

Perioperative Hemodynamic Echocardiography (PHE) Fellowship Program

Definition:

Perioperative Hemodynamic echocardiography (PHE) refers to Transesophageal Echocardiography (TEE) or Transthoracic Echocardiography (TTE) performed on patients undergoing non-cardiac surgery perioperatively to assess hemodynamics. PHE is a monitoring tool rather than a diagnostic one. Perioperative hemodynamics assessment can be identified as assessment of loading conditions, ventricular function, regional wall motion abnormality (RWMA), valvular lesion monitoring, dynamic ventricular outflow obstruction, pulmonary embolism, monitoring cardiac output and assessment response to therapy. PHE should be performed by a certified physician in perioperative echocardiography. Appropriate supervision and leadership should be maintained by an individual with advanced

Duration: 12 Months

Application's dead line: Application with 3 reference letters needed to be submitted before October 31

Eligibility: Anesthesiologists with completed Anesthesia training Fellowship /Certification.

Details of the PHE Fellowship Program:

This PHE training program is based in the non-cardiac operating rooms at the Ottawa Hospital. The aim of the Program is to produce qualified echocardiographers with main

interest in utilizing echocardiography in non-cardiac surgery for optimal patient's management (hemodynamic management). The Department of Anesthesiology, University of Ottawa has started this Fellowship program for the first time in 2006. In order to have fair and complete echocardiography training with wide range of clinical experience, the Fellowship has the following rotation;

- Non cardiac ORs (base)
- Cardiac ORs
- Echocardiography Laboratory
- Simulator
- CME

The Fellowship is comprised of 12 months duration, which allows enough time to rotate through all the echocardiography rotation components. However, majority of the training is spent in caring for patients undergoing noncardiac surgery. The fellow is expected to spend 3 days per week in the speciality and 2 days working independently in the non-cardiac operating rooms.

The goals and objectives of the Fellowship are summarized as;

1. Achieve the PHE cognitive and technical skills. (table 1&2)
2. Develop new and high level of monitoring skills in perioperative period
3. Perform qualitative and quantitative assessment of hemodynamics
4. Master hemodynamic management in high risk patients and in patients presented for high risk surgery
5. Meet the requirements of NBE for examination and certification
6. Provide leadership in PHE.

There are periodic formal evaluations of fellow's progress at the end of each rotation. Each fellow keeps a log of all cases performed and reviewed during his/her training to assess the fellow's exposure and knowledge. The case numbers is used to obtain the NBE Certification. The fellow is expected to be actively involved in a research project with national presentation at the Canadian Society of Anesthesiology Annual meeting.

Here are the details of each rotation:

Non-cardiac OR Rotation:

The non-cardiac ORs is the base of the Program. The fellow will start his/her rotation in the non-cardiac ORs and will have the opportunity to be familiarized with the Echocardiography machine and transducers. Basic exams, comprehensive exam and normal structure are taught to the fellow during the first few weeks of the rotation. Efforts are exerted to ensure the sufficient volume and diversity of the cases in different surgical specialities to gain a broad spectrum of perioperative challenges. Main focus is on the hemodynamics, indications and perioperative applications. Once the fellow gets comfortable in obtaining echo images, arrangement for cardiac and echo lab rotation are obtained. The fellow is returning back to the non-cardiac ORs at the end of each rotation. The specific goals and objectives of the non-cardiac echocardiography is to develop the initial basic knowledge in PHE (see above) which include;

- Ultrasound physics and knobology
- Acquiring images, saving and storing
- PHE Indications and contraindications
- Normal echocardiography cardiac structures, blood velocity and directions.
- Normal cardiac function

In addition to the following initial technical skills;

- Operate and navigate through the echocardiography machine.
- Safe insertion of the TEE probe
- Perform a full comprehensive echocardiography exam

At the end of the rotations, the fellow is expected to master a full range of the knowledge and technical skills of the PHE.

