focused Transoesophageal Echocardiography accreditation (fTOE)

Introduction

Welcome to the fTOE accreditation pathway, a joint collaboration between the Intensive Care Society (Society) and the Association of Anaesthetists (Association).

fTOE is valuable when unexplained life-threatening circulatory instability persists despite corrective therapy, and whenever a focused ultrasound scan (FUSIC) is unable or unlikely to discover the problem.

Below is a table of contents to help you easily find the information you need.

Contents

Accreditation pathway

Accreditation in fTOE requires:

1. Finding a supervisor to oversee the accreditation.
2. Registration via the Intensive Care Society website, on the fTOE module page
3. Both members of the Society and Association of Anaesthetists are eligible to pay the member rate for fTOE accreditation. Association members will be provided with a discount code to apply at the checkout.
4. Completing the e-learning modules on the Society's FUSIC® Portal
5. Completing a face-to-face course (optional).
6. Performing supervised and unsupervised practice, leading to completion of a logbook demonstrating knowledge of an appropriate range of pathology. Logbook examinations must be collected within a **12-month** period.
7. Being assessed by a supervisor to have the necessary competencies for fTOE.
8. Taking the final practical assessment via the Association of Anaesthetists. Information on the practical assessment can be found here

fTOE accreditation (all the steps above) must be completed within **24 months** of registration, **though all scans, together with the related logbook must be completed within a 12-month window**. Extensions will only be granted in special circumstances by advanced application to the fTOE Committee. This can be done by emailing the ICS learning team.

Identification of a recognised supervisor

Before beginning your fTOE accreditation journey, we strongly recommend that candidates **first identify a recognised supervisor**. Having the right supervisor ensures you receive appropriate guidance and support throughout the process, which is essential for a successful accreditation experience. Once you have secured a supervisor, you can proceed to **register for the accreditation via** the Society website. If you are unable to identify a supervisor at this stage, please contact the ICS learning team for assistance.

The fTOE Supervisor is any healthcare professional working in intensive care, anaesthesia, cardiology, emergency, or acute medicine able to demonstrate:

- Suitable echo experience, as defined by an appropriate Level 2 TOE accreditation (e.g., BSE, EACVI, ASE)
- Regular practice in TOE.
- Able to demonstrate active engagement with local echo governance.

Supervisors need to be approved by the fTOE Committee. Application forms can be found on the Society's website here.

Responsibilities of a Focused TOE Supervisor

1. Delivering coaching to the candidate, including directly supervised cases.
2. To coordinate training and coaching.

3. Reviewing all the candidate's scans and reports (ideally, periodically) throughout their training.
4. To provide expert advice and review of scans when needed by the candidate.
5. "Sign-off" of the candidate's logbook, in preparation for their Final Practical Assessment.

There are two ways to secure a supervisor:

1. Contact the ICS learning team, to identify a registered Supervisor.

   OR

2. Ask someone in your hospital who meets the right criteria to apply via the ICS website here.

Registration

Registration is an essential way to ensure that you are kept up to date with all aspects of the accreditation. To start the fTOE accreditation, candidates must register via the Intensive Care Society website by visiting the fTOE module page. The fee to join the accreditation pathway is:

- £97 for Association of Anaesthetists and Intensive Care Society members
- £146 for Associate members
- £195 for Association and Society non-members

The accreditation pathway fee covers the administration, online training, development and clinical governance costs associated with running the programme. Please note that there will be an additional fee for the practical assessment:

- £220 for Association and Society members/associate members
- £330 for Association and Society non-members

More information on the practical assessment can be found here You do not need to sign up for the practical assessment at the same time as the accreditation pathway. You only need to register for the practical assessment when you think you are nearly ready to pass it. Please note, that there will only be two opportunities in the year to take the practical assessment.

Completion of eLearning

The mandatory e-learning can be accessed via the Society's FUSIC® Portal. Details on how to access the FUSIC® Portal can be found on the Society's fTOE homepage.

The price of e-learning content is included in the cost of registration. fTOE pathways are accessible upon registration and enrolment and enable full access to materials such as theoretical modules, clinical cases and multiple-choice questions (MCQs). The e-Learning modules **must** be completed before commencing mentored practice and collecting the logbook of scans.

