Certificate in Clinician Performed Ultrasound

(CCPU)

Syllabus

Serratus Anterior plane block

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

CCPU Serratus Anterior plane block

Purpose
Demonstrate skill in obtaining appropriate ultrasound images/clips and needle guidance for Serratus anterior block. This module addresses the indications, approach, technique and specific risks related to Serratus anterior blocks.
It also covers the principles of using ultrasound to guide other regional blocks and Catheter insertion in the Emergency Department, ICU or Operating theatres for upper limb 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.
- Self-directed learning before and ongoing includes understanding specific details, indications, and contraindications for the range of procedures that they perform. This includes asepsis and use of the various needles and catheter techniques.
- The knowledge of the **Intercostal nerves and lateral cutaneous branch of intercostal nerve.** Their distributions dermatomes, myotomes and osteotomes.

Course Objectives

- Relate Serratus anterior block CCPU to peer-reviewed literature and relevant published protocols or standards of practice. Consider development of related regional anaesthesia techniques for example the Erector Spinae block.
- Demonstrate the technical (sonographic) ability to acquire satisfactory ultrasound images to guide regional anaesthesia and avoid complications.
- Describe the limitations of ultrasound in Serratus Anterior plane block.
- Develop appropriate ongoing patient management as a result ultrasound-guided regional anaesthesia conjunction with other clinical information.
- Describe and document the ultrasound procedure in the clinical record to facilitate continuity of care.
- Identification and management to address complications (include and are not limited to):
    - Cardiovascular collapse
    - Seizures
    - Hypotension
    - Allergic reaction
    - Ventilatory impairment
    - Impaired consciousness
    - Haematoma
    - Infection
    - Abscess
    - Failed block
    - Nerve damage
    - Pneumothorax

Course Content

Anatomy
An understanding of the **anatomy** (and common variations) of the following structures, including their relationships to adjacent structures and surface anatomy.

Surface Anatomy	Manubriosternal joint
	Intercostal spaces
	Latissimus dorsi muscle
	Pectorals major muscle
	Serratus anterior muscle

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Ultrasound Anatomy	Muscles	Latissimus dorsi Serratus anterior Intercostal muscles
	Pleura	
	Bones	Ribs
	Vessels	Thoracodorsal artery

Technical Skills

- Perform preliminary scan to determine optimal target/site, adipose tissue, muscles, thoracodorsal artery, and fascia.
- Aseptic technique, application of sterile probe covers.
- Ultrasound Probe in the transverse at the mid axillary line at the level of the nipple/4-5th ribs
- Identify the relevant ultrasound anatomy: ribs, pleura, thoracodorsal artery, latissimus dorsi, serratus anterior, and intercostal muscles
- Insert needle via in-plane approach into plane superior to serratus anterior, infiltrate and watch for the spread of the Local anaesthetic.
- If the plane superior to serratus anterior is not easily identified/infiltrated the plane deep to serratus anterior can be targeted.
- Catheter insertion:
    - The procedure consists of three phases: (1) needle placement; (2) catheter advancement; and (3) securing the catheter
    - Confirm the correct position of the catheter.
- Document the procedure and note any complications.

Equipment

- Sterile probe covers (and how to apply them)
- Local anaesthesia per local protocol. Include dosing and dilution.
- Local anaesthetic options and dosage.
- The volume can be made up by adding normal saline.
- Catheter doses of local anaesthetic per local protocol.
- Patient, operator, machine and equipment position.
    - Patient comfortable and in appropriate position
    - The 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.

Limitations and Pitfalls

- Cooperative patient with Informed consent, prepared to reverse the same with Intralipid
- Patients' ability to maintain position.
- Patient body habitus
- Variable anatomy
- Avoiding adjacent structures – nerve, vascular injury.
- Losing (and finding) the needle in both in-plane and out-of-plane techniques.

