Certificate in Clinician Performed Ultrasound

(CCPU)

Syllabus

Erector Spinae Plane Block

Australasian Society for Ultrasound in Medicine
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ACN 001 679 161 ABN 64 001 679 161

CCPU Erector Spinae Plane Block (ESPB)

Purpose

Deliver ultrasound-guided Erector Spinae Plane Block for regional anaesthesia to block the anterior and posterior branches of the spinal nerves for multi-dermatomal analgesia. Cover principles of ultrasound-guided regional blocks in the Emergency Department, ICU or Operating Theatres for limb analgesia and anaesthesia.

This unit addresses theoretical and practical curriculum of ultrasound-guided erector spinae plane block. It also covers the principles of using ultrasound to guide other regional blocks and Catheter insertion for analgesia and anaesthesia.

Prerequisites:

CCPU candidates engaged in ultrasound assessment of patients must:

- Enrol in the CCPU.
- Review ASUM Code of Conduct and Safety Policies.
- Complete the ASUM CCPU online physics tutorial quiz.
- Attend a CCPU accredited course.

Course objectives

- Describe clinical questions related to the CCPU Erector Spinae Plane Block addressed using focused point-of-care ultrasound scanning.
- Appreciates peer-reviewed literature, published protocols and standards of practice.
- Demonstrate technical (sonographic) ability to acquire satisfactory ultrasound views guiding regional anaesthesia.
- Describe limitations of ultrasound in assessing the Erector Spinae.
- Describe and document examination, indication, procedure, disposition and follow-up related to regional anaesthesia.
- Describe indications, contraindications, and limitations of Erector Spinae Plane Block.
- Understands anatomy and common variations of related structures and surface anatomy.

Course Content

The course presents learners with:

Surface Anatomy:	Spinous Process in the midline, 2cm lateral to the spinous process, this would be the ideal probe placement. T8 at the level of the inferior angle of the Scapula. C7 spinous process is the most prominent vertebrae at the base of the neck.
Ultrasound Anatomy :	
Muscles:	Above T8 trapezius, rhomboids and erector spinae. Below T8 trapezius and erector spinae. Erector spinae comprises a group of muscles including the iliocostalis, longissimus, and paraspinal muscles. These run longitudinally from the skull to the pelvis and sacral region, and from the spinous to the transverse processes extending to the ribs. Muscles change their size and profile along their craniocaudal course.
Nerves:	Sensory innervation of the posterior thorax arises from the dorsal rami of the first cervical (C1) through the fifth lumbar (L5) nerves, while the ventral rami of the thoracic spinal nerves from T1-T12 continue as intercostal nerves innervating the anterolateral chest and abdominal wall.
Bones:	Sonographic appearance of the spinous and transverse processes of the vertebrae compared to the ribs.

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Pleura and lung: Identification of the pleura and of lung sliding if present
Arteries and veins: Intercostal and spinal.

Limitations and Pitfalls

- Cooperative patient with informed consent.
- Patients' ability to maintain position. Challenges of spinal precautions.
- Patient body habitus.
- Variable anatomy.
- Avoiding adjacent structures – nerve, pleura and lung
- Losing (and finding) the needle in both in-plane and out-of-plane techniques.
- Probe too medial – Laminae are seen as flat lines.
- Probe too lateral – Ribs are seen as round structures.
- Monitoring and observation during and following the procedure for local anaesthetic toxicity; procedural complications and effect of the block.

Complications

- Local anaesthetic toxicity (LAST) - identification and treatment of local anaesthetic toxicity according to local hospital procedure is an essential skill.
- Pneumothorax
- Neural injury
- Haemothorax
- Abscess- Regular inspection of the site of injection.
- Inadequate block – PRN and regular Analgesia charted for both inadequate block or wearing of the block.

Post-procedure

- Observe the patient for analgesia, toxicity, and pain score.
- Acute pain service review or appropriate suitable follow-up for ongoing catheter care and analgesia.

Expected standards of practice CCPU Erector Spinae Plane Block Unit

- **General considerations**
  - Before this course, Learners should have completed the Applied Physics in Ultrasound unit. Providers are expected to know indications, contraindications, risks, benefits and alternatives for the range of procedures that they perform. This includes aseptic technique and use of the various needles and catheter techniques.
  - Risks of regional anaesthesia may be related to the physiological effects of a block, medication effects, and dosage and needle path complications. Identification and management to address include and are not limited to:
    - Cardiovascular collapse
    - Seizures
    - Hypotension
    - Allergic reaction
    - Ventilatory impairment
    - Impaired consciousness
    - Haematoma
    - Infection
    - Abscess
    - Failed block
    - Nerve damage
- **Time out and mechanisms to avoid wrong site block with verification of:**
    - Patient
    - Site and side
    - Consent
    - Mark block site

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- **Documentation by the proceduralist in the notes:**
  - Technique and method of block. Ease or difficulties encountered and patient tolerance of the procedure.
  - Drugs and dosages administered.
  - Follow-up drug orders.
  - Monitoring requirements following block completion.
  - Follow-up plan.

