



Vascular Technology Professional Performance Guidelines

Upper Limb Arterial Duplex Ultrasound Examination

This guideline was prepared by the Professional Standards Committee (PSC) of the Society for Vascular Technology (SVT) as a template to aid the clinical vascular scientist/vascular sonographer and other interested parties. This guideline may be used in part or in its entirety with suitable additions made by local policy implementers.

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.

Purpose

Duplex ultrasound examination is used to assess the arteries of the upper limb (Brachiocephalic/Subclavian to palmar arch) to determine the location and severity of vascular disease (occlusive and aneurysmal).

Common Indications

Common indications for the performance of this examination include:

- Exercise induced pain, ischemic rest pain, gangrene or ulceration
- Post surgical intervention follow-up e.g. angioplasty
- ?aneurysm
- ?false aneurysm
- Assessment of arterial trauma.

Contraindications and Limitations

Contraindications for upper limb arterial duplex ultrasound assessment are unlikely; however, some limitations exist and may include the following:

- Obesity
- Casts, dressings, open wounds etc.
- Patients who are unable to cooperate due to reduced cognitive functions e.g. Alzheimer's or dementia and through involuntary movements
- Bone; A short segment of the subclavian artery cannot be examined as it moves under the clavicle.
- IV or catheters that limit visualisation of vessels.

Equipment:

Duplex Doppler ultrasound machine with imaging frequencies of 3.5MHz and greater; with both linear and curvilinear transducers available. Doppler frequencies of at least 3.0MHz should be available, with colour Doppler capability.

Compliance with the Medical Devices Directive is necessary. Electrical safety testing is required annually, with regular maintenance and quality assurance testing to specified level by qualified personnel. Review of in-service equipment should typically be undertaken four - six years after installation¹.

Examination couch should be height adjustable preferably electrical. The CVS's chair should provide good lumbar support, be height adjustable and allow for the CVS to move close to the examination couch²³.

The examination room should be temperature controlled with adjustable lighting levels suitable for examination⁵.

Explanation of examination and patient history:

The CVS undertaking the examination should:

- introduce themselves
- confirm the patient's identity e.g. full name and date of birth
- explain why the examination is being performed
- give an explanation of the procedure and its duration – consideration should be made to the age and mental status of the patient
- obtain verbal consent for the examination
- obtain a pertinent relevant medical history from the patient and/or notes
 - Presence of risk factors
 - Smoking
 - Hypercholesterolemia
 - Hypertension
 - Diabetes
 - Results of other relevant diagnostics & previous vascular studies

Examination:

The examination may be unilateral or bilateral dependent upon clinical symptoms and departmental policy.

The patient is asked to remove their clothing to expose the upper limb wrist to neck. The patient can be examined supine or in an upright position sat in a chair.

The patient's dignity and privacy should be maintained at all times. Due to intimate nature of the examination it may be considered necessary to offer a chaperone⁴

During the examination the patient's mental and physical status should be monitored and modifications made to the examination accordingly.

The following appropriate techniques should be used to evaluate the upper limb arterial system:

- B-mode should be used to image the artery and assess for, aneurysmal dilation and vessel contents e.g. atheromatous plaque

- Spectral Doppler should be used to determine direction of flow, stenotic flow and absence of flow
- Colour Doppler should be used to assess for the presence/absence of flow and aid the position of spectral Doppler when quantifying stenoses.

Evaluation of the following arteries should be included:

- Brachiocephalic Artery (Right)
- Subclavian Artery
- Axillary Artery
- Brachial Artery
- Radial Artery
- Ulnar Artery

Reporting:

The report is a recording and interpretation of observations made during the lower limb arterial duplex ultrasound examination; it should be written by the CVS undertaking the examination and viewed as an integral part of the whole examination⁵.

The report should include correct patient demographics; date of examination; examination type and the name and status of the CVS.

The reporting should include:

- Which arteries have been assessed commenting on the presence/absence of flow
- The anatomical position and length of any occlusions or stenosis e.g. x cm in length starting y cm above the elbow
- The anatomical position and size of any aneurysms
- Any limitations e.g. difficult examination due to body habitus
- An appropriate number of annotated images that represent the entire ultrasound examination - in accordance with local protocols and SVT Image Storage Guidelines⁵

Ensure appropriate efficient referral of critical ultrasound results to the referring consultant are made prior to the patient being discharged so treatment plans can be enforced or expedited accordingly.

RESOURCES:

Society for Vascular Ultrasound Vascular Technology Professional Performance Guidelines Upper Limb Arterial Duplex Evaluation 2011 www.svunet.org

American Institute of Ultrasound in Medicine Practice Guideline for the Performance of Peripheral Arterial Ultrasound Examinations Using Color and Spectral Doppler Imaging 2010 www.aium.org

Australasian Society for Ultrasound in Medicine Policies and Statements D15 Peripheral Arterial Ultrasound 2007 www.asum.com.au

REFERENCES:

¹ Standards for Ultrasound Equipment Royal College of Radiologists, February 2005 www.rcr.ac.uk

² Guidelines for Professional Working Standards Ultrasound Practice United Kingdom Association of Sonographers (UKAS) October 2008 www.sor.org/learning/document-library

³ The Causes of Musculoskeletal Injury Amongst Sonographers in the UK Society of Radiographers, June 2002 www.sor.org/learning/document-library

⁴ Society for Vascular Technology Professional Standards Committee Chaperone Guidelines April 2012 www.svtgbi.org.uk

⁵ Society for Vascular Technology Professional Standards Committee Image Storage Guideline April 2012 www.svtgbi.org.uk

