INTRODUCTION TO THE TRANSESOPHAGEAL ECHOCARDIOGRPHY ROTATION

Before Starting the Rotation

It is expected that fellows will have a basic understanding of the different views obtained during TEE, and the cardiac structures typically visible in each of the view.

The following are good starting references:

1) "**A Practical Approach to Transesophageal Echocardiography**"
   Albert Perrino & Scott Reeves. ISBN 978-0-7817-7329-4
   Refer to the "Resources" section on the Fellows' Website

2) University of Toronto's **Virtual TEE** website
   http://pie.med.utoronto.ca/TEE/index.htm

Note: Before starting the rotation, notify Cathy Guard what your clinic day is so that a sonographer can be scheduled to assist when you are not available.

Assessment of Patients Prior to Arrival in the Lab

- **Indications & Appropriateness:**
  Review the indications and appropriateness for performing TEE for each patient. Indication will be appropriate in most cases, for example, endocarditis in a patient with positive blood cultures and poor acoustic windows or a prosthetic valve; or a young patient with recent stroke to rule out PFO. In other cases, however, the indication may not be clear or TEE may not be the best test to perform. For example, a request to evaluate aortic stenosis is usually a mistake as it is typically not a reason to perform a TEE. In such cases, further information should be obtained by reviewing the initial order, reviewing the medical record, or discussing the case with the ordering physician or the TEE attending prior to performing the TEE.

- **Logistics:**
  To optimize logistics in the TEE lab when there are multiple requests, pre-screening for appropriateness (i.e., ***before*** the patient comes for TEE) is essential. This can usually be done the day before the procedure is scheduled. Doing so will prevent patients who are not candidates for a TEE, from coming to the lab – potentially wasting a TEE slot.

- **In-patients:**
  Assessment of inpatients ***prior to*** arrival in the TEE lab should include assessing for contraindications to TEE such as an inability to give consent, unwillingness to agree to the procedure, swallowing difficulty (or presence of dysphagia), loose teeth or other issues. This can be best done by speaking directly with the patient.

- **Additional Data:**
  Ancillary data should be reviewed. These include:

  - Prior TEEs and TTEs
  - Prior CTA or MRI (performed in almost all pre-ablation patients)
  - Reports of prior CABG or valve surgery (to determine if the LAA has been ligated)
  - Prior esophageal issues (history of dysphagia, esophograms, upper endoscopies etc.)

  These data assist in targeting key imaging portions of the TEE. Lack of knowledge of what prior studies showed is inexcusable.

Evaluation of Patients in the Lab Prior to TEE

The "Pre-Conscious Sedation Assessment" form **MUST be completely filled out PRIOR to testing.** This process is very similar to the "Pre-Cath Assessment" but we use our own form. It includes:

- Date & time
- Important historical factors
- A limited physical exam including Mallampati score and dental exam
- Anticoagulation status
- Important labs (e.g., INR, PTT, platelet count & hemoglobin; Cr and K^+ are less important)
- ASA classification: These are noted in the TEE lab for reference. In general, outpatients are Class II; most in-patients with TEE performed in the Echo lab are Class II or Class III. The patient cannot be > Class II for outpatients and > Class III for inpatients that are performed in the TEE lab. Sedation plan is moderate.
- Appropriate consents (one for TEE, one for conscious sedation, & if necessary, DCCV for A-Fib patients).

The risk of **serious complications** for TEE is ~1/2000 (or 1/5th of 1%). The risks include:

- Risks related to sedation
- Aspiration
- Esophageal perforation
- Bleeding (if patient is anticoagulated or has thrombocytopenia)

A **Time-out form** must also be filled out. This form is printed on the reverse side of the TEE consent form.

Most patients will require a TTE prior to the TEE. The information obtained is complementary to the TEE and allows better targeting of specific imaging in the situation where a TEE must be abbreviated. You must inform the attending of having completed the TTE prior to sedating the patient. Frequently this will be reviewed before the TEE is started. The attending may often be busy and not immediately available.

TTE & TEE Presets

The appropriate **presets** should be used. In general, the "VCU ECHO" preset is used for TTEs. The "MK-TEE" preset has the appropriate gains and sweep-speeds for Doppler and color.

Generating the Report

A TEE procedure note (found under "TEE Procedures") needs to be generated in Cerner (except for Dr. Nixon, who generates his own). The results should be limited to just one or two key findings (i.e., "No thrombus seen" or "No vegetation seen"). There is no reason to write a more extensive note as a full Preliminary Report is in the chart and the Final Report is out in Cerner by the end of the day.

When generating a report in Excelera, be sure to use the TEE icon on the dropdown menu. Otherwise, the report goes into Cerner as a TTE.

1) Select the correct procedure under "Procedure" (combination, TTE and TEE)

2) Use the following order for entering the procedure details in the procedure section:
    a. Procedure (TTE and TEE)
    b. ASA Class:
    c. Ease of intubation:
    d. Complications:
    e. Attending present:
    f. Blood loss in not routinely entered (should be under "complications")

    This information does not go in the summary, but in the procedure section.

3) Make sure that the "History" and "Indications for the procedure" make sense and are appropriate for what was actually ordered. For example, for patients undergoing a stroke evaluation, the appropriate reason for the study should be "to assess for ASD or PFO". FYI – "Source of embolus" in not covered by any insurance.

4) Enter the reason for the study from the dropdown menu. If it is not there, you can type it in.

5) The attending for record for the patient is entered in the "Ordering Physician" box. If it is not there, you can type it in.

6) The medications given during TEE should be listed, including individual medications and doses, and should include the Lidocaine Swish and Swallow.

7) Review the Preliminary TEE findings prior to generating your report. Make sure your interpretation agrees with the attending's findings. If on review of the TEE you have disagreement, it is important to discuss it with the attending and come to a consensus.

8) Make sure basic 2D measures are entered.

9) The TEE package does not calculate LV mass. You will have to do it on your own to determine if there is LVH. This is good practice so that you can become familiar with the standard definitions and calculations.

10) Each attending ahs a slightly different preference for how the report should appear. In general, leave the conclusion section at the top blank. The attending will fill this in.

11) Review the final report the attending has generated so that you can become familiar with the different ways the information is finalized, and to become comfortable with different reporting styles.

12) Completeness of filling out the preliminary echo report is an important part of the TEE procedure. The ability to accurately convey the findings to those who ordered the test will be necessary throughout your career, and this provides a good opportunity to begin to acquire this skill.

13) Remember to proofread your report, and if not clear on findings, discuss it with the attending. An incomplete or sloppy preliminary TEE report reflects poorly on the echocardiography lab.

Post-TEE

Familiarize yourself with the process of disconnecting and cleaning the TEE probe after the procedure is complete. You may be assigned this task during your TEE rotation.

Note: The TEE schedule is intermittently busy or slow. When there are few TEEs, the time can be used to prepare for Echo Conference. In addition, you may be asked to assist with TTEs, particularly in the CICU. Since both TEE and TTE knowledge is important, this is considered part of your responsibilities during this rotation.