- **Clinical administration issues to address in the teaching course include:**
  - The proceduralist is required to be immediately available until the block is satisfactory; the patient is stable and the potential for immediate complications has passed. For any regional anaesthesia technique, the institution should have a written protocol and procedure.
  - Catheters used for regional anaesthesia are required to have unique labelling and dedicated pumps according to hospital policy. Specific follow-up for block catheters should address assessment of block adequacy and evaluation for adverse effects.
  - Integration of regional anaesthesia with follow-up and coordination with admitting Team and Pain Service as appropriate.
  - Available medications and upper dose limits.
  - Practitioners are expected to be proficient with the neurological examination and documentation of target anatomy before and after the procedure.
  - Knowledge of pharmacology of common local anaesthetic for example ropivacaine, bupivacaine, and lignocaine especially the toxic dose, onset, and duration of action.
  - A discussion of the evidence regarding adjuvant agents should also be included in the course.
  - Clean ultrasound equipment safely and correctly as per ASUM Safety Protocols
  - Store ultrasound equipment safely and correctly.

Please note that separate modules exist for inter scalene, supra clavicular block, and Fascia iliac block

Minimum expected ultrasound data acquisition/protocols:

Preparation

- Prepare clinical environment.
- Prepare patient, including informed consent where possible (refer to ASUM code of conduct) in line with state and hospital/practice policy.
- Select and prepare ultrasound and ancillary equipment in line with ASUMs safety policies.
- Enter patient data into ultrasound equipment.
- Local anaesthesia per local protocol
- Perform preliminary scan to determine optimal target/site, adipose tissue, muscles, differentiate between the rib and the transverse process.

Image acquisition

- Acquire and optimise ultrasound images/data.
- Identify relevant anatomical features and landmarks.
- Linear probe and scanner settings
- Pre-set, depth, frequency, focus and gain.
- Important artefacts including relevant examples.
- Reverberation artefact

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- Long path
- Between the skin and horizontal fascial planes
- Short path
- Comet tail deep to needle
- Beam artefact
- Either side of the needle
- Specular reflection.
- Patient, operator, machine, and equipment position.
- Patient comfortable and in appropriate position (Sitting up or supine, head towards the contralateral side).
- The operator is comfortable, usually seated.
- Operator, target and Ultrasound screen should be in a straight line the screen will often need to be on the other side of the patient.
- All equipment is within reach and readily accessible.
- Perform a preliminary scan to determine the optimal target/site, adipose tissue, and muscles, and differentiate between the rib and the transverse process.

Technique

- Aseptic technique.
- Administration of local anaesthetic for the skin.
- Choose the Needle based on type, Gauge (22 -25) and length and decide on Cephalad or caudal point of entry of the needle technique, appropriate size, and length of the needle, usually 150 mm.
- Place the transducer in a Para median sagittal orientation, approximately 2cm away from the midline (spinous processes) and visualise the transverse process.
- Optimise the image of Transverse process.
- Optimise the image of the needle, using colour Doppler to ensure no vascular structures are in the path of the needle before needle insertion.
- Administration of Normal saline first to delineate the fascia from the tip of the transverse process by Hydro dissection.
- The local anaesthetic is injected just above the Tip of transverse process allowing for
- Cranio caudal spread of the anaesthetic in the prevertebral plane.
- Watch for the spread of the Local anaesthetic.
- At this point, a catheter can be inserted or a pre-loaded needle with the catheter.
    - At this point a catheter can be inserted or a pre-loaded needle with the catheter this involves
    - The procedure consists of three phases: (1) needle placement; (2) catheter advancement; and (3) securing the catheter.
- Confirm the correct catheter position.

Minimal recorded images/ultrasound data

Required minimal images are indicated below unless the patient's clinical situation renders this impracticable and/or unsafe. In this situation, the practitioner should record whatever images are obtainable, in the time available, to answer the clinical question without allowing the ultrasound examination to interfere with ongoing medical treatment.

Compliance with local protocols recommending more recorded images/data for a particular examination is required.

The anatomical structures -

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The three muscles – Trapezius, Rhomboid and Erector Spinae muscles. Transverse process.

a. Pre needle insertion
b. Post needle insertion.
c. Post anaesthetic injection – with hydro dissection lifting the fascia above the Transverse process.

Training
Recognised through attendance at an ASUM-accredited Erector Spinae Plane block course. (Please see the website for accredited providers).
Evidence of the satisfactory completion of the training course is required for unit award.