Attendance at an fTOE approved course

Simulation-based learning is recommended prior to commencing supervised practice and collecting logbook cases. Candidates who do not have access to simulation-based learning are advised to attend an fTOE approved course to gain this experience. However, please be advised that attending an approved course or performing simulation training is not mandatory to successfully completing the fTOE accreditation pathway. **All candidates should complete the e-Learning before simulation-based learning, attending a course or commencing scanning**. fTOE F2F courses can be accessed here or by contacting the ICS learning team.

Supervised practice and completion of logbook

The minimum number of examinations required to demonstrate competence and experience for the accreditation pathway is **50 (fifty)** fTOE examinations. Candidates with accreditation in FUSIC Heart (formerly FICE), FUSIC HD, BSE Level 1, BSE Level 2 (TTE or ACCE), EACVI or EDEC, require 30 fTOE examinations.

- The **50 exams** (or **30 exams** for those with relevant related accreditation, as explained above), must be completed within **12 months** from the date that the first examination was completed.
- The supervisor must confirm that first **20 exams** have been directly supervised.
- The exams contain minimum dataset and are reported.

- **It is essential that no patient identifiable details should be included within the logbook, and that reporting information is legible and sufficient.**
- Simulation scans should not be included in the logbook, only scans performed on real patients in a clinical setting will be considered.
- Periodic coaching is encouraged throughout the training.

Timeline: Focused TOE echocardiographic examinations must be completed within 24 months from accreditation registration. Furthermore, **the logbook of examinations must be collected within a 12-month period, and this will commence from the date of the first examination.** Once the Supervisor has signed off the training logbook and competency assessment form, **registration for the practical assessment** will need to be completed with the Association by visiting the Association website. If you require **an extension** to the **12 months** allocated to the collection of logbook examinations, application should be submitted at least **4 weeks** prior to the expiry of your **12-month scanning window** to be considered by the fTOE Committee. For more information, please email the ICS learning team.

Supervised examinations: the first **20 fTOE examinations must** be directly supervised by a recognised fTOE Supervisor with accreditation in:

- Level 2 TTE/TOE
- fTOE accreditation with **12 months** experience since accreditation
- EDEC; OR
- An equivalent

Distant supervision: After the first **20 examinations** and assessment of skills relating to probe insertion, probe manipulation, image acquisition and interpretation, the fTOE supervisor may sign the candidate off to undertake fTOE exams under distant supervision, however there are very strict conditions that must be met for distance supervision to be taken forward as a safe and viable option. If these conditions cannot be met, then distance supervision should not be attempted.

Conditions for distant supervision to be permitted:

All scans performed under distant supervision should be promptly reviewed by the nominated supervisor within a clinically meaningful timescale and no clinical action should be taken until this review is completed.

For this, both the candidate and supervisor must have access to the same echo reviewing/reporting platform so that the candidate can upload, and the supervisor can view the scans and feedback instantaneously with the candidate. The aim is that the

supervisor can view and comment on scans so that candidate can act swiftly based on feedback. This usually means candidate and supervisor must be in the same clinical setting or referral region provided their networks facilitate sharing of patient data. The ICS/AAGBI portals are NOT intended for this purpose. As fTOE are not without risks we do

not support practice where scans are performed purely for the purpose of candidate's learning, which are then reviewed a few hours/days later.

Distant supervision should only be performed under the guidance of the approved, nominated supervisor. Candidates should not seek to collect the cases independently for review at a later date or time, nor should this type of activity be undertaken with a colleague who has not been formally approved by the Society.

Secondment: Candidates assigned to a separate hospital or institution away from their usual clinical setting for a dedicated period and are unable to obtain help, should contact the ICS learning team as soon as possible to seek guidance on how to address any challenges such as identifying a supervisor, managing scanning timelines and/or achieving final assessments.

Case mix: Logbook examinations should include patients with cardiac dysfunction and pathology. It is acceptable to include serial/multiple examinations from the same patient if their clinical or radiological picture has changed. No more than 50% of logbook studies should be normal studies. Case-mix should ideally include pathologies such as ventricular dysfunction, pericardial effusion, tamponade, pleural effusion, severe reduced preload/hypovolemia.

Reporting: The standard fTOE report should be completed after each examination. Once a candidate has registered for the accreditation pathway, they will have access to the Learning Portal. All reporting forms are available to the candidate after enrolment.

