

# **CARDIOLOGY AND CARDIOVASCULAR ANESTHESIA**

## **STANFORD UNIVERSITY HOSPITAL**

### ***Perioperative Echocardiography Educational Program and Clinical Services***

#### **Program Goals**

- I. Provide Cardiovascular Anesthesia fellows education in perioperative echocardiography leading to successful completion of the American Society of Echocardiography/Society of Cardiovascular Anesthesiologists Exam in Perioperative Echocardiography.
- II. Establish procedure/format to record and review intraoperative TEE Exams of patients cared for at Stanford University Hospital.
- III. Provide anesthesia residents rotating on Cardiac Anesthesia fundamental skills the use of TEE as an intraoperative monitor.

#### **Program Components**

##### **Goal I**

1. CV Anesthesia Fellows will participate in all ECHO lab activities for a six-week period during their Fellowship. The CV Anesthesia Fellow is expected to function as an integral member of the ECHO team during their echo lab rotation.
2. After completion of their six-week echo lab rotation, the CV Anesthesia Fellow will participate one day per week in all Echo lab activities. The day will be determined by the Cardiology Fellows' Clinic day. Thus, the CV Anesthesia Fellow will perform ECHO exams with the Attending Cardiologist on the day that the cardiology fellow is in the general cardiology clinic.
3. On Wednesday and Friday mornings, the CV Anesthesia Fellow will meet with Drs. Liang and Schnittger, respectively, between 07:50 (8am) and 09:00 (sharp). TEE exams from the previous week will be reviewed. It is expected that all of the exams will be "Q'ed-up" to facilitate optimal use of this one-hour session.

##### **Goal II**

1. We will access and record a TEE exam on every cardiac surgery patient cared for at SUH. The Anesthesia Attending with the Resident is responsible for obtaining these materials and providing appropriate documentation.
2. To enhance the process outlined in number one, a one-hour meeting will be scheduled at the beginning of each month between an ECHO lab ultrasonographer and Anesthesia Resident.

3. At the conclusion of each case, a preliminary report of the ECHO exam will be placed in the patient's chart.
4. Each Resident must keep a log of the ECHO cases performed.

**Goal III**

1. See components two and three for goal I above.
2. Residents rotating on Cardiovascular Anesthesia should be relieved of their OR duties every Wednesday and Friday morning between 07:45 and 9:10 am to attend ECHO exam readings in the ECHO lab. All cardiac anesthesia residents will be "single-covered" on Wednesday and Friday mornings to facilitate resident attendance at the one-hour meetings.
3. The Anesthesia Residents assigned to "TEE" (or HR-4) Resident is responsible for keeping a record of every TEE exam obtained during their rotation.

## **TRANSESOPHAGEAL ECHOCARDIOGRAPHY EDUCATIONAL GOALS FOR CA 2-3 RESIDENTS IN CARDIOVASCULAR ANESTHESIOLOGY AT STANFORD UNIVERSITY**

### **Cognitive Skills**

1. Knowledge of the physical principles of Echocardiographic image formation and blood flow velocity measurement.
2. Understanding of the operation of the ultrasonographic instrument, including the function of all controls affecting the quality of data displayed.
3. Knowledge of the equipment handling, infection control and electrical safety recommendations associated with the use of TEE.
4. Knowledge of the absolute and relative contraindications to the use of TEE.
5. Knowledge of the normal cardiovascular anatomy as visualized tomographically by transverse plane, two-dimensional echocardiography.
6. Knowledge of the normal hemodynamics, fluid dynamics, and blood flow velocity profiles as measured by Doppler echocardiography, including pulsed-wave and continuous-wave Doppler.
7. Knowledge of the echocardiographic presentations of myocardial ischemia.
8. Knowledge of the echocardiographic displays of normal ventricular function and of the major disturbances in ventricular function.
9. Knowledge of native and prosthetic valvular anatomy, and function, as displayed echocardiographically. Knowledge of the major echocardiographic manifestations of valve lesions and dysfunction and of the advanced echocardiographic tools (e.g., continuous-wave Doppler) that are available for valve assessment.
10. Knowledge of the common indications and all contraindications for the use of TEE in congenital heart disease.
11. Knowledge of the principal echocardiographic manifestations of: cardiac masses, thrombi, and emboli; cardiomyopathies; pericardial effusions and tamponade; lesions of great vessels.
12. Knowledge of the physiology and echocardiographic presentation of air embolization.

