

**Certificate in Clinician Performed Ultrasound
(CCPU)
Syllabus**

Vascular Access (venous (peripheral and central) and arterial)

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Vascular Access (venous (peripheral and central) and arterial) Syllabus

Purpose

This unit is designed to cover the theoretical and practical curriculum for the procedural use of ultrasound for the purpose of securing peripheral vascular access, both venous and arterial. It also covers the principles of using ultrasound to guide central venous access.

Prerequisites

Learners should have completed the Applied Physics in Ultrasound unit.

Prior to this course, practitioners are expected to know the specific details, indications and contraindications for the range of procedures that they perform. This should include aseptic technique and use of the various cannulation equipment, including the Seldinger technique.

Please note that separate modules exist for pleural aspiration and hepatic procedures.

Course Objectives

On completing this course learners should be able to demonstrate:

- A greater understanding of the ultrasound techniques and physical principles of peripheral and central venous access, and of arterial access.
- Proficiency in image optimisation in order to enable appropriate procedural guidance.
- An understanding of the anatomy (and common variations) of the following structures, including their relationships to adjacent structures and surface anatomy:

Veins of the upper limb including:

- Brachial veins
- Basilic vein
- Cephalic vein

Arteries of the upper limb including:

- Brachial artery
- Radial artery
- Ulnar artery

Nerves of the upper limb including:

- Radial nerve
- Ulnar nerve
- Median nerve

Structures in the neck including:

- Internal and external jugular veins
- Carotid arteries
- Thyroid
- Trachea
- Strap and sternocleidomastoid muscles

Structures in the femoral triangle including:

- Femoral nerve
- Common femoral artery
- Common femoral vein
- Long saphenous vein

Structures in the subclavian region including:

- Subclavian and axillary veins
- Subclavian and axillary arteries
- Pleural surface
- Ribs
- Clavicle

The ability to image the above vessels in transverse and longitudinal planes using:

- B-mode compression US
- Colour Doppler US

Understanding of the sonographic characteristics of peripheral veins and arteries in various physiological states including:

- Normal
- Tourniquetted limb
- Hypovolaemic patient
- Hypotensive patient
- Venous thrombosis

Understand the sonographic appearance of a needle in:

- Transverse view
- Longitudinal view

Have the technical understanding and ability to guide a needle under real-time ultrasound guidance into a target vessel using:

- In-plane technique

- Out-of-plane technique

Course Content

The course will present learners with the following material:

Anatomy

As described above

Ultrasound techniques and physical principles

- Linear probe and scanner settings
- Preset, depth, frequency, focus, gain
- Important artefacts including relevant examples
- Reverberation artefact
- Long path
- Between skin and horizontal fascial planes
- Short path
- Comet tail deep to needle
- Beam width artefact
- Either side of needle
- Slice thickness artefact
- Vein in longitudinal with needle outside vessel but appearing within

Preparation for the procedure

- Equipment including:
- Sterile probe covers (and how to apply them)
- Aseptic technique
- Local anaesthesia
- Variety of longer cannulae (to reach and cannulate deeper targets)
- Patient, operator, machine and equipment position
- Patient comfortable and in appropriate position for procedure being performed
- Limb rotated and supported so target vessel is at 12 o'clock with no important structures either directly superficial, or directly deep to the vessel
- Operator comfortable, usually seated
- Operator, target and US screen should be in a straight line - screen will often need to be on other side of patient.
- All equipment within reach and readily accessible
- Optimise vessel appearance / size with tourniquette (for vein)
- Perform preliminary scan to determine optimal target / site for attempt

Technical skills

- Aseptic technique
- Administration of local anaesthetic
- Decide on in-plane or out-of-plane technique
- Optimise image of vessel
- Optimise image of needle
- Hit target with needle and perform cannulation
- Confirm correct position

Limitations and Pitfalls:

- Patient body habitus
- Variable anatomy
- Avoiding adjacent structures
- Losing (and finding) the needle in both in-plane and out-of plane techniques
- When to abandon peripheral venous access and move to central venous access (or PICC line)

Training

- Recognised through attendance at an ASUM accredited Vascular Access course. (Please see the website for accredited providers)
- Evidence of the satisfactory completion of training course is required for unit award.