Review: The Supervisor is responsible for:

- reviewing the logbook
- signing off for distant supervision, probe handling and insertion
- confirming that the candidate has undertaken studies and acquired competence in an appropriate range of pathology.

It is recommended that candidates and Supervisors meet regularly to review studies, examinations, and practice. Over time, an increasing agreement in interpretation between the candidate and Supervisor should be noted.

Competence: Candidates acquire skills at a different pace, and more than the suggested number of cases may be required for the candidate to become competent.

The Supervisor is responsible for assessing competence and whether the candidate has undertaken an adequate number of scans before the final practical assessment.

Assessment of competence

Once you have performed and logged an appropriate number of examinations and have had your competencies signed off, you may undertake a final practical assessment.

Prior to attending the final practical assessment, you must ensure that your examinations, reporting form and competency assessment have been completed, dated, and signed off by your registered FUSIC® approved Supervisor. You should submit all your examinations, reporting form and competency assessment for review by uploading these via the FUSIC® Portal.

If your examinations and final competencies are not signed off by a FUSIC® approved Supervisor, they cannot be accepted.

Once the steps as explained above, and requirements for the final practical assessment as detailed further below have been completed and you have passed the final practical assessment, you will receive a certificate of accreditation from the Society and the Association in fTOE.

Focused TOE minimum dataset

An fTOE examination is based on **8 relevant views** (listed in the table below) and it can provide the operator with the necessary information to identify the etiology of haemodynamic instability.

A Focused TOE examination is based on **2-dimensional (2D)** ultrasound and qualitative colour flow Doppler (CFD) assessment to confirm **2D impression** of gross valvular abnormalities. The operator should be familiar with CFD optimisation including box position, box size, scale, and baseline.

fTOE certification does not include pulse wave or continuous wave Doppler as these have many pitfalls and require considerable experience to perform correctly.

Guidance on Views - Focused Transoesophageal Echocardiography

Views	Modality	Description
1. Mid-oesophageal Four chamber view (ME4Ch)	2D and CFD across MV and TV	Eyeball LV and RV function, Identify RWMA, Septal dyssynchrony, Gross structural abnormalities, Identify severe mitral or tricuspid regurgitation, Pericardial effusion, Atrial septal defects (ASD).
2. Mid-oesophageal Two-chamber view (ME 2Ch)	2D and CFD across MV	Eyeball LV function, Identify RWMA, Gross structural abnormalities, Identify severe mitral regurgitation, Thrombus in Left Atrium appendage (LAA).
3. Mid-oesophageal Long Axis View (ME LAX)	2D and CFD across AV	Eyeball LV function, Identify RWMA, Gross structural abnormalities, Identify severe aortic or mitral valve disease, Systolic Anterior Motion (SAM) and LVOT Obstruction.
4. Mid-oesophageal Ascending Aorta Long Axis View (Asc Ao LAX)	2D	Significant aortic root dilation, Ascending Aortic dissection.
5. Mid-oesophageal bicaval view (ME Bicaval)	2D	Cannula, pacing wires position.
6. Mid-oesophageal Right Ventricle inflow-outflow (ME RV Inflow-Outflow)	2D and CFD across TV	Eyeball RV function, Severe tricuspid valve disease, PA catheter position.
7. Transgastric Midpapillary Short Axis View (TG Mid SAX)	2D	Eyeball LV function, RWMA, hypovolemia/low pre-load, pericardium, septal position.

Views	Modality	Description
8. Descending Aorta Short Axis View (Desc Ao SAX)	2D	Dissection, left pleural effusion, mobile atheroma, Intra-aortic balloon pump position.

fTOE report

It is recommended that candidates use a standard fTOE report. The report can be found on the FUSIC® Portal in the fTOE section. Refer to pages 10 and 11 for exemplar reporting forms for further guidance.

Questions to be asked by each study

Answer: yes/no/unsure

- Is the LV dilated?
- Is the LV significantly impaired?
- Is the RV dilated?
- Is the RV significantly impaired?
- Is there pericardial fluid?
- Is there evidence of low pre-load (vasodilation/hypovolaemia)?
- Is there pleural fluid?
- Is there significant incompetence or flow restriction across the valves?
    - Tricuspid - Y/N
    - Aortic – Y/N
    - Mitral – Y/N

Other comments can be made, and conclusions should relate back to the clinical findings.

