiology, Obstetrics, Vascular and Cardiology.
The strength of ultrasound imaging lies in its safety, non-invasive nature and comparatively low cost, which supports its use as a vital first line diagnostic test in many different clinical scenarios.
In addition, ultrasound is increasingly contributing to minimally invasive therapy and to more complex diagnostic procedures, increasing diagnostic accuracy and enabling a greater range of treatment options to be offered to patients.

This increase in scan requests has not been matched by resources. Radiology departments in particular are facing a national staffing crisis, and there is a well-documented shortage of both radiologists and sonographer practitioners, with a requirement for almost 25% more posts in order to adequately address current shortages. 1 Vacancy levels as high as 30% have been reported in some departments. 3 Many centres still do not have adequate equipment replacement programmes and large numbers of out-of-date ultrasound scanners are still in service, significantly reducing diagnostic capability (2.)

Demand Management

It is possible to contain increasing demand by more aggressive prioritisation. The removal from lists of scans whose contribution to patient management is arguably minimal (such as screening procedures, or the follow-up of benign disease) has been explored in some institutions.

Such a strategy may potentially free up resources to concentrate on symptomatic and urgent referrals. However, insufficient evidence of the epidemiological effects and consequences for patient management is available at present, and such a course of action, in which established services are withdrawn, is controversial, and unlikely to be readily acceptable to patients or clinicians.

In addition, the resources subsequently made available may not necessarily be transferable to other areas of ultrasound diagnosis. (For example, a reduction in obstetric screening for low-risk women is unlikely to translate into an increase in resources for symptomatic hepatobiliary patients, as the equipment and staff skills required are different.) Justification of ultrasound scan requests in terms

of patient management is essential, and scans should be performed in order to deliver value to the diagnostic and treatment process. Patient benefits should be evident when planning new services.

NHS Capacity

If adequately resourced, NHS hospital departments could increase their capacity for scanning, improving access for hospital and primary care patients. Without adequate resourcing increasing the number of examinations performed is only possible by limiting the scope of scanning protocols. This option would clearly have a negative effect on patient care and may be medico-legally indefensible. (4.)

Current Trends

In many areas, patients requiring ultrasound scans have been subjected to delays, which potentially compromise their treatment. The reaction of some clinicians, including those in the primary care sector, has therefore been to consider ultrasound service provision outside conventional ultrasound departments and there is a general perception that patient access can be significantly improved by providing ultrasound scans in the setting of the GP surgery or hospital outpatient clinics. Calls have been made to formulate a national strategy for the future of ultrasound services. There are a number of issues which must be seriously considered before embarking upon service provision outside conventional departments. (4.)

Issues for Consideration in Delivering / Extending Ultrasound Services

Staff Training & Education

The Need for Training :

The greatest hazard of ultrasound is the misinterpretation of the appearances by poorly trained or untrained operators

Ultrasound diagnosis is highly operator-dependent, and it is essential that operators are properly trained. This applies to both medically and non-medically qualified individuals. There is considerable evidence to support the fact that diagnostic accuracy in ultrasound, and, thus, successful patient management, is directly related to the skill, training and experience of the operator. This has been recognised by the Chief Medical Officer who in his assessment of the safety of diagnostic ultrasound concluded that the greatest risk to patients was from inaccurate interpretation of the image rather than any physical hazard of the ultrasonic field. (4.)

Current Training Systems :

In the UK, post-graduate modular courses are available through 20 universities, accredited and approved by the Consortium for the Accreditation of Sonographic Education (CASE.) These provide suitable training for various areas of ultrasound practice, and include clinical placement for practical training in an approved ultrasound department, with practical assessment to ensure basic competency.

Possible Future Training Options:

The crisis in recruitment and retention of qualified post-graduate practitioners leads to the consideration of training options which may address future developments: Limited or abbreviated training of health care professionals, to perform a basic level of scanning within a narrow range of

applications, would be possible (see below). However, there are no such recognised training programmes at present, and practical training would still be required in the setting of the hospital department. There are also a number of issues around employing this type of practitioner which must first be addressed, including firm guidelines for particular areas of practice, and the standards to be met.

A further option would include undergraduate entry to ultrasound education, dependent upon adequate educational programmes being in place. Any scheme of this nature should aim to produce practitioners of at least equal skill and level of practice to the current system. This may offer school leavers an attractive career option, improving recruitment and attracting further interest, long term funding and planning for the profession. However, the problem of clinical placement still exists – and current hospital departments do not have the facilities to significantly increase their teaching commitments.