Teaching Methodologies for the Vascular Access

All courses accredited toward the CCPU will be conducted in the following manner:

- A pre-test shall be conducted at the commencement of the course which focuses learners on the main learning points
- Each course shall comprise at least two (2) hours of teaching time of which at least one (1) hour shall be practical teaching. Stated times do not include the physics, artefacts and basic image optimization which should be provided if delegates are new to ultrasound.
- Learners will receive reference material covering the course curriculum.
- The lectures presented should cover substantially the same material as contained in this curriculum document.
- The live scanning sessions for this unit shall include sufficient live patient models to ensure that each candidate has the opportunity to scan and explore the normal vascular anatomy and adjacent anatomical relationships. Vascular access phantoms shall be used for participants to practice both in plane and out of plane cannulation techniques.
- A post-test will be conducted at the end of the course to ensure the required learning objectives are met.

Assessments

- Two (2) formative assessments of clinical skills, specifically related to the assessment of vascular access
- One (1) summative assessment of clinical skills, specifically related to the assessment of vascular access

All assessments are to be performed under the supervision of the Primary Clinical Supervisor using the competence assessment form supplied at the end of this document.

Please refer to section 8 of the [CCPU Regulations](#) for information regarding timing and exclusion of these assessments in the logbook.

Logbook Requirements

- Five (5) peripheral cannulation procedures (successful and directly supervised), for those new to peripheral cannulation. Three (3) peripheral cannulation procedures (successful and directly supervised), for those already competent at peripheral cannulation.
- Five (5) central venous cannulation procedures (successful and directly supervised).
- A maximum of 50% paediatric cases (14 years and under) may be included in the logbook. Record in the column provided.
- All scans must be clinically indicated
- All cases must be compared with gold standard findings (such as comprehensive imaging, pathological findings or if these are unavailable then clinical course)
- All logbook cases must be signed off by a suitably qualified supervisor (see section 6 of the [CCPU Regulations](#)).
- At the discretion of the ASUM CCPU Certification Board candidates may be allowed an alternative mechanism to meet this practical requirement
- Those cases that involve a procedural component must be signed off by a suitable assessor who performs those procedures themselves.

Please note: All assessments and logbooks are required to be completed by the Primary Clinical supervisor as outlined in the CCPU regulations.

ASUM CCPU Competence Assessment Form

Vascular Access Ultrasound

Candidate: _____

Assessor: _____

Date: _____

Assessment type: Formative (feedback & teaching given during assessment for education)
 Summative (prompting allowed but teaching not given during assessment)

Procedure: Peripheral cannulation
 Central venous cannulation

To pass the summative assessment, the candidate must pass all components listed

Prepare patient

	Competent	Prompted	Fail
Position			
Informed			

Prepare Environment

Prepares equipment			
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Probe & Preset Selection

Can change transducer			
Selects appropriate transducer			
Selects appropriate preset			

Image Acquisition

Optimisation (depth, freq, focus, gain)			
<i>Identifies</i> Target Vessel			
Relevant anatomy			
Optimal insertion site			

Performs Procedure

Performs procedure competently			
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Artefacts

Identifies & explains the basis of common artefacts

Competent

Prompted

Fail

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Record Keeping

Labels & stores appropriate images
Documents any pathology identified
Completes report:

Describes findings briefly
Integrates ultrasound findings with clinical assessment & explains how findings might change management

Machine Maintenance

Cleans / disinfects ultrasound probe
Stores machine and probes safely and correctly

For Formative Assessment Only:

Feedback of particularly good areas: _____

Agreed actions for development _____

Examiner Signature: _____ Candidate Signature: _____

Examiner Name: _____ Candidate Name: _____

Date: _____