Cardiac OR Rotation:

This rotation is important not only from the echo images point of view but also from the clinical experience in dealing with severe or critical cardiac lesions in cardiac surgery patients. It is a one-month full time rotation (5 days/ week). Specific goals and objective in this rotation include;

- Echocardiography as a diagnostic tool
- Exposure to wide variety of cardiac lesions
- Gain experience on how to handle patients with cardiac lesions undergoing general anesthesia (GA) utilizing the Echocardiography monitoring
- Understand and experience what patients with critical cardiac lesion can tolerate and what can't tolerate under GA. Compare the clinical findings with the echo images
- Consolidate TEE skills and interpretations intra-operatively / peri-operatively to help prepare the fellow for the NBE
- Understand the basic concept of different cardiac repair and the echo images associated with the repair.
- Recognize the limitation and asking for help for advanced echo skills when needed

Arrangement is taken to ensure maximum exposure of cases during the cardiac rotation.

Echocardiography Laboratory Rotation:

This rotation consists of one month full time training (5days/week). The rotation is supervised by Cardiology Department during which, the fellow gets full advantage of the

cardiologist's experience and echo skills. The Echo lab at the General campus has been very supportive of the program and has actively participated in teaching the PHE fellows.

Specific goals and objectives during this rotation are;

- Obtain the knowledge and technical skills of performing TTE exam
- Wide exposure with big volume to different cardiac cases and pathology
- Exposure to elective and emergency indications for echocardiography outside the ORs.
- Utilization of different echo modalities, which include 2D, M mode, CFD, PW, CW Doppler, tissue Doppler and detailed measurements.
- Learning the skills of interpretation and reporting of the findings on daily bases with in a big volume environment.

Echo Simulator Training:

This is new rotation and a new technology, which is going to be introduced to our program this year. The Simulator center at University of Ottawa has purchased an echo simulator with ability to perform both TTE and TEE study. Echo probe with an adjustable scan plane can produce an echo view that is demonstrated in real time. Allocation of time for the fellow to ensure enough exposure to simulator will be addressed. Full range of normal views is obtainable by the echo simulator. In addition to some pathology and clinical scenarios. Emerging data shows that the echo simulator is very useful teaching tool for beginners. This rotation will be great for beginners to allow enough teaching time for the echo probe orientations and images.

Echocardiography CME & Echo Rounds:

Four main core lectures are provided to the fellows. This involves:

- Physics and basics of the ultrasounds

- Hemodynamics (systolic and diastolic function)
- Valve lesions and impact on hemodynamics
- Cardiac hemodynamic measurement and Calculations

There are weekly Echo rounds and echo exam reviews. The fellows is also encouraged and supported to attend the annual perioperative echocardiography conducted by the NBE. In addition, Echocardiography archive is full of wide range of images and teaching materials. The fellow is given unrestricted access to all sites and all studies across the city.

Table 1: PHE Knowledge

1. Ultrasound physics and knobology
2. Acquiring images, saving and storing
3. PHE Indications and contraindications
4. Normal echocardiography cardiac structures, blood velocity and directions.
5. Normal cardiac function
6. Abnormal cardiac function and cardiac lesions
7. Utilization of 2D, M mode, CFD, PW, CW Doppler, tissue Doppler and speckle tracking
8. Ability to perform echocardiography measurements
9. Recognize intracardiac or great vessel pathology
10. Recognize their limitation and asking for help for advanced echo skills when needed

Table 2: Technical Skills

1. Operate and navigate through the echocardiography machine.

- 2.Safe insertion of the TEE probe
- 3.Perform a full comprehensive echocardiography exam
- 4.Assess the hemodynamics which include:
 - Loading conditions
 - Ventricular Function / dysfunction
 - RWMA
 - Valvular lesions
 - Shunting
 - Ventricular outflow obstruction
 - Pulmonary Emboli
 - Pericardial effusion
- 5.Reporting the findings

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