

## Introduction

Echocardiography in the critical care setting is increasingly being recognised as a valuable aid to diagnosis and guide to therapy<sup>1</sup>.

Critical Care echocardiography is rapidly developing field. Previously largely limited to peri-operative trans-oesophageal echocardiography (TOE) in cardiac surgical patients, and a cardiology led transthoracic echocardiography (TTE) service targeted at specific cardiological questions, it's use has expanded to the more generalised critical care population both as a diagnostic and haemodynamic management tool. It can provide clinically vital information on cardiac structure and function, but also to haemodynamic status<sup>2</sup>, which is of fundamental significance to the intensive care physician.

This change in practice has many triggers and there has been increasing focus in recent years on the use of ultrasound to expedite diagnosis, particularly in the acute trauma and peri-resuscitation settings<sup>3</sup>.

Evidence suggests that focused training can be successful in producing a degree of competency, even in non-expert hands, sufficient to guide management<sup>4,5</sup>. And, whilst the intensive care population tend to pose significant technical challenges to even experienced echocardiographers, the relevant information can be discerned in the majority of cases.

In addition, transthoracic echocardiography is now more accessible to the non-cardiologist with the advent of focused training on a national scale (eg FICE, FEEL FAST etc), and technological advances mean that the machines have become much more portable and affordable.

### **1.1 Types of Transthoracic Echo on ICU**

#### ➤ **Focussed Intensive Care Echo (FICE)**

This is a limited study looking to give an global but not detailed assessment

#### ➤ **BSE Level 1 Echo**

This is an interim level of study and represents a slightly more detailed focussed study and is bridge the gap between FICE and BSE Level 2

#### ➤ **Full Echo/BSE Level 2**

This provides a detailed comprehensive and departmental level assessment



# Guidelines for the Use of Transthoracic Echocardiography in Critical Care

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## Critical Care ECHO service at RSCH:

The unit aim is to provide a full in-house echocardiography service and the majority of the ICU echos are carried out by the ICU team which currently includes 5 consultants FICE certified and 2 Consultants capable of full Level 2 studies, as well as a number of consultants and junior doctors in training for FICE.

### 1.4 Current ICU Echo sessions at RSCH :

- Monday pm: Dr Hindocha
- Tuesdays: Dr Hindocha/Phillips/Harrison- depending on available
- Other days: Ad hoc sessions depending on availability

### 1.5a How to book a Critical care echo: Non time critical

- In-house as first line, if possible
- Fill in request form for Critical Care Echo on Panda (note this is separate from the Echo request form for the Cardiology department, and...
- Discuss with ICU echo team (see above)

If an echo is deemed to be time-critical and is out-of hours or in house echo is not possible, an echo can be organised as part of an urgent cardiology review. Routine departmental requests via Bamboo are not encouraged for the ICU patients except in special circumstances.

### 1.5b How to book a time-critical or urgent echo:

- Discuss with ICU Echo team if available
- If not available....
- Discuss with on call Cardiology SpR for an urgent review

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## **Critical Care ECHO at PRH:**

Currently, there are no dedicated in-house echo sessions at the PRH ICU site. Therefore, in general if an echo is required on PRH ICU, this will need to be booked via the echo department or as part of a Cardiology review by Cardiology Spr/Consultant on duty. Currently, cardiology cover is limited to daytime 09:00- 17:00, and depending on availability.

## **ECHO REPORTS:**

All in-house echos are reported on Metavision with a short summary in the notes. A printed copy is filed in the notes and electronic report can be found under the ICU Echo tab under the Doctors forms.

For comprehensive BSE studies, an additional report may be found on the Medcon reporting system.

Where studies are carried out by the on call Cardiology team or Echo physiologist, a report should be entered in the notes in the first instance pending formal reporting on Medcon.

As we are a training unit for transthoracic echos, a number of studies will be carried out by sonographers in training. Whereas these are often supervised studies, a number of them will be conducted without direct supervision. These studies will be reviewed prior to being formally reported on the systems. Where findings are critical, an interim report may be provided prior to formal review with caveats, however in most cases these findings should be corroborated with a FICE certified sonographer or with the cardiology team.

## **ECHO STORAGE AND ARCHIVE:**

All echos carried out using the ICU echo machine are stored on the machine for a minimum period of 1 year. They are also downloaded onto the cardiology Medcon system and integrated with the patients file, and are accessible to the wider clinical teams. This allows remote review and is an important aid to timely clinical decision making.

## **ECHO Machines:**

There are 3 dedicated echo machines between the 2 sites (Vivid S70 at RSCH and PRH, with an additional Vivid I at PRH). Use of these machines is limited to those who have had specific training. For everyone else, there are other ultrasound machines with echo probes (Sonosite and Vscans) which can be used.

## **Transthoracic Echo training:**

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Currently, we run a number of training programmes to include FICE, BSE Level 1 and also BSE Level 2 (Adult Critical Care Echocardiography) and we also support BSE Level 2 (Adult Transthoracic Echocardiography).

There are a number of weekly hands-on training sessions as well as echo review and monthly thematic teaching sessions for anyone interested in learning about transthoracic echo, as well as a range of teaching materials.

We run an annual FICE course nationally, and also offer a fellowship for training in echocardiography which is for a period of a year initially, but can be extended to 2 years.

## ICU ECHO Trainers:

BSE and FICE Supervisor: Dr R Hindocha

FICE and Level 1 Trainer/Supervisors: Drs Hindocha/Phillips

FICE Mentors: Drs Phillips/Baldwin/Harrison

Author: R. Hindocha; April 2018 + revised 2022;

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### References

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3. Breitzkreutz, R., Walcher, F., Seegar, F. (2007). "Focussed echocardiographic evaluation in resuscitation management: Concept of an advanced life support-conformed algorithm". Crit Care Medicine **35**: S150-161.
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