

Certificate in Clinician Performed Ultrasound (CCPU) Syllabus

Endocrine Ultrasound

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Endocrine Ultrasound Syllabus

Purpose

The following curriculum guidelines have been developed by the Breast and Endocrine Sections 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 practitioners, such as surgeons, who intend to perform and incorporate endocrine ultrasound and procedures into their practice. This curriculum outline is intended to detail the minimum criteria only in terms of knowledge and expertise which should be attained by specialist Breast and Endocrine surgeons who will be undertaking ultrasound as part of their clinical practice.

Prerequisites

Advanced surgical training or FRACS, advanced physician training or FRACP or equivalent. Learners should have completed the Applied Physics in Ultrasound unit.

Course Objectives

On completing this course learners should be able to demonstrate:

- Effectively perform a cervical/neck ultrasound examination
- Understand the Sonographic imaging criteria of thyroid and parathyroid 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:

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 haematoma 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.

Anatomy:

- Understand thyroid anatomy, normal dimensions of the thyroid in adults and children and its relationship to the trachea.
- Understand the embryology of thyroid and thymus.
- The location of the pyramidal lobe and the frequency with which it occurs.
- Demonstrate the ability to calculate thyroid volume and knowledge of the normal mean thyroid volume in the adult.

- Understand the blood supply of the thyroid including the positions of the superior and inferior thyroid arteries as well as the superior, middle and inferior thyroid veins.
- Understand the anatomy of the strap muscles, sternocleidomastoid and longus colli muscle and relationships to the thyroid gland.
- Understand the relationship of the recurrent laryngeal nerves to the thyroid gland and inferior thyroid artery.
- Identify the oesophagus and understand its relationship to the thyroid and trachea.
- Knowledge of the carotid arteries and branches, internal jugular vein and tributaries.
- Understand the distribution of lymph nodes in the cervical region and the nomenclature used to label the lymph node compartments.
- Understand the usual locations of the parathyroid glands and their relationships to the recurrent laryngeal nerve and inferior thyroid artery and thymus.
- Understand the variations in parathyroid locations and the frequently encountered ectopic sites.
- Understand the dimensions and weight of a normal parathyroid gland
- Identify and understand the anatomic relations of the major salivary glands

Performance of Ultrasound Examination of the Cervical Region:

- Understand the indications and rationale for thyroid and parathyroid ultrasound.
- Demonstrate the optimal positioning of a patient for ultrasound examination of the neck.
- Demonstrate a system for a thorough examination of the vital cervical structures.
- Demonstrate manoeuvres which enhance the examination of poorly visualized regions in the neck.
- Demonstrate proficiency in correlating ultrasound images with clinical findings.
- Understand and demonstrate the benefits of Doppler examination and its relevance in thyroid and parathyroid pathology.

Sonographic Imaging Criteria of Thyroid Pathology:

- Identify the sonographic features of benign hyperplastic or colloid nodules and adenoma.
- Recognise the sonographic features of papillary thyroid carcinoma including vascularity and patterns of microcalcification.
- Understand the common distribution of lymph node metastases and recurrences in papillary thyroid cancer and the features of pathologic nodes on ultrasound.
- Understand the limitations of ultrasound and fine needle biopsy in the diagnosis of follicular carcinoma.
- Understand the sonographic features of medullary thyroid carcinoma and its association with the multiple endocrine neoplasia (MEN) type II syndromes.
- Understand the presentation of anaplastic thyroid carcinoma and the features and limitations of ultrasound examination in this disease.
- Understand the typical sonographic features of thyroid lymphoma.

- Understand the features which differentiate benign and malignant nodules including internal contents, echogenicity, halo, regularity of margin, calcification and vascular flow patterns.
- Understand the significance of thyroid isthmus thickness in diffuse thyroid conditions.
- Understand the sonographic features commonly encountered in subacute granulomatous thyroiditis (de Quervain's), autoimmune lymphocytic thyroiditis (Hashimoto's), and Graves' disease.

