THE SOCIETY FOR VASCULAR TECHNOLOGY OF GREAT BRITAIN AND IRELAND

Professional Performance Guideline

Vascular Ultrasound Service Specifications

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Suggestions for improvement of this guideline are welcome and should be sent to the Chair of the PSC
see www.svtgbi.org.uk for current Chair details.

1. EQUIPMENT

Specification

Duplex Doppler ultrasound machine with a wide range of probes should be available, with colour and power Doppler capability.

Linear and curvilinear transducers should be available. A selection of probes should be available which are appropriate for the required examination, and also ensure adequate assessment of a range of patients (e.g. body habitus). Higher frequency transducers will be required for some examinations such as those involving assessment of the temporal artery, and where high resolution is required for B-mode measurements. There should be facilities to record images/measurements.[1] The Royal College of Radiologists (RCR) has more detailed technical standards for ultrasound equipment.[2]

The Joint Working Group gave recommendations for equipment specification, and in particular on the need for ultrasound scanners to be capable of making accurate velocity measurements[3]. It should be noted that a range of relatively low-cost portable scanners are now available, not all of which will be suitable for vascular work. It is important that the duplex scanner is of ergonomic design to minimise the risk of operator work related musculoskeletal disorders,[4] as explained in the health and safety section.

ABPI and Pre - Post Exercise ABPI (Exercise Test): Equipment

A hand held continuous wave (CW) Doppler unit is required [5,6], which has a pencil probe of nominal frequency 8MHz, although a lower frequency probe may be helpful for patients who have oedematous legs. Headphones may also be helpful.

For resting ABPI, use a sphygmomanometer with a dial gauge, and a blood pressure cuff that measures at least 20% wider than the diameter of the limb.[7] For an exercise test, a treadmill can be used if available.

The examination couch should be height and tilt adjustable, ideally with electronic controls for both functions to minimise manual handling risks to staff.

Maintenance

Electrical safety testing is required annually, with regular maintenance and quality assurance tested to a specified level by qualified personnel in accordance with manufacturer's recommendations. There should be processes for review of equipment typically between 4 and 6 years after installation [2] with plans for timely replacement depending on usage and assessment of diagnostic quality [8] .Further information is available from the British Medical Ultrasound Society (BMUS): 'Extending the provision of ultrasound services in the UK.'[9]

Quality Assurance (QA) and Calibration

QA procedures should be in place to ensure a consistent and acceptable level of performance of all modes of the duplex scanner [2 10]. Such procedures require participation by service users and may include the involvement of Medical Physics Departments and service engineers.

Detailed guidance on QA of imaging modes of duplex scanners is contained in the Institute of Physics and Engineering in Medicine (IPEM) Quality Assurance of Ultrasound Imaging Systems report 102.[11] The IPEM report 70 'Testing of Doppler Ultrasound Equipment' contains extensive information relating to performance testing of the pulsed and colour Doppler modes of duplex scanners.[12]

Further general guidance is available in the joint Society and College of Radiographers and British Medical Ultrasound Society document 'Guidelines for Professional Ultrasound practice.'[13]

Infection control

The UK Health Security Agency has issued guidance on the use of ultrasound gel in relation to good infection control practice [15] The principles contained within this guidance should inform local infection control policies . BMUS[9] advises users to refer to manufacturer's instructions for cleaning and disinfecting transducers, and general equipment care.

It should be noted ultrasound probes can be damaged by some cleaning agents, and so manufacturer's specifications should always be followed. Sterile ultrasound gel and sheaths should be available and used in appropriate cases. Where there is open ulcers the ulcerated area should be covered with cling film to prevent contamination of equipment.

Accessory equipment

Examination couches and scanning stools must be of an appropriate safety standard and ergonomic design to prevent injury. Particular consideration should be given to reducing the risk of operator work related musculoskeletal disorders.[4]

2. PATIENT

Information and consent

There is no legal requirement for written patient consent to be obtained prior to a vascular ultrasound scan. However, patients should be fully informed about the nature and conduct of the examination so they can provide verbal consent. It is desirable for this information to be provided in written format, prior to their attendance.[16] This information should also be verbally explained to the patient when they attend for the investigation.

The Circulation Foundation produces leaflets that provide further information to patients: www.circulationfoundation.org.uk.