Logbook report

All logbook reports and summary sheets must be fully anonymised and legible. All reports should include relevant clinical information including the clinical scenario, haemodynamics and level of organ support.

Logbooks are for training purposes only. Training reports **must not** be entered into the patient's notes, nor should major treatment decisions be made based on them, unless they are verified by an accredited practitioner.

The logbook should be signed off by the Supervisor and will be reviewed during the final practical assessment.

Logbook reporting guidance

Patient details: ***Any patients identifiable details to be deleted for logbook cases*** **Date:**		**Indications:** *e.g., intraoperative cardiac assessment, hemodynamic instability* **Vasoactive or mechanical support:** *Type and dosage of any inotropic or vasopressor support and any mechanical cardiac support (e.g., ECMO, IABP) to provide clinical context.* **BP:** **HR:**			**Insertion: easy/difficult** **Complications: Y/N** **(Specify e.g. blood on probe)**
Left ventricular cavity size	Normal	Reduced	Dilated	LVIDD (cm) or LVEDA (cm^2) *TG mid-short axis view.*	*Measurements (e.g., LVIDD or LVEDA) are required if the cavity appears abnormally small (e.g., hypovolemic shock) or dilated (e.g., heart failure).*
Left ventricular function	Normal	Severely impaired	Severe RWMA	FAC (%) or EF (%)	*Measure if LV impaired:* *TG mid-short axis view for FAC or derived EF (2D or M-Mode), only if gross RWMA absent. Simpson's biplane method not required.*
Right ventricular size	Normal	Dilated	RVIDD (cm)	*ME four-chamber view. Measure RV basal and mid-cavity diameters if RV appears enlarged. Report RV:LV ratio if RV dilated.*	
Right ventricular function	Normal	Severely impaired	*Describe qualitative function (loss of radial/longitudinal contraction). Ideally support with one measurement (e.g. FAC).*		
Mitral Valve structure	Normal	Abnormal	*Comment qualitatively on leaflet morphology (e.g., normal, thickened, prolapsing or restricted).*		
Mitral valve function	Normal	Significant stenosis	Significant regurgitation	*Describe function qualitatively as normal, stenotic or regurgitant. Describe any regurgitation or stenosis using descriptive terms such as 'trace/mild', or 'significant.' If regurgitation or stenosis is present, comment on whether it is significant or not.*	

Patient details: ***Any patients identifiable details to be deleted for logbook cases*** **Date:**		**Indications:** *e.g., intraoperative cardiac assessment, hemodynamic instability* **Vasoactive or mechanical support:** *Type and dosage of any inotropic or vasopressor support and any mechanical cardiac support (e.g., ECMO, IABP) to provide clinical context.* **BP:** **HR:**		**Insertion: easy/difficult** **Complications: Y/N** **(Specify e.g. blood on probe)**
Aortic Valve structure	Normal	Abnormal	*Describe leaflet structure as normal, thickened or calcified without including measurements.*	
Aortic valve function	Normal	Significant stenosis	Significant regurgitation	*Describe function qualitatively as normal, stenotic or regurgitant. If regurgitation or stenosis is present, comment on whether it is significant or not.*
Aorta	Normal	Possible dissection		
Tricuspid Valve structure	Normal	Abnormal	Describe leaflet structure qualitatively as normal, thickened or tethered.	
Tricuspid valve function	Normal	Significant stenosis	Significant regurgitation	*Describe regurgitation severity (significant or not) and comment on visual jet characteristics (e.g., central or eccentric).*
Pericardial effusion	No or small	Large	Chamber collapse	*Describe the effusion as 'absent,' 'small,' 'moderate' or 'large.' Note if there are signs of chamber collapse indicating tamponade physiology.*
Pleural effusion	No or small	Large	*Describe effusion as small, moderate, or large and note laterality (left or right). Measurements are not required unless there is a specific reason for documentation.*	
Any changes in management?	Comment if yes			
Performed by:			Supervised by:	