Sonographic Imaging Criteria of Parathyroid Pathology:

- Understand the common presentations of primary hyperparathyroidism and the biochemical features of the disease.
- Understand the causes of primary hyperparathyroidism and frequency of adenoma, multiglandular disease and carcinoma.
- Demonstrate the typical locations and sonographic appearance of parathyroid adenoma.
- Understand the typical sonographic features of parathyroid carcinoma.
- Understand the common ectopic locations for parathyroid adenoma and techniques which can be employed to visualize these sites.
- Understand the role of ultrasound in the investigation of persistent or recurrent hyperparathyroidism including the features of graft-dependent disease.
- Understand the sonographic features of parathyroid glands in secondary hyperparathyroidism.
- Be aware of the normal and pathologic cervical structures which may produce false-positive results during neck sonography for parathyroid adenoma.
- Understand the sensitivity of ultrasound in parathyroid localization and the factors which influence accuracy.
- Understand the role of other imaging modalities in parathyroid localization and their role in facilitating minimally invasive surgery.

Ultrasound Directed Interventional Procedures:

- Demonstrate competency in performance of diagnostic interventional techniques namely FNAB
- Understand the role of core biopsy in the evaluation of specific subtypes of thyroid nodules.
- Demonstrate competency in the identification and biopsy of pathologic lymph nodes.
- Understand the role of thyroglobulin assay in the assessment of suspicious lymphadenopathy.
- Be aware of the role of intraoperative ultrasound as an adjunct in the surgical exploration for difficult hyperparathyroidism cases.
- Understand the role of percutaneous biopsy in the management of parathyroid nodules and the use of PTH assay in this setting.

Training

- Recognised through attendance at an ASUM accredited Endocrine 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 Endocrine courses

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 five and a half (5.5) 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 unit 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. 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 may be used.
- A post-test will be conducted at the end of the course that includes this unit as formative assessment.

Assessments

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

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) endocrine scans
 - Twenty (20) needle interventions procedures, of which a minimum of five (5) are to be endocrine 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 endocrine.
- Annual performance of twenty (20) needle interventions per year of which a minimum of five (5) to be endocrine.
- Attendance or participation in at least one ultrasound teaching course every four (4) years.

Resources

American Association of Clinical Endocrinologists and Associazione Medici Endocrinologi medical guidelines for clinical practice for the diagnosis and management of thyroid nodules. *Endocr Pract* 2006; 12(1):63-102.

Fish SA, Langer JE, Mandel SJ. Sonographic imaging of thyroid nodules and cervical lymph nodes. *Endocrinol Metab Clin North Am* 2008; 37(2):401-17, ix.

Hoang JK, Lee WK, Lee M, Johnson D, Farrell S. US Features of thyroid malignancy: pearls and pitfalls. *Radiographics* 2007; 27(3):847-860.

Low TH, Delbridge L, Sidhu S, Learoyd D, Robinson B, Roach P et al. Lymph node status influences follow-up thyroglobulin levels in papillary thyroid cancer. *Ann Surg Oncol* 2008; 15(10):2827-2832.

Brennan MF, Norton JA. Reoperation for persistent and recurrent hyperparathyroidism. *Ann Surg* 1985; 201(1):40-44.

Soon PS, Delbridge LW, Sywak MS, Barraclough BM, Edhouse P, Sidhu SB. Surgeon performed ultrasound facilitates minimally invasive parathyroidectomy by the focused lateral mini-incision approach. *World J Surg* 2008; 32(5):766-771

Baskin HJ. Detection of recurrent papillary thyroid carcinoma by thyroglobulin assessment in the needle washout after fine-needle aspiration of suspicious lymph nodes. *Thyroid* 2004; 14(11):959-963.

Formulated by Combined RACS/ ASUM Working Committee for the Development of Breast & 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

Endocrine 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)

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Identifies

Thyroid gland
Trachea
Oesophagus
Carotid artery
Internal jugular vein
Strap muscles
Sterno-mastoid
Cervical lymph nodes

Describes appearance & pathology

Thyroid nodules number
size
features
Parathyroid adenomas
size
position
Abnormal lymph nodes number
level
features
Setup for US guided FNA

Competent	Prompted	Fail
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Artefacts

Identifies & explains the basis of common

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Record Keeping

Abnormal lymph nodes
number
level
features
Set up for US guided FNA
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: _____