

# **Standard Operating Procedure (SOP) for the use of ultrasound in the Emergency Department 2006**

## **Introduction**

This SOP relates to the use of emergency ultrasound undertaken by non-radiologists in the Emergency Department at Addenbrooke's Hospital, Cambridge.

It is based upon the 2005 Guidelines 'Ultrasound Training Recommendations for Medical and Surgical specialties', produced by the Faculty of Clinical Radiology of The Royal College of Radiologists in conjunction with the Faculty of Emergency Medicine (1) and now incorporates a competency based assessment tool and guidelines from the College of Emergency Medicine (2).

## **Overview**

There are three levels of practitioner status as well as a trainee. Trainees progress from being a trainee to a level 1 practitioner when they have fulfilled all the criteria outlined. A Level 1 practitioner can develop their practice to Level 2 status but need to be supervised by a Level 2 practitioner. The criteria for each level of training (including trainee) is outlined below.

## **Trainees in emergency ultrasound:**

- Will initially only train in the core indications namely:
  - Trauma
  - Aortic aneurysm
  - Vascular access
- Must be registered within department as a trainee in emergency ultrasound and be allocated an ultrasound practitioner as trainer.
- Must register all scans on the scan database log.
- Must have attended a recognised basic ultrasound course, or modular equivalent.
- Must have scans supervised by a recognised trainer (Level 1 practitioner or above).
- Initially scans must be supervised as real time, subsequently supervision can be undertaken using hard copies. To enable hard copy supervision the trainee must have satisfied their trainer that they have the necessary competency. Trainees may gain competency in the three core indications at different stages.
- Must keep all hard copies must be filed in the departmental log until verified by trainer.
- Must regularly review all scans with trainer (scans will not be accredited until reviewed)
- Must keep a personal logbook of all scans undertaken.
- Level 1 practitioners may make a written record in the patient's notes whenever a scan is undertaken. Trainees may note positive findings only and must NEVER RULE OUT a diagnosis.

## Level 1 Practitioner

Level 1 training is seen as the standard of knowledge and practice that EM doctors should have in the future. We encourage uptake of knowledge and competency early in training, but would certainly anticipate that SpRs would achieve this by the end of their 4<sup>th</sup> year. Practice at this level would usually require the following abilities:

- ◆ To perform common examinations safely and accurately
- ◆ To recognise and differentiate normal anatomy and pathology
- ◆ To diagnose common abnormalities within certain organ systems
- ◆ To recognise when a referral for a second opinion is indicated
- ◆ To understand the relationship between ultrasound imaging and other diagnostic imaging techniques

### Theoretical training

Preliminary theoretical training should cover relevant anatomy, the physics of ultrasound, levels and sophistication of equipment, image recording, reporting, artefacts and the relevance of other imaging modalities to ultrasound. This element of training may be best delivered by linking with some of the excellent courses run by University departments accredited by the Consortium for the Accreditation of Sonographic Education (CASE).

#### **Anatomy**

- ◆ Normal anatomy of the abdomen and pelvis
- ◆ Normal anatomy of the neck

#### **Physics and instrumentation**

- ◆ The basic components of an ultrasound system
- ◆ Types of transducer and the production of ultrasound, with an emphasis on operator controlled variables
- ◆ Use of ultrasound controls
- ◆ An understanding of the frequencies used in medical ultrasound and the effect on image quality and penetration
- ◆ The interaction of ultrasound with tissue including biological effects
- ◆ The safety of ultrasound and of ultrasound contrast agents
- ◆ The basic principles of real time and Doppler ultrasound including colour flow and power Doppler
- ◆ The recognition and explanation of common artefacts
- ◆ Image recording systems

#### **Ultrasound techniques**

- ◆ Patient information and preparation
- ◆ Indications for examinations
- ◆ Relevance of ultrasound to other imaging modalities
- ◆ The influence of ultrasound results on the need for other imaging
- ◆ Scanning techniques including the use of spectral Doppler and colour Doppler

#### **Administration**

- ◆ Image recording, storing and filing
- ◆ Reporting
- ◆ Medico-legal aspects – outlining the responsibility to practise within specific levels of competence and the requirements for training
- ◆ Consent
- ◆ The value and role of departmental protocols
- ◆ The resource implications of ultrasound use

## **Practical training**

Practical experience should be gained under the guidance of a named supervisor trained in ultrasound within a training department.

The syllabus set out includes a competency assessment sheet for training. This should be completed during the course of training, as it will help to determine in which area(s) the trainee can practise independently.