Teaching Methodologies for the CCPU Erector Spinae Plane Block

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

- Learners will receive reference material covering the course curriculum.
- A pre-test to focus learners on 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.
- Lectures should cover substantially the same material as this CCPU curriculum.
- An appropriately qualified clinician involved in the development and teaching of the course and must be present for the course itself.
- Live scanning sessions for this unit shall include sufficient live patient models to ensure that each candidate has the opportunity to scan (maximal candidate: tutor/machine ratio of 5:1). Models will include normal subjects and patients with appropriate pathologies. Patient simulations may be approved at the discretion of the CCPU Board.
  A compulsory post-test will be conducted at the end of the course to ensure the required learning objectives are met.

Assessments
The successful completion and documentation of the following assessments in CCPU Erector Spinae Plane Block is required:

- Two (2) formative assessments of clinical skills, specifically related to the assessment of the Erector Spinae Plane Block examination.
- One (1) summative assessment of clinical skills, specifically related to the assessment of Erector Spinae Plane Block.
- Please refer to the CCPU Regulations for specific timing requirements related to the completion of these assessments.

Logbook Requirements

For CCPU Erector Spinae Plane Block, candidates must demonstrate, in their verified logbook, that they have personally performed:

- Five (5) ESPB procedures (successful and directly supervised), for those new to Erector Spinae plane block. Three (3) Erector Spinae plane blocks (successful and directly supervised), for those already competent at erector Spinae plane blocks.
- Logbook cases must be signed off by a suitably qualified supervisor (see section 6.0 of the CCPU Regulations).

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- Blocks must be indicated and performed in a clinical environment.
- The ‘Comparison with Further Imaging or Clinical Outcome’ column should describe the final outcome of the patient in this case the degree of analgesia or extent of anaesthesia.
- Cases must be signed off by a suitable assessor who performs erector spinae plane blocks.
- At the discretion of the ASUM CCPU Certification Board candidates may be allowed an alternative mechanism to meet this practical requirement.

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ASUM CCPU Competence Formative Assessment Form

Erector Spinae Plane Block

Candidate: _____

Assessor: _____

Date: _____

Assessment type: **Formative 1** (feedback & teaching given during assessment for education) ☐
Formative 2 (feedback & teaching given during assessment for education) ☐

		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				
	Optimisation (depth, freq, focus, gain)			
Identifies				
	Trapezius,Rhomboid,Erector Spinae			
	Transverse process			
	Ribs, Pleura			
	Needle insertion technique			
	Depth			
	Angle			
	Injection of local anaesthetic			
	Amount			
	Hydrodissection			
	Anatomical Spread			
Identifies any complications		**Competent**	**Prompted**	**Fail**
	Complications - Pneumothorax			
Describes appearance & pathology				
Artefacts				
	Identifies & explains the basis of common artefacts			

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Record Keeping

Pre needle insertion			
Post needle insertion			
Post anaesthetic injection			
Documents focussed scan only			
Describe findings briefly			
Integrates ultrasound findings with clinical assessment and explains how the findings might change management			

Machine Maintenance

Cleans / disinfects ultrasound probe			
Stores machine and probes correctly			

Feedback of particularly good areas: _____

_____

_____

Agreed actions for development: _____

_____

_____

_____

Examiner signature: _____ Candidate signature: _____

Examiner name: _____ Candidate name: _____

Date: _____

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ASUM CCPU Competence Summative Assessment Form

Erector Spinae Plane Block

Candidate: _____

Assessor: _____

Date: _____

Assessment type: 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				
	Optimisation (depth, freq, focus, gain)			
Identifies				
	Trapezius,Rhomboid,Erector Spinae			
	Transverse process			
	Ribs, Pleura			
	Needle insertion technique			
	Depth			
	Angle			
	Injection of local anaesthetic			
	Amount			
	Hydrodissection			
	Anatomical Spread			
Identifies any complications		**Competent**	**Prompted**	**Fail**
	Complications - Pneumothorax			
Describes appearance & pathology				
Artefacts				
	Identifies & explains common artefacts			

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Record Keeping

Pre needle insertion			
Post needle insertion			
Post anaesthetic injection			
Documents focussed scan only			
Describe findings briefly			
Integrates ultrasound findings with clinical assessment and explains how the findings might change management			

Supervisor Declaration

*Once the candidate has met the minimum assessment and logbook criteria (5 if new to erector spinae plane block, 3 if experienced), the supervisor may choose to recommend the candidate to the CCPU board for credentialing in Erector Spinae Plane Block CCPU.

I _____(supervisor name) am satisfied that _____(candidate's name) has demonstrated the minimum requirement for competency in Erector Spinae Plane Block on _____(date).

Supervisor signature: _____

Candidate signature: _____

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