Explanation of Examination and Patient History

The CVS undertaking the examination should introduce themselves, confirm the patient's identity according to local policy (*e.g.* full name and date of birth), and explain the procedure, why it is being performed and its duration. Consideration should be made to the patient's age and mental status, and consent for the examination should be obtained. Local policies should include guidance for staff in cases where the patient is unable to provide consent, and follow the principles of the Mental Capacity Act https://www.nhs.uk/conditions/social-care-and-support-guide/making-decisions-for-someone-else/mental-capacity-act/

Relevant medical history should be taken and suitability for the examination assessed. When appropriate, a limited physical exam relevant to the diagnostic scan may be undertaken. Consideration of risk factors, and results from other relevant diagnostic tests may also be helpful. Prior to starting the ultrasound scan, the CVS should verify the requested procedure correlates with the patient's clinical presentation. Depending on the examination been undertaken, it may be necessary to offer a chaperone.[17] During the examination the CVS should monitor the patient's mental and physical status and modify the examination accordingly.

Clinical history

The referral for the investigation should contain relevant clinical history. This information should be verified and clarified for discrepancy. This should include any history of previous intervention. The nature and duration of symptoms should be established, and relevant risk factors established.

Preparation

Please refer to Professional Performance Guidelines for each diagnostic exam https://www.svtgbi.org.uk/professional-issues/.

Image Storage and Reporting:

An appropriate number of annotated images should be taken and stored, in accordance with local protocols. Stored images should represent the entire examination and will ideally be available on a Trust wide storage system such as PACS. Further explanation and guidance is given in section four of the Guidelines for Professional Ultrasound Practice document[13] and SVT image storage guidelines.[1]

The report is a record of observations and interpretations made during the duplex ultrasound examination. It should be written, signed and dated by the CVS undertaking the examination and viewed as integral to the whole examination.[18] There are no specific recommendations for the structure and content of reports for vascular ultrasound scans, but many referrers find a pictorial report with written conclusions helpful.

Where a computer-generated reporting system is used, the local verification and authorisation procedure should be followed. Report release should be appropriate to clinical urgency and locally documented requirements. There should be arrangements in place for report amendment and escalation of clinically urgent findings.

For more specific guidelines regarding examination technique and reporting, please see individual professional performance guidelines.

3. ENVIRONMENT

The environment in which ultrasound scanners are used can have a profound effect on the efficiency of a service. A private room is preferable to carry out the scan, although it may be possible to use a curtained area in a larger multi-scan bay unit, if provision is made to ensure privacy for each patient. On occasion, scans may need to be carried out in other localities eg. in theatre, theatre recovery or at the patient's bedside. These scans may be limited due to poor environmental conditions, are time-inefficient, pose additional ergonomic risks for the operator and should be minimised where possible.

Room size should be compatible with the needs of immobile patients, with sufficient room for the safe transfer of these patients to the examination couch. Door width should enable bed patients to be brought into the examination room where this is required. Vascular ultrasound scans often require the ultrasound machine to be moved to different positions in relation to the patient/couch and the environment should allow for this requirement.

Room lighting should be dimmable to ensure reflections do not interfere with the operator's view of the screen, and air-conditioning is recommended to prevent excessive temperatures. Operators can seek advice from ultrasound manufacturer's regarding exact requirements. Sufficient electrical power sockets are needed to support the demands of the scanner, couch, IT equipment and any accessories. Socket positions should be carefully planned to prevent trailing leads. Image storage and reporting on PACS or a similar system is recommended, IT provision should be compatible with efficient use of such systems, for example, dual monitors on computer workstations.

ENVIRONMENT for Pre and Post Exercise ABPI (Exercise Test):

ABPIs may be carried out in primary care, including in a patient's own home. A quiet room/area is required to ensure the patient is as relaxed as possible, and there should be the facility to ensure the patient can lie flat to minimize any measurement errors due to differences in height of the limbs. This will help reduce fluctuations in blood pressure. If the room is too cold, arteries may constrict and be difficult to locate.

If an exercise test is to be carried out, the environment should be suitable and risk factors should have been assessed. It is essential that an emergency call system is in place and is easily accessible.

All equipment should be purchased with consideration for infection control requirements and should easily be cleaned and disinfected. Facilities for timely replacement, regular servicing, maintenance and safety checking should be in place.