- ◆ Practical training should involve regular emergency department or radiology department ultrasound, with approximately five examinations performed by the trainee (under supervision) per week.
- ◆ Training should be supervised by a Level 2 practitioner or a Level 1 practitioner with at least 1 years' experience of Level 1 practice.
- ◆ The goal of training is adequate competency, and this must be demonstrated rather than rigid adherence to a fixed number of training scans. Trainees should aim to collect a logged number of examinations, (nominally 50, [half directly supervised] consisting of 20 FAST, 20 AAA assessments and 10 vascular access), though a trainer may assess as competent a trainee who has not completed this number of scans. A clinician working in emergency medicine will need to devote sufficient time to gain Level 1 competence. This may be as much as one session per week but is unlikely to be in dedicated blocks of time. Sessional attachment to an Ultrasound Department or another Emergency Department may be necessary. However, different trainees will acquire the necessary skills at different rates, and the key end point of the training programme should be judged by an assessment of competencies.
- ◆ Examinations should concentrate on the core clinical indications of trauma, aortic aneurysm and vascular access where there are benefits of an early focused ultrasound scan in the Emergency Department or acute assessment area.
- ◆ A logbook listing the types of examination undertaken should be kept. All training scans must be logged, and 10 cases should be accompanied by case histories and details of follow up.
- ◆ An additional pictorial record containing an illustrated description of 10 cases in which the trainee has been personally involved may be collected and is a useful confirmation of experience when moving between departments.
- ◆ Trainees should attend an appropriate theoretical course and should be familiar with the published literature on focused emergency ultrasound.
- ◆ During the course of training the competency assessment sheet should be completed as this will determine in which area or areas the trainee can practise independently.

## **Assessment (see the Triggered Assessment Form (3))**

Assessment of training should cover the following areas;

### **Knowledge**

- ◆ Physics and technology, ultrasound techniques and administration
- ◆ Sectional and ultrasonic anatomy
  - Kidneys
  - Liver
  - Spleen
  - Retro-peritoneal structures (aorta, IVC)
  - Vessels: internal jugular veins, carotid arteries, femoral veins and arteries
- ◆ Pathology in relation to ultrasound
  - Kidneys: trauma/free fluid
  - Liver and spleen: trauma/free fluid
  - Retroperitoneal: presence or absence of abdominal aortic aneurysm (AAA)
  - Vessels: vascular access
  - Cardiac scan: trauma/pericardial tamponade, pericardial effusions, asystole

### **Competencies**

- ◆ To be able to:
  - Recognise normal anatomy
  - Use focused ultrasound to assist in bedside emergency department decisions
  - Recognise the limitations of a scan and be able to explain these limitations to patients/carers
  - Recognise patients requiring formal specialist sonographic assessment
  - Incorporate ultrasound findings with the rest of the clinical assessment
- ◆ To be able to use ultrasound in the context assessment of:
  - Focused assessment by sonography for trauma (FAST)
  - AAA screening/detection in symptomatic patients
  - Peri-arrest scenario for pulseless electrical activity (PEA)/tamponade/effusion
  - Vascular access
  - Pleural and pericardial fluid

## **Maintenance of Skills**

- ◆ Having been assessed as competent to practise there will be a need for CPD and maintenance of practical skills
- ◆ An emergency trainee will need to continue to perform ultrasound scans throughout the remainder of the training programme and into his/her consultant appointment. Such further ultrasound practice may be intermittent, but no more than 3 months should elapse without the trainee using his scanning skills. If more than 3 months elapses the trainee must be re-assessed with a DOPS by a trainer.
- ◆ All practitioners should have regular meetings within the department to ensure appropriate focused emergency ultrasound use. The department lead for ultrasound practice will have regular contact with radiological colleagues and should have a named radiologist as an 'ultrasound mentor'.
- ◆ Practitioners should:
  - Include ultrasound in their ongoing CME
  - Audit their practice
  - Participate in multidisciplinary meetings
  - Keep up to date with relevant literature

## **Continuing Medical Education and Professional Development**

The minimum amount of on-going experience in ultrasound as outlined in each syllabus should be maintained.

CME/CPD should be undertaken which incorporates elements of ultrasound practice.

Regular audit of the individual's ultrasound practice should be undertaken to demonstrate that the indications, performance and diagnostic quality of the service are all satisfactory.

## **Summary: Level 1 Practitioner**

- Attend an appropriate theoretical course
- Regular ED or radiology department ultrasound,
  - approximately 5 supervised exams per week.
  - nominally 50 examinations, [half directly supervised]
  - 20 FAST, 20 Aorta and 10 vascular access
  - Logbook
- The key end point: triggered assessment of competencies.
- Concentrate on the core clinical indications of FAST, AAA and vascular access.

## **Level 2 Practitioner**

- Must have completed Level 1 practitioner status for one year and be completing 3-5 scans per week.
- Must have completed at least a further 150 scans
- Must keep a personal logbook of all scans undertaken.
- Must keep pictorial logbook of minimum of 10 cases
- Must be supervised by a Level 2 practitioner with at least 2 years experience at this level.
- Must be able to perform at least three of the following:-
  - Ultrasound-guided invasive procedures
  - Initial assessment for patients with loin pain / renal colic
  - A focussed assessment of patients with hypotension
  - Proximal DVT assessment
  - Detection of foreign bodies and fluid collections within soft tissues
  - Assessment of symptomatic women in the first trimester of pregnancy
  - Emergency Department obstetric presentations

## **Level 3 Practitioner**

- Fulfil requirements outlined in the Royal College of Radiologists Guidelines.

## **References**

1. Ultrasound Training Recommendations for Medical and Surgical specialties. Board of the Faculty of Clinical Radiology of the Royal College of Radiologists (2004). Royal College of radiologists, London.
2. Emergency Medicine Ultrasound Level 1 training guideline (2006). The College of Emergency Medicine, London.
3. Emergency Ultrasound Competency Triggered Assessment. Atkinson, P & CEM Ultrasound Subgroup. Adapted from de Cossart and Fish 2005©

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August 2006

For review December 2007