Expected standards of practice CCPU Serratus Anterior plane block

- Understand ultrasound-guided techniques of the Serratus Anterior plane block.
- Indications and contraindications to the use of the local anaesthetic.
- Proficiency in image optimisation facilitating procedural guidance.
- Indications, contraindications and limitations of the Serratus Anterior plane block.
- Time out and mechanisms to avoid wrong site block with verification of:
    - Site and side
    - Consent
    - Patient and indication
    - Mark block site

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- Relate CCPU Serratus Anterior plane block to peer-reviewed literature and relevant published protocols or standards of practice.
- Documentation by the proceduralist in the notes:
    - Technique and method of block.
    - Drugs and dosages administered.
    - Complications and problems.
    - Follow-up drug orders.
    - Monitoring requirements following block completion.
- Clinical administration issues to address in the teaching course include:
    - The requirement that the proceduralist remains 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. Specific follow-up for block catheters should address the 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.
- Post-procedure planning including liaison with Admitting / Surgical / Trauma team and Acute Pain Service. This may include oral / parenteral analgesia and use of incentive spirometry.
- Address adjuvant therapies relating to block effectiveness or duration. For example, the inclusion or exclusion of steroids like dexamethasone with the local anaesthetic or systemically and considering other relevant medications like clonidine or emerging trends.
- Discuss needle options and risks for example spinal needle vs nerve block needle vs Touey vs nerve catheter needle.
- The knowledge of pharmacology of common local anaesthetic drugs**,** for example, ropivacaine, bupivacaine and lidocaine.
    - Toxic doses, onset and duration of action.
    - Awareness that local anaesthetics are often available in multiple concentrations.
    - Knowledge of new and emerging medications.
- Knowledge of local anaesthetic toxicity (LAST**)**. Signs, symptoms and treatment of LAST.
- Local guidelines inform decision-making related to nerve block techniques. Discussion of these local guidelines and impact on admitting services, for example, trauma team.
    - In case of admission to the hospital follow-up planning (Acute Pain Service consultation) for ongoing analgesia.

**Please note that separate modules exist for the Erector Spinae Block, Supraclavicular Block and Interscalene 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.

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Image acquisition

- Acquire and optimise ultrasound images/data.
- Identify relevant anatomical features and landmarks.
- Identify and respond to ultrasound artifacts, if required, to improve diagnostic quality of images/data.
- Ultrasound techniques and physical principles for both in-plane and out-of-plane techniques.
  - Linear probe and scanner settings.
  - Pre-set, depth, frequency, focus, gain.
  - Recognition and management of important artefacts.
    - Reverberation artefact
    - 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.

Minimal recorded images/ultrasound data

The following are the required minimal images to be recorded unless the patient's clinical situation (for example clinically relevant example e.g. during CPR) 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.

If local protocols recommend more recorded images/data for a particular examination then these should be adhered to. If relevant - Images should be saved as cineloop or real-time recordings if possible.

- The muscles – Latissimus dorsi, Serratus anterior, ribs, and pleura.
  1. Pre-needle insertion
  2. Post needle insertion.
  3. Post anaesthetic injection – with hydro dissection lifting the fascia.

Sonographic appearances of expected positive, negative and equivocal findings

- Describe ultrasound appearances using correct sonographic terminology
- Identify and describe conclusive findings, positive or negative
- Identify limitations of an examination, including specific examples/situations if appropriate
- Identify the relevance of equivocal findings

Integration of ultrasound findings with clinical information

- Describe the relevance of ultrasound findings correlated to clinical presentation and other data
- Integrate information with ongoing clinical management of patient

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Post Procedure

- Ensure procedure and findings are adequately recorded in patient clinical record
- Clean ultrasound equipment safely and correctly as per ASUMs safety policies
- Store ultrasound equipment safely and correctly.
- Observe the patient for block effectiveness, toxicity, and pain score.
- Acute pain service review / Admitting Team per hospital protocol for ongoing catheter care.

Training

- Recognised through attendance at an ASUM accredited Serratus Anterior 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 Serratus Anterior plane block.
All courses accredited toward the CCPU will be conducted in the following manner:

- Pre-test to focus learners on main learning objectives.
- 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 receive reference material covering the course curriculum.
- The lectures cover at least the contents of this curriculum document.
- Live scanning sessions for this unit shall include sufficient live patient models to ensure that each candidate can scan and explore the normal vascular anatomy and adjacent anatomical relationships. Maximum 4:1 ratio of candidates to model. Neuro-vascular access phantoms shall be used for participants to practice in-plane techniques.
- Complete a post-test to reinforce learning objectives.

Assessments

- Two (2) formative assessments of Serratus Anterior plane block.
- One (1) summative assessment of Serratus Anterior plane block.

