Transesophageal Echocardiography Rotation Objectives

Residents completing a one-month elective in transesophageal echocardiography (TEE) will gain a basic understanding of the role of echocardiography in perioperative patient assessment and its integration as a monitor during cardiac surgery. In addition, the core focus will be on performing a complete perioperative examination.

Specific Objectives:

The following specific objectives should be achievable during the rotation:

1. Demonstrate the role of TEE in the perioperative setting including advantages for its use as well as limitations and contraindications.
2. Performance of a complete examination to obtain standard views.
3. Develop proficiency with the current echocardiographic machine in order to obtain reasonable images and be able to store images in digital format.

Clinical Faculty:

- Cardiac Anesthesiologists

Organization of the Rotation:

There is a one-month elective rotation available for senior residents who have completed at least two months of cardiac anesthesia (PGY3 to PGY5).

Resident Rotation -Teaching Techniques:

There are two essential skill sets required to master TEE. There is a physical skill set, being able to manipulate the probe. This is taught in the OR setting under supervision of a consultant anesthesiologist. At this time proficiency with the echocardiography machine is also learned. The second skill set is interpretation, which involves reviewing numerous images. This is taught thru self-directed learning with the consultant as resource person as well as through lectures and case presentations during Wednesday morning didactic rounds.

Clinical Decision Maker/Medical Expert:
Skill sets and topics:

1. Physiology and Anatomy
   The resident is expected to:
   - Describe detailed cardiac anatomy, physiology and its relationship to images obtained during a TEE exam.
   - Know important aspects of the anatomy and physiology of cardiac valves, left ventricle, right ventricle, left and right atria, coronary sinus, SVC, IVC and aorta.

- Be familiar with relevant embryology and physiology as it applies to adult congenital heart disease.

2. Monitoring
   The resident will be able to:

   - Describe the advantages and limitations of TEE as a cardiac monitor.
   - Demonstrate principals of acquisition of cardiac output with TEE.
   - Understand the concepts of wall motion analysis and wall motion scores and the effect of ischemia and other disease processes on this score.
   - Describe ways of monitoring the cardiac ejection fraction.

3. Clinical Assessment
   - This will add to the cardiac rotation in general. Emphasis will be placed on integration of the TEE examination into the presenting disease process as well as integration of the surgical treatment with its possible complications, into the post bypass examination.

4. Clinical Management
   - Will be limited as the scope of the rotation will not allow complex echocardiographic interpretation. Any management issues will be coordinated with the consultant anesthesiologist. However, some basic concepts will be reviewed:
     - Identify potential causes of hypotension on TEE and suggest treatment options (hypovolemia, LV failure).
     - Identify potential high risk stroke patients (poor aorta's) and be aware of alternate treatment strategies for management of these patients.
     - Identify the use of TEE during weaning from bypass and suggest treatment options for hypotension. (volume, inotropes).

5. Knowledge of issues related to cardiac surgery and the role of TEE.
   - Fast-track Cardiac Anesthesia and Surgery.
   - Beating heart surgery.
   - Neuro-cognitive dysfunction, stroke, and aortic pathology.
   - Circulatory Arrest, for cardiac and non-cardiac cases.
   - IABP.
   - CPB and related issues, including minimally invasive cardiac surgery.
   - Left and Right ventricular assist devices.

Communicator:

Effective communication skills will be taught and encouraged at several levels:

- Between Resident and the Cardiac Anesthesiology Attending

    - Communicate TEE findings and the implications for the current procedure or for treatment during unstable events.
- Between Resident and OR Personnel
    - Ensure clear and audible communication with Perfusionist, and Surgeon, to ensure findings are effectively communicated to the cardiac surgical team.
- Between Resident and the Surgeon
    - To provide a brief TEE report to the surgeon to identify potential problems or abnormalities discovered during the examination and to come to an agreement on the presumed best course of action.

Collaborator:

Residents are expected to learn this role in several areas and become increasingly comfortable with it in their senior years:

- Recognize their limitations and seek consultation from medical experts in other disciplines
- Learn how to advise other physicians in an oral format on cardiac issues in which the resident has developed expertise.
- Foster healthy team relationships (ex: refrain from blaming or denigrating others).

Manager:

Residents are taught:

- Collaborative Care Plans between anesthesiology, cardiac surgery and perfusion focusing on patient management.
- The role of new monitoring devices, the cost of these devices and impact on patient outcomes.

Health Advocate:

Health Advocacy requires clinical experience at an advanced level. Resident will learn:

- The role of TEE on improving outcomes in cardiac patients.
- The role of TEE to facilitate minimal access surgery and thus reduce length of stay.
- The integration of scholarly activities, especially through evidence based best practice, to guide the care of the cardiac surgical patient from pre-operative assessment, intraoperative care and postoperative management, to provide for the best possible outcomes.
- The importance of the cardiac team approach, with involvement of nursing, perfusion, surgery and anesthesia to allow for consultation in patient management
- To provide a consistent and standard high level of care through continuous quality review with attention focusing on errors within the cardiac care system.

Scholar:

Residents will be encouraged to develop scholarship in several areas:

- Identify important determinants during the cardiac anesthetic that impact the health and success of the fast-track cardiac patient.
- Identify areas of controversy in the management of cardiac patients using clinical observations, literature searches and seek to practice evidence-based medicine using the best available evidence.
- Contribute to the medical education of other health professionals (clerks, medical students, nurses, RTs etc.)
- Develop an educational pattern of self-study and critical appraisal of ones own performance and knowledge.
- Participate through attendance, interaction and presentation at rounds including departmental, echocardiographic and cardiac didactic teaching.

Professional:

Residents must:

- Always demonstrate respectful, and compassionate behavior toward patients, their families and other health care providers
- Demonstrate an appropriate sense of responsibility to themselves and their patients
- Strive to maintain insight and self-assessment regarding their behavior, learning objectives and achieved goals
- Remain calm and organized in stressful, or emergency situations
- Demonstrate appropriate interactions with colleges and staff

Evaluation:

A one on one interview with the perioperative TEE director is completed at the end of the rotation. Resident feedback is used to improve teaching techniques and rotation specific goals.

Resources:

Written material (books, lecture notes) as well as material on the web site (video taped lectures, electronic journals) is made available to residents. There is also an extensive library of digitally archived images to review. In addition, DVD's are available with course instruction from the Society of Cardiovascular Anesthesia (SCA).