Echocardiography training for non-cardiologists

Echocardiography, once the exclusive domain of cardiologists, is increasingly found in the hands of front-line clinicians from a variety of specialties. This article explores the role of echocardiography within acute care and discusses existing opportunities for training.

Introduction

Echocardiography is increasingly used outside the traditional cardiology environment. This article explores the benefits, drawbacks, opportunities and challenges associated with this technological expansion.

Transthoracic echocardiography can provide information which guides the management of the acutely ill (Colebourn et al, 2008), and it has been reported that novice operators can obtain diagnostically useful images with relatively little training (Royse et al, 2006). Doctors practising anaesthesia, acute medicine, emergency medicine and critical care now frequently use echocardiography to identify pathology, monitor haemodynamics, and assist with interventions. Echocardiography may be combined with lung, abdominal and vascular ultrasound to form a comprehensive sonographic assessment.

This dissemination of echocardiography has been made possible by the growing availability of affordable, portable ultrasound technology. The recent emergence of hand-held devices may herald the beginning of a new era of ultrasonic clinical examination – front-line clinicians exchanging stethoscope for ultrasound (Cooper, 2014).

The role of echocardiography in acute care

Echocardiography has been suggested as a core skill for emergency medicine (Labovitz et al, 2010), acute medicine (Royse et al, 2012), trauma (Ferrada et al, 2011), anaesthesia (Canty et al, 2012), resuscitation teams (Price et al, 2010), and intensive care (Seppelt, 2007). Training in echocardiography at the undergraduate level is advocated (Royse et al, 2012) and ultrasound training programmes for medical students have been shown to be feasible (Bahner and Royall, 2013).

The use of clinician-delivered echocardiography appears to increase the detection of significant pathology and to frequently impact upon management (Stanko et al, 2005; Orme et al, 2009; Razi et al, 2011). In detection of major abnormalities, clinician-delivered echocardiography has been reported to have similar sensitivity as scans performed by an expert (Colebourn et al, 2008; Lucas et al, 2009; Ferrada et al, 2011; Razi et al, 2011).

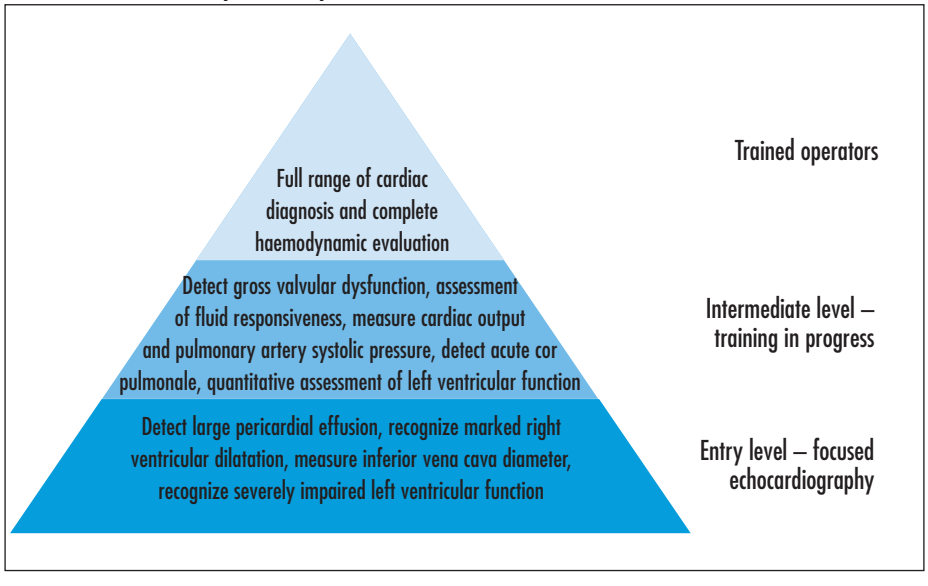
This rapid expansion of echocardiography use has, however, created a number of training and governance issues (Price, 2005). The consensus response has been to develop a tiered structure of echocardiography training (*Figure 1*)(Walker, 2010) within which the majority of non-cardiology echocardiographers will develop entry-level skills allowing them to identify gross, life-threatening pathology. A minority will go on to develop more advanced abilities, on a par with accredited echocardiographers within the cardiology department (Colebourn et al, 2010).

Training opportunities

For the doctor seeking to develop echocardiography skills, a number of opportunities exist. At entry level, clinicians may embark on a 'focused' echocardiography programme. In general, these begin with a 1- or 2-day course introducing echocardiography theory and providing hands-on scanning experience (*Table 1*). This is followed by a period of supervised practice in the workplace during which the trainee undertakes fifty scans under the supervision of a competent practitioner.

This training format is offered by a number of groups including Focused Emergency Echocardiography in Life Support (FEEL), Focused Assessed Transthoracic Echocardiography (FATE)

Figure 1. Tiered approach to echocardiography training in critical care demonstrating focused, intermediate and advanced levels. Adapted, with permission, from Walker (2010).



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and Focused Intensive Care Echocardiography (FICE). These programmes provide candidates with the ability to identify gross pathology, for example severe left ventricular dysfunction or pericardial effusion. Front-line clinicians are thus equipped with the skills to elicit life-threatening issues at any time of day or night, but with the expectation that findings will be validated by an experienced echocardiographer when the opportunity arises.

