Basic Perioperative Transesophageal echocardiography course for non-cardiac anaesthesiologists

Conduct of anaesthesia has now reached a trajectory where use of echocardiogram appears useful even in non-cardiac practice. This topic needs to focus on a practical, competency-based curriculum, incorporating both techniques of Transesophageal (TEE) imaging and point of care ultrasound. There must exist a strong emphasis on perioperative applications and real-time image interpretation, while ensuring safety and ethical considerations. The intention of this core curriculum and syllabus is to define a unifying framework for education and training. This is aimed to result in competence in focus cardiac ultrasound for varied medical professionals dealing with diagnostics and cardiovascular emergencies like non cardiac anaesthetists, Critical care, emergency physicians and trauma specialists. It may not be a hyperbolic statement that in the very near future all doctors may have to understand and practice echocardiography.

1. Curriculum:

   The course will be tailored to the needs of medical professionals, emphasizing the use of echocardiography both TEE and POCUS for critical care management, perioperative risk assessment, intraoperative monitoring and post-operative management. The emphasis will be more on TEE (70%), and 30% on POCUS.

   A) Basic techniques

   The course will cover TEE techniques, including relevant 2D views, M-mode, spectral Doppler, and colour flow imaging. POCUS course will cover the interrogation of the heart and lungs with the i-aim principle (indication, acquisition, interpretation, and management).

   B) Real time image interpretation

   At the end of the course the participants will be expected to interpret echocardiograms in real-time, focusing on identifying relevant findings and assist in making clinical decisions with respect to their field of speciality.

   C) Case studies and simulation: The course is aimed to incorporate simulation-based learning and case studies to enhance practical skills and decision-making abilities wherever possible.

   D) Ethical Considerations:

The participants should be able to address ethical issues related to echo, including patient safety, informed consent, and data privacy.

2. Training modules:

A) Hands-on Training: Enrolled candidates should undergo hands-on practice with echocardiography machines and ultrasound probes at the recognised centre of their choice or at places of their work under the supervision of their seniors.

B) Mentorship and Supervision:

The enrolled candidates will choose an experienced certified echocardiographer as mentor to guide and supervise the trainees.

The nominated supervisors for TEE course will be from the IACTA. The list of supervisors along with their affiliated institutions will be available on the IACTA website.

C) Logbook and Assessment:

Enrolled candidates should maintain a logbook of minimum 15 case scenarios including 5 video cases of TEE combined both supervised and independent which will be evaluated by the supervisors to track the training progress and to evaluate competency.

D) Continuing Education:

3. Candidates should be encouraged to attend echo workshops, webinars, conferences for continued learning and enhancing professional competency. The board will hold online classes twice a month for a period of one year (24 classes) from the date of enrolment.

4. Key Topics to Cover:

A) Basic Physics of Ultrasound and knobology: For acquiring and image optimisation. Familiarity with ultrasound machine controls and imaging techniques.

B) Anatomy and Physiology of the Heart: Review the anatomy and physiology of the heart and cardiovascular system.

C) Echocardiographic Techniques:

Participants to be taught techniques of performing TEE,

D) Transthoracic Echocardiography (TTE) (relevant to POCUS):

Basic views - Parasternal long axis, short axis, apical 4 chamber view, Subcostal view and Aortic valve short axis view to assess the pulmonary arteries along with

assessment of chamber size and function, intra cardiac shunts, valve function and pericardial effusion.

Lung ultrasound- Diagnosis of pneumothorax, pleural effusions, pulmonary oedema, lung injury.

E) TEE:

Basic views:

Mid oesophageal 4 chamber view, two chamber view, Mid oesophageal long axis view, Bi-caval view, Hepatic vein view, Trans gastric mid papillary view and descending aortic short axis view.

Candidates should be able to assess myocardial ischemia, volume status and treat adverse hemodynamic instability including cardiac arrest using echocardiography (Rescue TEE).

F) Interpretation of Echocardiograms:

Hemodynamic Assessment:

Interpreting echocardiographic findings to treat adverse hemodynamic, guide fluid management, inotropic support, and other interventions.

G) Complications and Contraindications: Discuss potential complications and contraindications of TEE.

H) Data collection tool, Interpretation and Reporting: Teach participants how to collect, interpret echocardiographic data and prepare reports.

I) Resources and Facilities:

Access to Echocardiography Machines: Ensure access to modern echocardiography machines and ultrasound probes.

Learning Materials: Provide access to relevant textbooks, articles, and online resources.

J) Duration of the course:

One year from June to next May. Yearly 24 on line classes with two Hands-on training workshops (December and June) can be held at VASA centre Bangalore. The June workshop will be followed by theory and practical's which consists of 25 multiple choice questions and 5 video questions.

K) Evaluation and Accreditation:

Candidates can obtain accreditation by appearing for the exams conducted by IACTA. The accreditation will be valid for a period of ten years after which the candidates will have to undergo recertification at a nominal fee.

L) Fees:

Candidates opting for the course should make a non-refundable deposit of Fifty thousand rupees apart from the examination fees of ten thousand as prescribed by the association. Expenses for attending workshops and workshop fees will be borne separately by the candidates.

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Syllabus – Basic TEE

1. Physics of ultrasound
2. Knobology, Image optimisation
2. Basic comprehensive TEE Views
3. Imaging artefacts and pitfalls
4. Surgical anatomy
5. Indications of Intraoperative TEE
6. Systolic LV, RV function assessment
7. Assessment of LV diastolic function
8. TEE assessment of Mitral valve
9. TEE for Congenital heart disease (Shunts)
10. TEE in critical care setting
11. Perioperative Hemodynamic assessment by TEE
12. Perioperative Myocardial viability assessment
13. Lung ultrasound

Syllabus- POCUS TTE and Lung ultrasound

1. Understand the i-aim principle of image acquisition.
2. Three basic windows (parasternal views, apical 4- chamber, and subcostal views) and five views (parasternal long and short axis, apical-4 chamber, and subcostal views)
3. Rapid diagnosis of hypovolemia, LV systolic dysfunction, dissection, thrombus, effusions (pericardial and pleural), major valvular lesions
4. Lung ultrasound- pneumothorax, consolidation, effusion, edema