All assessments performed under the supervision of the Primary 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
For CCPU Serratus Anterior candidates must demonstrate, in their verified logbook, that they have personally performed:

- A minimum of Five (5) Serratus Anterior plane block procedures (successful and directly supervised), for those new to regional block.
- Or Three (3) Serratus Anterior plane blocks (successful and directly supervised), for those already competent at Serratus anterior plane blocks.
- All ultrasound scans must be clinically indicated and performed in a clinical environment.
- All blocks are clinically indicated
- Logbook cases must be signed off by a suitably qualified supervisor (see section 6.0 of the CCPU Regulations).
- The 'Comparison with Further Imaging or Clinical Outcome' column should describe the outcome of the patient in this case the degree of analgesia or extent of anaesthesia.

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- 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: the Primary Clinical supervisor as outlined in the CCPU regulations must certify all assessments and logbooks.

The CCPU committee values the input of our community that developed the module:
Dr Jake Andrews, Advanced Trainee, John Hunter Hospital Newcastle
Dr Chris Partyka, FACEM, Royal North Shore, Sydney, Chief Investigator SAPB

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ASUM CCPU Competence Formative Assessment Form

CCPU Serratus Anterior 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 consent			
	Allergies confirmed			
Prepare Environment				
	Lights dimmed if possible			
Probe & Preset Selection				
	Can change transducer			
	Selects appropriate transducer			
	Selects appropriate preset			
Data Entry				
	Enter patient details			
	Document femoral nerve examination			
Image Acquisition				
	Optimisation (depth, frequency, focus, gain)			
Identifies				
	Latissimus dorsi			
	Serratus Anterior			
	Pleura			
	Ribs			
	Intercostal muscles			
	Thoracodorsal artery (optional)			
Describes appearance & pathology		**Competent**	**Prompted**	**Fail**
	Needle insertion technique			
	Depth			
	Angle			
	Injection of local anaesthetic			
	Amount			

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	Hydro visualisation of the nerve			
	Anatomical spread			
	Identifies and complication			
Artefacts				
	Identifies & explains common artefacts			
Record Keeping				
	The anatomical structures			
	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			
	Block and analgesia			
Machine Maintenance				
	Cleans / disinfects ultrasound probe			
	Stores machine and probes safely and correctly			

Feedback of particularly good areas: _____

_____

_____

Agreed actions for development: _____

_____

_____

*Once candidate meets minimum assessment and logbook criteria (5 if new to Serratus anterior block, 3 if experienced) the examiner may recommend the candidate to the CCPU board for credentialing in Serratus Anterior Plane Block CCPU.

Examiner Name: _____

Examiner Signature: _____

Date: _____

Candidate Name: _____

Candidate Signature: _____

Date: _____

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ASUM CCPU Competence Summative Assessment Form

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Candidate: _____

Assessor: _____

Date: _____

Assessment type: **Summative 1** (feedback & teaching given during assessment for education) □

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

	Competent	Prompted	Fail
Prepare patient			
Position			
Informed consent			
Allergies confirmed			
Prepare Environment			
Lights dimmed if possible			
Probe & Preset Selection			
Can change transducer			
Selects appropriate transducer			
Selects appropriate preset			
Data Entry			
Enter patient details			
Document femoral nerve examination			
Image Acquisition			
Optimisation (depth, frequency, focus, gain)			
Identifies			
Latissimus dorsi			
Serratus anterior			
Pleura			
Ribs			
Intercostal muscles			
Thoracodorsal artery (optional)			

Describes appearance & pathology	**Competent**	**Prompted**	**Fail**
Needle insertion technique			
Depth			
Angle			
Injection of local anaesthetic			
Amount			
Hydro visualisation of the nerve			
Anatomical spread			

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	Identifies and complication			
Artefacts				
	Identifies & explains common artefacts			
Record Keeping				
	The anatomical structures			
	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			
	Block and analgesia			
Machine Maintenance				
	Cleans / disinfects ultrasound probe			
	Stores machine and probes safely and correctly			

*Once the candidate has met the minimum assessment and logbook criteria (5 if new to Serratus anterior plane blocks, 3 if experienced) the examiner may recommend the candidate to the CCPU board for credentialing in Serratus anterior blocks CCPU.

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

Supervisor signature: _____

Candidate Signature: _____

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