Staffing Options for Ultrasound Units outside Main Ultrasound Departments

1. **Using inadequately trained staff is potentiall dangerous, will have a detrimental effect on diagnosis, and is not medico-legally defensible.**

   It is not an option for qualified healthcare professionals of any kind to undertake ultrasound without proper training, due to the clear risk of diagnostic misinterpretation and its subsequent effect on patient management. The European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) has produced Minimum Training Standards for ultrasound practitioners, which endorse the requirement for proper training. (6.)

2. **Staffing Units by using Qualified Staff already Working within the NHS**
   This will
   - remove them from hospital departments, causing further pressures on these services and increasing waiting lists.
   - reduce the flexibility and capacity of hospital departments to deal with major fluctuations in workloads – eg trauma, inpatient scanning and variable demand from primary care.
   - compromise the long-term development of the quality of the ultrasound service as a whole, removing staff from the multidisciplinary team setting.
   - achieve fewer scans overall than can be performed in the setting of a dedicated ultrasound department. (By scanning in remote and small sites ultrasound practitioner time can be wasted in travelling and appointments that are not filled or vacated when patients do not attend cannot be utilised at short notice as they can in a hospital setting.)

3. **Employing Staff from Abroad**
   The concept of DTCs assumes 'additionality' and that the staffing of these units will come from staff bought in from other countries. Whilst this does get around the current staffing crisis in this country the teaching and training of ultrasound varies enormously elsewhere. If this model is pursued then there must be robust mechanisms in place to assess the adequacy of the skills of any such practitioners employed in the PCT/DTC setting.

4. **Training More Staff**

   Usually, CASE accredited training is the required minimum standard for employment of sonographer practitioners within UK NHS Ultrasound Departments. These courses are open to, and accessed by, both medically and non-medically qualified healthcare professionals. NHS Ultrasound Departments provide practical training for these programmes, and clinical placements in busy departments put an additional burden on the service, limiting patient throughput. Departments must find a compromise between maximising the number of trainees whilst maintaining the necessary throughput of patients.

5. **Variation in Levels of Training and Practice**

   In order to ensure basic minimum training standards and address increasing demands, the European Federation accepts that three different levels of scanning practice may be necessary.3 Limited practical training, in conjunction with appropriate theoretical education, might enable a range of clinicians and practitioners to undertake some basic scanning, leaving existing, fully qualified ultrasound practitioners to provide the more complex scanning and specialist procedures.

   Focussed ultrasound training may be applicable to some hospital specialists, such as intensivists and emergency physicians, to utilise ultrasound for very limited purposes such as to detect and drain pleural fluid collections, to obtain vascular access and to detect free fluid within the abdomen. However this will not be applicable in primary care where the range of diagnostic problems is much broader.

   These approaches depend on proper training, but to a more limited extent than current post-graduate diploma courses. It is fair to say, however, that even limited training would present a burden to NHS departments and cannot be currently accommodated without further resources, or without severely compromising the services.

Continuing Professional Development (CPD)

- Staff must have access to continuing professional development, to keep abreast of current techniques and developments, and to renew and extend their skills. This must be taken into account when planning a service.
- There must be regular appraisal and quality assurance to ensure that those practising ultrasound see an adequate number of patients and pathologies to maintain clinical standards. This can be very difficult in small ultrasound clinics.

Health & Safety

- The employer must be aware of the regulations governing health & safety for staff.
- Attention must be paid to providing an ergonomically suitable environment in which to scan. Work related musculo-skeletal disorder (WRMSD) has been found to affect up to 80% of sonographer practitioners. (7.)
- Where staff work extended hours to maximise the utilisation of equipment for evening and weekend sessions, care should be taken that working patterns fall within the European Working Time Directive.

Equipment

- Equipment purchased must be adequate for the intended purpose, and should have the required image quality and functionality. It should be born in mind that less expensive equipment has a limited performance in comparison to the higher-end more expensive technology, and patients may subsequently require referral for further diagnostic investigations to hospital departments if poor quality equipment is used.
- Equipment must be regularly safety-tested for patient and staff protection. Adequate cleaning and disinfection protocols should be put in place.
- Equipment must be regularly maintained, in line with the manufacturer's recommendations. A programme of regular equipment checks should be performed.
- Old equipment and equipment with inadequate image resolution or functionality for the examinations performed should be promptly replaced.
- Accessory equipment, such as examination couches and scanning stools must be of appropriate safety standard and ergonomic design to prevent injury. (8.)
- Utilising available equipment within NHS hospital departments to its maximum potential, by scanning during evenings and weekends, may often be more cost effective than purchasing new equipment for location in other, peripheral units, where it may be under-utilised. However, extended use of equipment requires more frequent maintenance and replacement, and is also dependent upon additional qualified staff to utilise it properly.