The ability to minimise ergonomic risks should also inform ultrasound scanner, couch and seat/stool purchasing decisions. The maximum weight of the couch should be clearly displayed and consideration should be given to the provision of tilting couches for some vascular scans.

Further general guidance on the environment is given in the following documents: "Extending the provision of ultrasound services in the UK"[9]; "Guidelines for Professional Ultrasound Practice"[13] and "Standards for the provision of an ultrasound service." [2]

4. PROCEDURE, INTERPRETATION and REPORT

For detailed information on PROCEEDURE, INTERPRETATION and REPORT please refer to Professional Performance guidelines https://www.svtgbi.org.uk/professional-issues/

5. WORKFORCE

It is well recognised that ultrasound diagnosis is highly operator dependent. It is essential that the workforce has the appropriate knowledge and competence. This is achieved by ensuring the workforce has followed recognised education and training routes. This applies to both medically and non-medically qualified individuals.

Education and training requirements
All staff performing and reporting investigations should have successfully completed one of the following education and training routes:

1. Full SVT accreditation (Accredited Vascular Scientist) http://www.svtgbi.org.uk/education

2. Post graduate qualification in ultrasound imaging from a Consortium for Accreditation of Sonographic Education (CASE) accredited course, with successful completion of a vascular module that included clinical competence in the relevant ultrasound modality. A list of CASE accredited courses can be found at http://www.case-uk.org/

3. Medical staff should have successfully followed the RCR recommendations for training in vascular scanning to level 2 competence in the relevant ultrasound modality BFCR(17)3 https://www.rcr.ac.uk/publication/ultrasound-training-recommendations-medical-and-surgical-specialties-third-edition

4. Completion of the NHS Scientist Training Programme specialising in Vascular Science and statutory registration as a Clinical Scientist with the Health and Care Professions Council (HCPC.) http://www.nshcs.hee.nhs.uk/join-programme/nhs-scientist-training-programme

It is recommended staff perform local competence reviews, and are involved in audit (both peer audit and results) to maintain high standards.
https://www.bmus.org/static/uploads/resources/Peer_Review_Audit_Tool_wFYQwtA.pdf)

6. Regulation

It is important both staff and employers are aware that although ultrasonography is not currently a regulated profession, there is a move towards future statutory regulation of all healthcare science groups. Current statutory or voluntary registration includes:

(i) Registered on the SVT Register of Accredited Vascular Scientists https://www.svtgbi.org.uk/avs-search/
(ii) UK Registered Physicians on the General Medical Council (GMC) Specialist Register http://www.gmc-uk.org/doctors/register/LRMP.asp
(iii) Registered Clinical Scientist (Vascular) with Health and Care Professions Council (HCPC) http://www.hpc-uk.org/check/
(iv) the Register of Clinical Technologists http://therct.org.uk/
(iv) Registered with the Academy of HealthCare Science. https://www.ahcs.ac.uk/patients-public/the-register-and-regulation/search-the-register/

Maintaining competence
It is important that scanning competence is maintained, together with CPD activities, by all personnel performing these investigations. Criteria for ensuring continuing competence are set by professional bodies.

Continuing Professional Development (CPD)
Staff must undertake CPD to keep abreast of current techniques and developments, and to renew or extend their skills.

I. SVT accredited sonographers must maintain their accreditation by meeting the CPD requirements of the SVT: https://www.svtgbi.org.uk/education/maintaining-avs-registration/

II. Staff with a post graduate qualification in ultrasound imaging should meet the CPD requirements for SCoR registration: http://www.sor.org/learning/document-library/continuing-professional-development-professional-and-regulatory-requirements

III. Medical staff should follow the requirements required for maintaining their skills, as well as the need to include ultrasound in their ongoing CME: https://www.rcr.ac.uk/clinical-radiology/cpd-scheme

IV. Clinical Scientists should meet the CPD requirements to maintain HCPC registration. https://www.hcpc-uk.org/cpd/

7. AUDIT, SAFETY & QA

Safety
The provider should be aware of the guidelines for the safe use of ultrasound equipment produced by the Safety Group of BMUS. In particular, they should be aware of ultrasound safety precautions related to vascular scanning. All staff should be aware of local safety rules and resuscitation procedures.