EXEMPLAR REPORT: NORMAL STUDY

Association of Anaesthetists

Intensive Care Society

fTOE logbook reporting form

Patient details: **Date:**		**Indications:** **Vasoactive or mechanical support:** **BP:** **HR:**			**Insertion: easy/difficult** **Complications: Y/N** **(Specify e.g. blood on probe)**
Left ventricular cavity size	Normal	Reduced	Dilated	LVIDD (cm) or LVEDA (cm^2)	Comments
Left ventricular function	Normal	Severely impaired	Severe RWMA	FAC (%) or EF (%)	Comments
Right ventricular size	Normal	Dilated	RVIDD (cm)	Comments	
Right ventricular function	Normal	Severely impaired	Comments		
Mitral Valve structure	Normal	Abnormal	Comments		
Mitral valve function	Normal	Significant stenosis	Significant regurgitation	Comments e.g., VC	
Aortic Valve structure	Normal	Abnormal	Comments		
Aortic valve function	Normal	Significant stenosis	Significant regurgitation	Comments	
Aorta	Normal	Possible dissection	Comments		
Tricuspid Valve structure	Normal	Abnormal	Comments		
Tricuspid valve function	Normal	Significant stenosis	Significant regurgitation	Comments	
Pericardial effusion	No or small	Large	Chamber collapse	Comments	
Pleural effusion	No or small	Large	Comments		
Any changes in management?	Comment if yes				
Performed by:				Supervised by:	

Note: Reports do not need to be typed, but handwriting must be legible ,therefore block capital text preferred.

Undertaking a Final Practical Assessment

The supervisor decides when a candidate is ready to undertake the final practical assessment; however, they do not participate in the assessment itself. Candidates should only register for the final practical assessment once the following steps have been completed:

- eLearning modules on the Society's FUSIC® Portal
- The **required number of scan examinations** has been performed and logged
- The competency assessment form has been signed off by your supervisor, and the following documents have been uploaded to the Learning Portal:
  - Fully signed competency assessment form
  - All 50 anonymised reporting forms (or 30 forms if exempted).
  - Training logbook summary.
  - For exempted candidates, evidence of completion of Heart ultrasound.

All candidates will be required to attend a practical assessment within **24 months** from registering for the accreditation pathway. Details of how to register for the Practical assessment can be found on the Society's website or Association's website

Dates of the exam will be announced on the Association website. The exam will take place at the Association of Anaesthetists, 21 Portland Place, London W1B 1PY. Other locations may be considered in the future.

All candidates will be required to bring a physical copy of their logbook, and 2 forms of ID (photo ID plus Trust/hospital ID).

The assessment will consist of three components:

1. Review of the completed logbook
2. MCQ exam
3. Simulator-based assessment

Review of the completed logbook

In this section, the quality of the candidate's logbook reports will be assessed. Assessors will check that the examinations have been checked and counter-signed by the Supervisor in the prescribed format. The logbook should not contain any patient

identifiable information. The presence of patient identifiable information will lead to the rejection of the logbook.

Simulator based assessment

This stage involves performing and interpreting a Focused TOE exam in a simulator under direct observation by the examiner. The candidate will be given a clinical scenario and will be required to obtain and acquire the **8 views** in **15 minutes**. The candidate will have **5 minutes** to generate a report, and the examiner may ask questions on specific views.

MCQ exam

The exam consist of a number of theory questions covering the syllabus and image interpretation questions to test fTOE anatomy, views and gross pathology.

	Logbook	MCQ exam	Simulator
Examiner	A, B		C, D
Equipment	Candidate logbook	Pen and paper	fTOE simulator
Description	Examiner to review and discuss logbook with candidate.	Paper-based question paper with overhead projector for image interpretation	Candidate to perform fTOE examination.
Assessment	- Logbook case mix - Timeline allocated for completion	- fTOE syllabus - Image interpretation	Image acquisition Image interpretation
Duration	30 minutes		20 minutes

Submission of your practical assessment

The results of the practical assessment will be sent to the Intensive Care Society. Once evidence of all the components is received and approved by the Society, a certificate of completion co-signed by both the Society and Association will be sent to the successful candidate.

