

Certificate in Clinician Performed Ultrasound (CCPU) Syllabus

Breast Ultrasound

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Breast Ultrasound Syllabus

Purpose

The following curriculum guidelines have been developed by the Breast Surgeons of the Royal Australasian College of Surgeons in conjunction with the Australian Society of Ultrasound in Medicine (ASUM) as a framework educational standard documenting the level of knowledge, training and technical skills required by Breast Surgeons who intend to perform and incorporate ultrasound into their surgical practice as well as Breast Physicians.

This curriculum outline is intended to detail the minimum criteria only in terms of knowledge and expertise which should be attained by specialist Breast surgeons and Breast Physicians who will be undertaking ultrasound as part of their clinical practice.

Certificates in Clinical Performed Ultrasound will be awarded specifically for either Breast Ultrasound, Endocrine Ultrasound or both Breast and Endocrine Ultrasound. Applicants will be required to nominate the particular CCPU discipline for which accreditation is being sought.

Prerequisites

This course is open to Surgeons and Breast Physicians including Registrars, who are members of the Australasian Society of Breast Physicians. Surgical trainees will be encouraged to undertake education in ultrasound principles and practice during their training and will be eligible to apply for interim certification in Breast ultrasound from SET year three (3) and above with full CCPU accreditation being awarded upon completion of RACS Fellowship.

Learners should have completed the Applied Physics in Ultrasound unit.

Course Objectives

On completing this course learners should be able to demonstrate:

- Understand and demonstrate the basic physical principles of ultrasound technology
- Understand the relevant ultrasound technology, quality control and safety
- Effectively perform a breast ultrasound examination
- Demonstrate proficiency in correlating ultrasound images with clinical findings
- Understand the Sonographic imaging criteria of breast pathology
- Demonstrate competency in performing ultrasound directed interventional procedures
- Understand the limitations of ultrasound and the importance of seeking assistance and advice.

Course Content

The course will present learners with the following material:

Physics:

- Understand the basic physical principles of ultrasound technology including Doppler.
- Understand sound wave behaviour and properties.
- Understand sound- tissue interactions (absorption, scattering, reflections)
- Demonstrate the principles of beam focusing.
- Understand the significance of beam attenuation.
- Recognise and understand the reasons for and significance of artifacts

Ultrasound Technology:

- Knowledge of equipment specifications most appropriate for sonography of the breast and cervical region
- Types of ultrasound monitors.
- Types of real time transducers/probes
- Sector scanning
- Linear array
- Curved array
- Familiarity with control panel functionality
- Performance of linear and volumetric measurements
- Recording and storing data.

Quality Control and Safety:

- Understanding of requirement for regular monitoring and safety checks for ultrasound equipment.
- Monitoring of personal performance outcomes, particularly in regard to interventional procedures including non-diagnostic biopsy outcomes and complications such as infection and hematoma rates.
- Demonstrating an understanding of the limitations of ultrasound imaging and of the importance of appreciating individual self-limitations depending on the practitioner's level of experience and expertise and knowing when to seek assistance or advice.

Breast - Anatomy, Embryology and Pathology:

- Breast development and normal anatomy of the female breast, male breast and axilla.
- Knowledge of the changes in breast structure which occur chronologically with age, menstrual cycle, pregnancy & lactation.
- Knowledge of the common pathological processes which occur within the breast including-
- Benign breast lesions including fibrocystic change, fibroadenomas, hamartomas, duct ectasia, breast abscesses, and lipomas
- Atypical benign breast lesions including atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH), lobular carcinoma-in-situ (LCIS), and other histologic risk factors
- Ductal carcinoma in situ (DCIS), including its histologic subtypes
- Invasive ductal carcinoma not otherwise specified (NOS); subtypes of invasive ductal carcinoma (mucinous, medullary, papillary, tubular); invasive lobular carcinoma - Other types of breast cancer, such as Paget's disease and inflammatory carcinoma
- Other malignancies involving the breast, including phyllodes tumor, lymphoma, leukemia, sarcomas, and metastases.
- Histological grading
- Pathological staging
- Understanding of the structure and anatomical changes which can occur in the breast as a result of previous treatments such as surgery and radiotherapy.

- Knowledge of the anatomy of the axilla and axillary contents including normal and abnormal lymph node architecture.

Performance of a Breast Ultrasound Examination:

- Knowledge of indications for breast ultrasound
- Understanding rationale of and indications for targeted ultrasound examinations
- Techniques of performing an ultrasound breast examination
- Proficiency in correlating ultrasound images with mammographic and clinical findings
- Understanding limitations of breast ultrasound including assessment of microcalcifications.