## Technical Skills

1. Ability to correctly operate an ultrasonographic instrument, including all controls affecting the quality of the displayed area.
2. Ability to safely insert a TEE transducer and adjust the controls to obtain the desired echocardiographic information.
3. Ability to perform a complete, basic echocardiographic examination including all transverse tomographic planes of the cardiovascular structures and relevant color flow Doppler images.
4. Ability to recognize major echocardiographic changes associated with myocardial ischemia, such as large changes in systolic wall thickening or in the grade of wall motion (e.g., from normal wall motion to akinesis).
5. Ability to detect qualitative changes in ventricular function and hemodynamic status as manifested on two-dimensional and color Doppler echocardiography.
6. Ability to visualize all cardiac valves in the longitudinal and short axis views using a transverse transducer. Ability to recognize gross valvular lesions and dysfunction using two-dimensional echocardiography and color flow Doppler.
7. Ability to recognize large intracardiac masses and thrombi.
8. Ability to detect large or hemodynamically significant pericardial effusions.
9. Ability to recognize all echocardiographic manifestations of air embolization, especially in patients in the supine or sitting position.
10. Ability to distinguish adequate from inadequate echocardiographic data and to distinguish an adequate from an inadequate TEE examination.
11. Ability to communicate the results of an echocardiographic examination to the patient, other health care professionals, and the medical record.

## **STANFORD UNIVERSITY HOSPITAL INTRAOPERATIVE TRANSESOPHAGEAL ECHOCARDIOGRAPHY**

### **Reporting Procedures**

Proper documentation of intraoperative TEE studies is very important. Patient benefit, quality assurance, communication with physicians, resident training, and medical insurance reimbursement will be deficient if proper documentation is not completed and maintained.

Please contact Dr. Isidra Veve for written and lecture taped educational materials on TEE. We will review the text, TEE by Catharine Otto over the course of the year. You are welcome to join us one Saturday a month to complete the text.

- 1) You are responsible for obtaining and recording a complete echo exam of any cardiac surgery patient that you care for. You will receive 2 blank tapes at the beginning of your rotation. Please keep these tapes with you during the month.
- 2) The chart or anesthesia record must indicate that intraoperative transesophageal echocardiography was performed.
- 3) Videotape recordings must be made of all intraoperative studies.
- 4) Videotape recordings are a permanent part of the medical record. Care must be taken not to lose or destroy this information. We will archive your tapes at the end of the month.
- 5) To set up the machine before you begin recording, check the following:
  - a. Correct date and time (change with CONF if necessary)
  - b. ID including medical record number and patient name (BEGIN)
  - c. Footage (use TAPE# to set the footage. For a new tape, set the footage to 0. For a tape that has other studies on it already, set the footage to the final number of the last study already on the tape.
- 6) Complete the three forms to document the study.
  - a. The preliminary report form
  - b. The memo to the echo lab
  - c. The green memo echo lab requisition
- 7) When the study is complete make sure that you have noted the correct footage on the preliminary report form and the memo to the echo lab. The memo to the echo lab must be turned in to the echo lab on the same day that the study is completed. The memo may be slipped under the door of the echo lab when no one is there. The preliminary report and the tape must be read out with the cardiologists in the echo lab within 7 days of the study being completed. Keep the preliminary report and the tape together until the reading with the cardiologists is complete.
- 8) Two weekly reading sessions will be held with the cardiologists in the echo lab at 8am on Wednesdays and Fridays. If you will not be able to bring your studies to this meeting for reading, please contact the anesthesia resident on the TEE rotation and arrange for the tape to be available for the reading session. If there is any problem with this arrangement, please go to the echo lab directly and arrange for a reading. It is very important that all studies be reviewed within 7 days of being completed.