From the authors' own experience and observations, completing a focused echocardiography programme can be challenging. Workplace training and supervision can be difficult to obtain. There are currently too few supervisors given the demand for echocardiography training in the acute specialties, and cardiology departments understandably prioritize the training of their own staff over those from other areas. Furthermore the degree of enthusiasm for focused echocardiography varies between hospitals and this impacts upon the opportunities for training, the availability of necessary equipment and the time allowed to trainees for developing what may be regarded as non-core skills. It is therefore advisable to combine focused echocardiography course attendance with placement in a department equipped to provide the necessary training and supervision.

Advanced accreditation

For the clinician who wants to go beyond level 1 accreditation, the British Society of Echocardiography is the primary regulatory body and offers a number of accreditation pathways. Non-cardiologists may choose between the standard, transthoracic accreditation which focuses on primary cardiac pathology and is the accreditation sought by those working within cardiology services; critical care accreditation which has a more acute theme; or transoesophageal echocardiography accreditation (*Table 2*).

British Society of Echocardiography accreditation allows candidates to develop advanced diagnostic level skills under the supervision of an established echocardiographer. It requires subscription to the British Society of Echocardiography, passing a written exam and practical assessment. It is recommended that the whole process should be undertaken over a period of 2 years. It can be challenging for non-cardiologists to identify a supervisor although some centres now offer formal fellowships in critical care echocardiography.

There are also a number of opportunities to learn and develop echocardiography outside the standard UK training pathways. Several universities offer distance learning qualifications ranging from postgraduate certificate up to masters level. These teach theory and develop reporting skills but provide no scope for image acquisition. Similar online modular programmes are provided by commercial organizations. Accreditation is also obtainable from European, American or Australasian regulatory bodies. In general the requirements are similar to British Society of Echocardiography accreditation but the degree of recognition of overseas qualifications by UK employers varies.

Conclusions

Echocardiography is undoubtedly a useful tool in the assessment of the acutely ill patient and seems likely to become a core

Table 1. Focused echo training programmes

	FEEL (Focused echo evaluation in life support)	FATE (Focused assessed transthoracic echocardiography)	FICE (Focused intensive care echocardiography)
Professional body	Resuscitation Council (UK)	USabcd.org	Intensive Care Society
Views	Parasternal long axis view, parasternal short axis, apical four-chamber, subcostal, pleural	Parasternal long axis view, parasternal short axis, apical four-chamber, subcostal, pleural	Parasternal long axis view, parasternal short axis, apical four-chamber, subcostal, lung bases
Pathology	Pericardial collection, gross ventricular function, cardiac activity	Pericardial collection, measurement of ventricular dimensions, pleural collection	Ventricular function, ventricular dimensions, volume status, pericardial collection, pleural collection
Training	One-day course, 50 cases	Two-day course, practical/theory exam	1–2-day course, 50 cases

KEY POINTS

- Echocardiography is increasingly used outwith the traditional cardiology role.
- Echocardiography appears to assist in decision making within acute medical specialties.
- The expansion of echocardiography has led to training and governance issues.
- 'Focused' echocardiography programmes have been developed to provide structured training of core skills.
- More advanced opportunities exist for those wishing to train in greater depth.

Table 2. Formal British Society of Echocardiography accreditation programmes

	Standard transthoracic echocardiography accreditation	Critical care transthoracic echocardiography accreditation	Transoesophageal echocardiography accreditation
Fees	British Society of Echocardiography membership (£60) + exam fee (£150)	British Society of Echocardiography membership (£60) + exam fee (£150)	British Society of Echocardiography membership (£60) + exam fee (£150)
Exam	25 multiple choice questions, 10 case studies with videos	25 multiple choice questions, 10 case studies with videos	100 single best answer questions
No. of cases required in logbook	250 – cardiology case mix	250 – critical care case mix	125 (75 if already transthoracic accredited)

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area of training and practice in acute, emergency and intensive care medicine. It is an exciting time for clinicians in these areas. As knowledge and experience in the use of echocardiography improves, so too will the quality of care provided to patients. **BJHM**

Conflict of interest: Dr P Madhivathanan organizes and teaches on a FICE course; Dr A Zafiropoulos and Dr S Gillon have taught on FEEL and FICE courses.

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Further Information

British Society of Echocardiography – www.bsecho.org/home/

Focused Intensive Care Echo (FICE) – www.ics.ac.uk/ics-homepage/events/fice-bse/focused-intensive-care-echo-fice/

Focused Echo Evaluation in Life Support (FEEL-UK) – www.feel-uk.com

FATE – www.fate-protocol.com

University of Melbourne Postgraduate Certificate (distance learning) – www.heartweb.com.au

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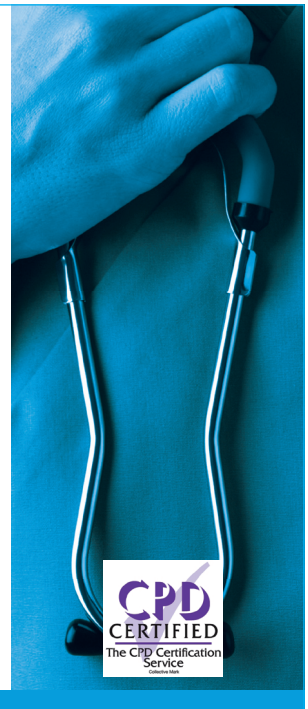

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