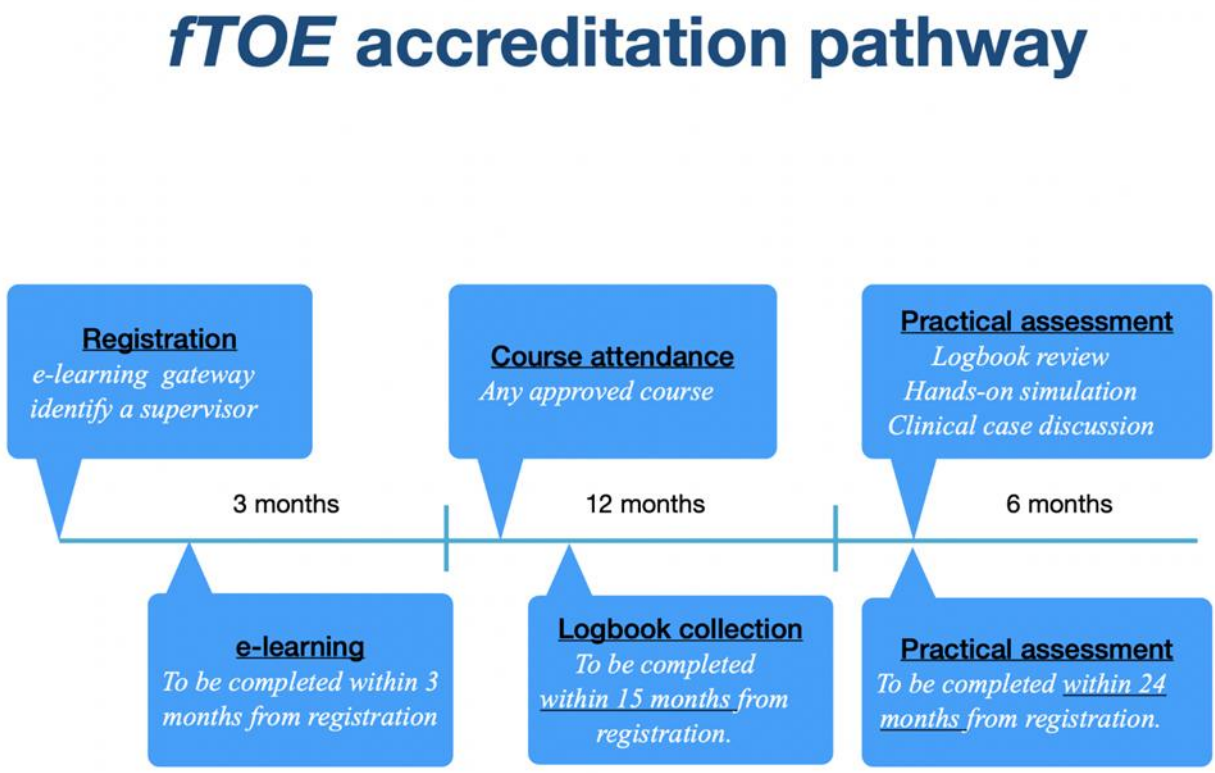
Completion of training

Candidates must complete the process within **24 months**. While we appreciate there may be circumstances that may affect the rate of completion, such as working conditions, facilities available to perform a TOE examination may be reduced,

pragmatic deadlines are necessary to ensure that training is safe and valid. These are as follows:

- Registration to completion: **24 months**
- Collection of logbook cases (first to last): **12 months**.
- Practical assessment presenting "Logbook" and "Summary of Training" documents: **6 months** from the date of the last logbook case

Failure to achieve any of these deadlines may necessitate repeating the entire process from the beginning. Extensions to these deadlines will be considered in exceptional circumstances, but requests must be submitted by email to the learning@ics.ac.uk at least **4 weeks** before the original deadline has lapsed.



Maintenance of competence post accreditation

Once accredited, the successful candidate will be responsible for maintaining knowledge and competence in fTOE by undertaking regular and relevant continuing medical education (CME/CPD).

To maintain practical skills, it is important that accredited operators regularly undertake fTOE examinations that involve an appropriate range of pathology and practical procedures. It is strongly recommended that by maintaining competence candidates should be regularly participating in local or national echocardiographic continuing medical education approved conferences or training courses.

Evidence of fTOE practice and how to keep the skills up to date should be discussed and agreed during an annual appraisal. Undertaking regular audit and multidisciplinary review of performed studies by advanced practitioners is an excellent way to maintain quality assurance. For further guidance on ultrasound governance, please read GPICS-2, section 4.7 (p.138).

Indication and Limitation of fTOE

fTOE should be used, in intensive care when unexplained life-threatening circulatory instability persists despite corrective therapy. fTOE should be considered whenever FUSIC scan is unable or unlikely to answer the clinical question.

