

Certificate in Clinician Performed Ultrasound (CCPU)

Syllabus

Basic Echocardiography in Life Support

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Basic Echocardiography in Life Support (BELS)

- Purpose:** This unit is designed to cover the theoretical and practical curriculum for Basic Echocardiography in Life Support.
- Prerequisites:** Learners should have completed the ASUM Physics Image Optimisation unit or accredited equivalent.
- Training:** Recognised either through attendance at an ASUM accredited Basic Echocardiography in Life Support course or equivalent.
- Assessments:** Learners are required to perform supervised ultrasound scans with documentation in a logbook.

Unit Objectives

On completing this unit learners should be able to understand:

- Normal heart and IVC appearance, including IVC collapsibility, pericardial fluid and chamber collapse
- Learners will be able to identify and discuss:
 - Sonographic signs of tamponade
 - Sonographic signs of cardiogenic shock
 - Sonographic signs of massive pulmonary embolism
 - Sonographic signs of sepsis and hypovolemia
 - The role of echo in cardiac arrest and its integration into ALS protocols
- Learners will be able to demonstrate the ability to interpret ultrasound in the following settings:
 - Echocardiography in the shocked or arrested patient
 - Fluid volume estimate in the shocked patient
- Learners will be able to demonstrate the following skills:
- 2-dimensional (B mode) Image acquisition:
 - Imaging the heart in parasternal long, parasternal short, apical 4 chamber and subcostal views.

- Imaging IVC in longitudinal and transverse planes and assess IVC size and collapsibility
- Image interpretation:
 - Qualitative assessment of IVC, LV/RV size, LV contractility and volume status
 - Recognition of cardinal ultrasound findings in shock / arrest.
- Clinical correlation:
 - Integration of clinical picture and BELS findings
 - The role of BELS in guiding ongoing resuscitation

Unit Content

The unit will present learners with the following material:

- The course will present basic normal heart, IVC and pericardium anatomy. It will also address IVC collapsibility, pericardial fluid and pericardial chamber collapse.
- The course will present the sonographic signs of:
 - Tamponade
 - Cardiogenic Shock
 - Massive pulmonary embolism
 - Sepsis and hypovolemia
- The course will present the appropriate techniques, physical principles and safety including:
 - Appropriate transducers, artifacts, windows, standard images, image optimisation in the context of a shocked patient
 - Imaging the heart in parasternal long, parasternal short, apical 4 chamber and subcostal views.
 - Imaging IVC in longitudinal and transverse planes and assess IVC collapsibility
 - Qualitative assessment of LV contractility
 - Appropriate integration of ultrasound in the setting of shock and cardiac arrest
 - Course faculty must include a member with experience in leading patient resuscitation teams during cardiac arrest / peri-arrest setting.

Limitations and Pitfalls

Understand the limitations of ultrasound of heart and IVC in general, and BELS In particular, in the resuscitation and stabilisation of the shocked / arrested patient. Specific limitations of BELS include:

- Time: unlike a formal echocardiogram, the BELS exam is specifically a brief, time-limited exam.
- Technology: 2-dimensional (B mode) only. No use is made of M-mode or Doppler imaging, and there is little time to perform quantitative measurements.
- Role: resuscitation only. BELS is unable to rule out more subtle pathology such as valve disease or segmental wall motion abnormalities.

Teaching Methodologies

All units 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 least 6 hours of teaching time of which at least 4 hours 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 the ones printed in this curriculum document.
- An appropriately qualified clinician will be involved in both the development and delivery of the unit and course (they do not need to be present for the full duration of the course).
- The live scanning sessions for this unit shall include sufficient live patient models to ensure that each candidate has the opportunity to scan. Models will include normal subjects and patients with appropriate pathologies. If the latter are unavailable, there will be at least one image interpretation station with cineloops demonstrating the appropriate pathology.
- A post-test will be conducted at the end of the course that includes this unit as formative assessment.