Sonographic Imaging Criteria of Breast Pathology:

- Understanding of changing sonographic appearances of the breast during the course of a woman's lifespan with particular appreciation of the differences between pre- and post-menopausal breast parenchymal patterns; and including awareness of changes associated with the menstrual cycle, pregnancy and lactation.
- Knowledge of sonographic image characteristics of common benign breast lesions e.g. fibroadenoma, cysts, duct ectasia, lipomas.
- Knowledge of sonographic image characteristics of malignant breast lesions.
- Knowledge of normal appearance of the axilla and the axillary tail of the breast
- Knowledge of sonographic image characteristics of benign and malignant axillary lymph nodes
- Understanding of the changed sonographic appearance of the breast and axilla following previous surgery and radiotherapy including features such as seroma formation, scarring, macrocalcification and fat necrosis
- Familiarity with ultrasound BI-RADS Classification system

Ultrasound Directed Interventional Procedures:

- Demonstrate competency in performance of diagnostic interventional techniques including FNAB and/or core biopsies.
- Demonstrate appropriate application of needle aspiration techniques in the management of seromas and drainage of breast abscesses.
- Understanding of techniques involved in intra-operative ultrasound guided excision of impalpable breast lesions.

Training

- Recognised through attendance at an ASUM accredited Breast 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 Breast course

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 at least six (6) hours of teaching time of which at least three (3) 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 the development and delivery of the 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. Given that it may be difficult to find subjects with sufficient pathology, it is appropriate to include a practical 'image interpretation' session in which candidates must interpret images of the relevant pathology. If the latter are unavailable, there will be at least one image interpretation station with cineloops demonstrating the appropriate pathology. For interventional procedures, appropriate phantoms will be used.
- A post-test will be conducted at the end of the course as formative assessment.

Assessments

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

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.

Logbook Requirements

- One hundred (100) ultrasound examinations, including:
 - At least fifty (50) breast scans
 - Twenty (20) needle interventions procedures, of which a minimum of five (5) are to be breast examinations
- If completing both the Breast and Endocrine units', candidates are required to complete a total of 100 ultrasound examinations, fifty (50) are to be breast, and fifty (50) endocrine.
- 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

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

Maintenance of Competence

- Once full accreditation has been obtained in relation to the CCPU for Surgeons demonstration of ongoing maintenance of competence will be required by documentation over every 4-year period of the following performance measures-
- Annual performance of fifty (50) ultrasound examinations per year of which a minimum of twelve (12) to be breast.
- Annual performance of twenty (20) needle interventions per year of which a minimum of five (5) to be breast.
- Attendance or participation in at least one ultrasound teaching course every three (3) years.

Resources

Bennett IC, Greenslade J, Chiam H. Intraoperative ultrasound-guided excision of nonpalpable breast lesions. *World J Surg* 2005;29(3):369-74

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Kopans, Daniel B.; *Breast Imaging – second edition*. Lippincott-Raven, Philadelphia, 1998.

Page, DL., Anderson, TJ.; *Diagnostic Histopathology of the Breast*. Churchill Livingstone, Edinburgh, 1987

Rotstein, AH, Neerhut, PK; Ultrasound characteristics of histologically proven grade 3 ductal breast carcinoma. *Australian Radiology* 2005, 49: 476-479

Smith LF, Rubio IT, Henry-Tillman RS, et al. Intraoperative ultrasound-guided breast biopsy. *Am J Surg* 2000; 180(6): 419-23

Staren ED. Ultrasound-guided biopsy of nonpalpable masses by surgeons, *Ann Surg Oncol* 1996; 3: 476-82

Stavros, A. Thomas; *Breast Ultrasound*. Lippincott Williams & Wilkins, Philadelphia, 2004

Stavros, A.T. et al; Solid Breast Nodules; Use of sonography to distinguish between benign and malignant lesions. *Radiology* 1996, 196: 123-134.

Tohno, Eriko, Cosgrove, David O., Sloane, John.; *Ultrasound Diagnosis of Breast Disease*. Churchill Livingstone, New York, 1994

Formulated By Combined Racs/Asum Working Committee For The Development Of Breast And Endocrine CCPU:

Peter Malycha, Mark Sywak, James Kollias, Beverley Barraclough, Ian Bennett, Jonathan Serpell, Glenn McNally, Keith Henderson, Arthur Banos, Alya Almenahi , December 2008.

ASUM CCPU Competence Assessment Form

Breast 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:

Prepare patient

Position

Informed

Competent	Prompted	Fail

Prepare Environment

Lights dimmed if possible

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Probe & Preset Selection

Can change transducer

Selects appropriate transducer

Selects appropriate preset

Data Entry

Enter patient details

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Image Acquisition

Optimisation (depth, freq, focus, gain)

Identifies

Breast

Breast anatomy

Axillary anatomy

Pectoralis major muscle

Skin of breast

Breast parenchyma

Breast fat

Axillary artery and vein

Pathology

Site of lesion
 Size of lesion
 Features
 How to perform FNA
 How to perform core biopsy

Competent	Prompted	Fail

Record Keeping

Labels & stores appropriate images
 Documents any pathology identified
 Completes report

Each view adequate / inadequate

Documents focussed scan only

Describe findings briefly

Integrates ultrasound findings with clinical

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: _____