This is frequently the case in the acute care setting when transthoracic windows are suboptimal (i.e., very obese, ventilated and/or on high levels of PEEP/CPAP, in patients with chest wall injuries etc.).

In this scenario, while the indication for performing fTOE is clear and should be documented, the patient would unlikely be able to give consent therefore practice might vary between different institutions based on local protocols. A creation of a local checklist or LocSIPP is highly encouraged.

In addition, when available, Focused TOE examination should be considered, in non-cardiac surgery procedures, when patients are at increased risk of hemodynamic instability or ischemia.

The increased risk of cardiac instability is either due to the nature of surgery (significant blood loss/fluid shifts including but not limited to liver transplant, other major abdominal surgery, redo major joint replacement) or due to major surgery in the presence of significant comorbidity like valvular or ischaemic heart disease.

In this context fTOE can be used as an additional monitor and point-of-care tool for real-time answers. The practitioner needs to weigh the potential added value of fTOE

against the known risks of TOE. The intended risks and benefits should be explained to the patient and explicit consent for fTOE should be gained.

TOE is considered standard of care by national bodies in cardiac surgery and patients should be routinely consented for this procedure as part of their surgery. Training for fTOE in this setting should follow the same rules and practice as training in comprehensive TOE.

The goals of a focused TOE examination in a patient with hemodynamic instability include early diagnosis of the aetiology of hypotension and guidance of therapeutic interventions to treat the underlying cause. It has less validity in physiologically normal patients to evaluate chronic cardiac disease; a comprehensive echo is still the investigation of choice in these patients.

fTOE should be performed in an environment where the "added value" of the fTOE can be realised in a timely fashion, no exam should be performed without clinical indication.

fTOE curriculum and indications

Global and regional left ventricular function

Determination of global left ventricular systolic function is one of the most common indications of fTOE and it is based on qualitative and visual estimation supported by simple 2D measurement. With a similar concept, regional wall motion abnormalities should be assessed.

Right ventricular function

Assessment of right ventricular function is equally important in hypotensive patients and is based on size, shape, and visual estimation in reduction in surface area and TAPSE.

Patients presenting for liver transplantation with pulmonary hypertension have additional risk for right ventricular dysfunction secondary to acute changes in pulmonary pressures associated with volume shifts and acid base disturbances during transplantation.

fTOE in this population allows rapid determination of cardiac status and therapeutic advantages over invasive monitoring alone. It is important to assess for right ventricular strain in ARDS/ALI.

Severe low pre-load

Severe low pre-load is a common cause of hemodynamic instability in the perioperative period. In an emergent setting, a TOE probe can be placed quickly and provides real-time assessment of left ventricular cavity size, although there is limited validity of this measurement being directly associated with pre-load or fluid responsiveness.

SVC respiratory variation – this has some validity for fluid responsiveness but requires correlation with the other monitoring and clinical context.

Pericardial effusion and thoracic trauma

Echocardiography plays an integral part in the evaluation of trauma involving the thoracic cavity. In trauma, rapid diagnosis and intervention are crucial to optimizing patient outcomes. fTOE offers a mobile diagnostic tool that provides a rapid, accurate diagnosis of pericardial effusions, traumatic aortic injuries, and cardiac contusions.

Both physical trauma (blunt or penetrating thoracic trauma) and iatrogenic trauma (during invasive procedures) can result in the accumulation of a pericardial effusion. If the effusion accumulates rapidly, hemodynamic instability may ensue, and fTOE can facilitate treatment with pericardiocentesis.

Tamponade and post cardiac surgical haematoma. TTE is not reliable to rule out post cardiac surgical haematoma and tamponade. fTOE is the preferable examination here.

Pulmonary embolism (PE)

Although TOE is not the gold standard for PE diagnosis, it compares well with computed tomography when the PE is acute and central. Echocardiographic findings consistent with acute PE include signs of right ventricular dysfunction (e.g., dilation and hypokinesis) and atypical regional wall motion abnormalities of the right ventricular free wall.

Basic valvular lesions

Although specific semi-quantitative assessments do not have to be obtained, recognition of a significant basic valvular lesion should be recognised. The mechanism

and degree of any valvular lesion should require consultation with a physician with advanced TOE capabilities.

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