Assessment and Logbook

- Evidence of satisfactory completion of training sessions
- Evidence of assessment of competence (summative assessment) signed off by a suitably qualified assessor (possessing a CCPU in the relevant unit, DDU, FRANZCR, DMU or

equivalent, or be a sonographer registered by ASAR or NZ MRTB). The original completed competence assessment form is to be sent to ASUM with the candidate's completed log book.

- Candidates are encouraged to demonstrate that they can obtain suitable images using both sector (cardiac) and curvilinear (abdominal) probes, if available, for both formative and summative assessments.
- Logbook requirements need to be completed, and logbooks need to be submitted within two years of completing a course.

Formative Assessments

- 2 formative assessments (directly supervised with suggestions and advice provided during the scan).

Summative Assessment

- Summative assessment is to be performed by a suitably qualified assessor (see above) using the competence assessment form supplied at the end of this document (or equivalent if deemed sufficient by ASUM at their discretion).
- Logbook requirements need to be completed, and logbooks need to be submitted within two years of completing an accredited course.
- Complete 25 examinations; at least 5 examinations need to reflect the setting of cardiac arrest or haemodynamic compromise.
- Review at least a further 25 examinations (may be performed by another operator or from an image bank).
- The total of 50 cases must include at least 2 cases of each of the following:
 - Tamponade,
 - Massive PE,
 - Left ventricular systolic failure,
 - Hypovolemia or distributive shock.
- Findings should be validated by comparison with a "gold standard" (e.g. formal ultrasound, other imaging, pathological findings, etc.).
- All cases are to be reviewed and signed off by a suitably qualified assessor (see above).

At the discretion of the ASUM CCPU Certification Board candidates may be allowed an alternative mechanism to meet this practical requirement.

ASUM CCPU COMPETENCE ASSESSMENT FORM BASIC ECHO IN LIFE SUPPORT ULTRASOUND

Candidate: _____

Assessor: _____

Date: _____

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

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

| | Competent | Prompted | Fail |
|-------------------------------------|-----------|----------|------|
| Prepare patient | | | |
| Position | | | |
| Informed | | | |
| Prepare Environment | | | |
| Lights dimmed if possible | | | |
| Probe & Preset Selection | | | |
| Can change transducer | | | |
| Selects appropriate transducer | | | |
| Selects appropriate preset | | | |
| Data Entry | | | |
| Enter patient details | | | |

Image Acquisition

NB - Candidates are encouraged to demonstrate that they can obtain suitable images using both sector (cardiac) and curvilinear (abdominal) probes, if available.

Images heart from the following windows:

| | | | |
|--|--|--|--|
| subcostal | | | |
| Parasternal long and short axes | | | |
| Apical 4 chamber | | | |
| IVC | | | |
| Optimisation (depth, frequency, focus, gain) | | | |

Identifies:

| | | | |
|-------------------|--|--|--|
| Pericardial space | | | |
| Right ventricle | | | |
| Left ventricle | | | |
| Right atrium | | | |
| Left atrium | | | |
| IVC | | | |

Without prompting, poses and answers the following questions:

- Is the heart beating?
- Is there a pericardial effusion (and if so, is it tamponading the heart?)
- Is RV pressure > LV pressure
- Is LV size grossly normal or abnormal?
- Is LV function grossly normal or abnormal?
- Is IVC size grossly normal or abnormal?
- Is IVC collapsibility grossly normally or abnormal?

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Artefacts

Identifies & explains the basis of common artefacts

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Record Keeping

- Labels & stores appropriate images
- Documents any pathology identified
- Completes report
- Describe findings briefly
- Integrates ultrasound findings with clinical assessment and explains how the findings might change management

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Machine Maintenance

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

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| | | |

For Formative Assessment Only:

Feedback of particularly good areas: _____

Agreed actions for development _____

Examiner Signature: _____ Candidate Signature: _____

Examiner Name: _____ Candidate Name: _____

Date: _____