Environment

- A private room should be provided for scanning procedures.
- The room should be dark, with no natural light entry, and dimmer switch lighting.
- The room may need to be air conditioned due to heat production from the scanning equipment.
- A chaperone should always be available, particularly bearing in mind that a significant proportion of scans are performed for gynaecological and urological reasons and these often necessitate the use of intimate examinations and intracavitary probes.
- Planning should take account of provision for disabled patients, the proximity of toilet facilities and adequate waiting & recovery areas.

Diagnostic Accuracy and Quality Control

- A mechanism of audit/quality control to ensure patients continue to receive the expected level of diagnostic accuracy should be in place, with regular checks on the service quality. 9 It is important to validate the diagnostic accuracy of ultrasound in the Primary Care setting, and this is likely to require the involvement of hospital departments.
- An independent operator routinely working in isolation, without the benefit of audit, feedback or the ability to discuss cases and technological advances with colleagues, may not be able to sustain an adequate standard of good practice.
- Scanning protocols/ schemes of work should be in place to ensure best practice. (10.)

Conclusion

Increasing the capacity of hospital ultrasound departments to accommodate increasing demand requires appropriate additional resources. There are significant advantages to utilising already established hospital departments, in terms of equipment, staffing and quality issues.

Staffing ultrasound services outside conventional ultrasound departments by:

- Using inadequately trained staff,
- Using existing qualified hospital staff or
- Putting pressure on hospital departments to train more staff (which will impact negatively on already busy departments)

are unacceptable options which will have a highly negative effect on patient care.

The quality of service provided must be closely monitored and adequate standards maintained. The ideal model for the provision of ultrasound outside main ultrasound departments is the 'hub and spoke' model, whereby staff working in peripheral units are part of a central hospital team. This allows experienced support to be available to them, allows appropriate onward referral for other imaging, or to appropriate clinicians, and also provides a mechanism for maintaining adequate standards.

An alternative way of ensuring high clinical standards is the use of teleimaging, which allows a practitioner scanning in isolation direct access to a second opinion from the base department. If ultrasound scanning is to be undertaken outside conventional departments then it should ideally take place in units with a sufficiently large critical mass to ensure adequate quality control and to minimise under-utilisation of staff and equipment which may occur in isolated or single-handed units.

'Level One' Scanning is an option which may contribute to a solution to the crisis, providing a basic level of primary care service, and also freeing up extra resources within hospital departments in the long term. However, this level of basic scanning is unlikely to be of significant value in general practice, which requires a broad-based approach to recognise a range of pathologies and ultrasound appearances.

Providing a scanning service of this nature would be dependent upon:

- Adequate training – (which is not currently available in any recognised or audited way)
- The ability of operators to recognise their limitations
- A clear mechanism in place for referral of patients for further imaging or investigation
- A robust audit/ quality control system to monitor diagnostic accuracy A robust audit/ quality control system to monitor diagnostic accuracy

Even limited practical training of this nature has implications for the existing service, and it is clear that further resources must be employed in order to progress any strategy of this kind.

The current system in the UK of providing ultrasound services with properly qualified post-graduate sonographer practitioners and medical practitioners is highly successful in terms of diagnostic accuracy and acceptability, making the crisis in sonographer and radiologist recruitment of particular concern. In the long term, sonographer numbers can only be maintained and improved if attractive

working conditions and career structure are provided. Even so, the capacity of hospital departments to train more practitioners is already severely limited, and cannot be significantly expanded without proper resources and long term planning.

September 2003

Jane Bates, Colin Deane, David Lindsell

REFERENCES

1. Modernising the Clinical Ultrasound Service. South West London Workforce Development Confederation. Southbank University, Faculty of Health. 2003
2. Audit Commission Report – Radiology, August 2002
3. Diagnostic Imaging Services – Barnet & Chase Farm Hospitals NHS Trust. Commission for Health Improvement, November 2002.
4. Bates JA. The Troubled future of ultrasound in Primary Care. National Association of Primary Care Review, 75 – 77, 2003
5. Safe Use of Diagnostic Ultrasound – CMO's Update. November 1994
6. Minimum Training Requirements for the Practice of Medical Ultrasound in Europe. EFSUMB Educational & Professional Standards Committee, January 2003
7. Society of Radiographers. The causes of muskuloskeletal injury amongst sonographers in the UK. SoR, London: 2002
8. Industry Standards for the Prevention of Work Related Musculoskeletal Disorders in Sonography. Society of Diagnostic Medial Sonography, Texas, May 2003
9. Dubbins PA. Ultrasound in Primary Care, Optimising Management. National Association of Primary Care Review, 79 – 81, 2003
10. UKAS. Guidelines for Professional Working Practice. UKAS, London. 1996.