Sonographers are at risk of work related musculoskeletal disorders. To minimise this risk the ultrasound machine and its control panel, the examination couch and scanning stool must be of appropriate safety standard and ergonomic design.

The published document by the Society of Radiographers (SCoR) 'Prevention of Work Related Musculoskeletal Disorders in Sonography'[4] gives clear guidance on this issue as well as 'Guidelines for Professional Working Standards Ultrasound Practice.'[13]

QA and Audit
There are no specific requirements, but a mechanism of audit/quality control to ensure patients continue to receive high level of diagnostic accuracy should be in place [9 13]. QA and audit programs should cover:

- Equipment performance
- Patient service
- Quality of investigation.

8. WEBSITES:
www.rcr.ac.uk
www.bmus.org
www.svtgbi.org.uk
www.svunet.org
www.case-uk.org
www.ipem.ac.uk
https://www.hcpc-uk.org/ www.rcplondon.ac.uk
www.vascularsociety.org.uk
www.circulationfoundation.org.uk
www.sor.org
www.nice.org.uk

9. References:

1. SVT Guidance on Image Storage and use, for the vascular ultrasound scans 2012.https://www.svtgbi.org.uk/professional-issues/

2. Standards for the Provision of an Ultrasound Service' Royal College of Radiologists 2017 https://www.rcr.ac.uk/publication/standards-provision-ultrasound-service

3. Joint recommendations for reporting carotid ultrasound investigations in the United Kingdom' Oates CP et al Eur J Vasc Endovasc Surg 2009 37: 251-261. https://www.ejves.com/action/showPdf?pii=S1078-5884%2808%2900552-2

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5. NICE guideline Lower Limb Arterial Disease Diagnosis and Management: https://www.nice.org.uk/guidance/cg147

6. Introduction to Vascular Ultrasonography Zwiebel Pellerito Fifth Edition 2005 Chapter 5 Nonimaging Physiological Test for Assessment Lower Extremity Arterial Occlusive Disease

7. Ward et Al. Blood pressure measurement, Continuing Education in Anaesthesia Critical Care & Pain, Volume 7, Issue 4, 1 August 2007, Pages 122–126 https://academic.oup.com/bjaed/article/7/4/122/466759

8. Renewal of Radiology Equipment. European Society of Radiology. Insights Imaging 2014 5:543-546 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4195838/pdf/13244_2014_Article_345.pdf

9. Extending the provision of ultrasound services in the UK' BMUS 2003 https://www.bmus.org/static/uploads/resources/EXTENDING_THE_PROVISION_OF_ULTRASOUND_SERVICES_IN_THE_UK.pdf

10. BMUS guidelines for the regular quality assurance testing of ultrasound scanners by sonographers. Dudley N et al 2014 Ultrasound 22:8-14 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4760519/pdf/10.1177_1742271X13511805.pdf

11. Quality Assurance of Ultrasound Imaging Systems' IPEM report 102 2010 https://www.ipem.ac.uk/resources/books/report-102-quality-assurance-of-ultrasound-imaging-systems/

12. Testing of Doppler Ultrasound Equipment' IPEM report 70 1994

13. Guidelines for Professional Ultrasound Practice. SCoR and BMUS 2019 https://www.sor.org/getmedia/00882406-9321-4b7d-b565-47262c2467de/2020.1.19_scor_bmus_guidelines_-.pdf_2

14. Vascular Technology Professional Performance Guidelines Ankle Brachial Pressure Index Assessment (ABPI): Resting and Post Exercise. The Society for Vascular Technology of Great Britain and Ireland https://www.svtgbi.org.uk/professional-issues/

15. Good Infection Prevention Practice: Using ultrasound gel. UK Health Security Agency https://www.gov.uk/government/publications/ultrasound-gel-good-infection-prevention-practice/good-infection-prevention-practice-using-ultrasound-gel

16. Improving Quality in Physiological Sciences (IQIPS) Standards and Criteria https://www.ukas.com/accreditation/standards/iqips/

17. Society for Vascular Technology Professional Standards Committee Chaperone Guidelines April 2012 www.svtgbi.org.uk

18. Society and College of Radiographers and British Medical Ultrasound Society: Guidelines for professional ultrasound practice 2016 https://www.sor.org/learning/document-library

SVT Professional Standards Committee November 2022