

Introductory Emergency Ultrasound Workshop

Emed Ultrasound offers a series of workshops on Point-of-Care Emergency Ultrasound developed by practicing emergency clinicians for clinicians working in emergency or critical care environments.

The **Introductory Emergency Ultrasound Workshop** covers the primary applications for bedside emergency ultrasound and can be considered to include those indications that identify specific life threatening conditions in which ultrasound is recognised as a standard imaging modality and ultrasound-guided procedures such as vascular access that may be time critical:

Focused Abdominal Sonography in Trauma (FAST)

Assessment of Suspected Ruptured Abdominal Aortic Aneurysm (AAA)

Identification of Pelvic Free Fluid (Blood) in Suspected Ruptured Ectopic Pregnancy

Emergency Cardiac Ultrasound in Cardiac Arrest

Ultrasound-Guided Vascular Access

The course includes a series of lectures and small group hands-on practical training and provides both for a realistically defined ranges of ultrasound competencies to be taught and acquired and focuses specifically on time critical scenarios where the use of point-of-care ultrasound has been demonstrated to impact significantly in decreasing morbidity and mortality.

For those registrants attending the workshop and considering using point-of-care emergency ultrasound in their clinical practice, the practical experience for competency should be consistent with the Australasian College for Emergency Medicine's Policy on 'Credentialing for ED Ultrasonography: Trauma and Suspected AAA', which also reflects international consensus.

The use of ultrasound by clinicians, particularly in the critical care or emergency environment is usually performed at the bedside simultaneously with the clinical examination, resuscitation or procedure. Typically the bedside examination performed by the clinician is designed to answer one or two specific questions and completed within a few minutes or to guide a procedural intervention. Emergency ultrasound is performed, interpreted and integrated rapidly into patient management and decision making regarding disposition.

In the context of trauma, physical examination of the abdomen is often equivocal for intra-abdominal injury (Schurink et al: 204 consecutive patients with possible blunt abdominal trauma: 45% equivocal examination increasing up to 84% in those with lower rib fractures).

In trauma the use of focused bedside ultrasound has been shown to be an accurate screening tool in abdominal trauma, it is rapid, non-invasive, repeatable, portable and does not involve radiation or contrast.

The Sonography Outcomes Assessment Programme (SOAP)-1 Trial published in Annals of Emergency Medicine in 2006 (Melniker et al) demonstrated the following positive outcomes associated with the use of FAST ultrasound:

1. Less time to operative intervention (57 minutes versus 166 minutes)
2. Shorter hospital lengths of stay (6.2 days versus 10.2 days)
3. Fewer complication rates
4. Lower likelihood of undergoing a CT examination

Plummer et al reported the benefits of introducing bedside echocardiography by emergency physicians in the clinical context of penetrating cardiac injuries (Ann Emerg Med 1992). Plummer reported on 49 patients presenting with penetrating cardiac injury over a 10-year period and compared the outcomes prior to the introduction of emergency ultrasound to those after its introduction. Comparing the retrospective control group, the use of bedside echocardiography significantly reduced the time to diagnosis and disposition to the operating theatre from 42.4 +/- 21.7 minutes to 15.5 +/- 11.4 minutes. This was associated with an improved survival rate from 57.1% to 100%.

In suspected ruptured abdominal aortic aneurysm the use of bedside ultrasound has been associated with decreased time to diagnosis and improved outcome. With bedside ultrasound time to diagnosis has been shown to be as low as 5.4 minutes as compared with 83 minutes when traditional diagnostic criteria are used (Acad Emerg Med 1998).

Central venous access is associated with a number of complications including excessive bleeding, inadvertent arterial puncture, vessel laceration, pneumothorax and haemothorax. With the traditional 'landmark' based approach to central access a 20% failure rate with a 10% complication rate has been reported that is even higher in the emergency setting. There are a number of studies, which demonstrate a higher success rate and lower complication rate with ultrasound-guided vascular access. The largest study to date published in Critical Care in 2006 by Karakitsos et al was a prospective trial of 900 patients comparing the traditional landmark technique with ultrasound-guidance for central access. Key benefits identified included:

Reduction in needle puncture time

Increased overall success rate (100% vs 94%)

Reduction in carotid puncture (1% vs 11%)

Reduction in carotid haematoma (0.4% vs 8.4%)

Reduction in haemothorax (0% vs 1.7%)

Decreased incidence of pneumothorax (0% vs 2.4%)

Reduction in catheter related infection (10% vs 16%)

In the USA the Department of Health and Human Services Agency for Healthcare Research and Quality Report published guidelines recommending the use of ultrasound to guide central venous access in 2001. The following year in the UK the National Institute of Clinical Excellence (NICE) published similar guidelines recommending the use of ultrasound.

Ultrasound can also be used to guide difficult peripheral vascular access and ultrasound-guided basilic vein cannulation has been shown to be very successful in the emergency department setting in whom it was difficult to obtain other peripheral access.