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| <b>National Imaging Associates, Inc.</b>  |   |
| <b>Clinical guideline</b><br><b>TRANSESOPHAGEAL (TEE) ECHO</b>                            | <b>Original Date:</b> <b>October 2009</b><br><b>Page 1 of 6</b> |
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## INTRODUCTION

- Transesophageal echocardiography (TEE) enables cardiac ultrasonic imaging from within the esophagus, which provides a window for enhanced quality images as well as additional views, beyond that acquired by standard transthoracic echocardiography (TTE).
- TEE can be used as a complement to TTE or as a superior alternative, depending upon the clinical scenario.

### INDICATIONS FOR TRANSESOPHAGEAL ECHOCARDIOGRAPHY (TEE)

(Ayres 2005; Douglas 2011; Hahn 2013; Flachskampf 2014; Manning, 2018)

| <b>TEE as Initial or Supplemental Test—General Uses</b>  |
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| <ul style="list-style-type: none"><li>• Use of TEE after nondiagnostic TTE or when there is a high likelihood of a nondiagnostic TTE due to patient characteristics or inadequate visualization of relevant structures, such as valvular heart disease, prosthetic valve dysfunction, left atrial thrombus, patent foramen ovale, atrial baffles post Fontan, Senning, or Mustard procedures, etc. (Ogbara 2011; Flachskampf 2014; Lancellotti 2013)</li></ul> |

- Re-evaluation of prior TEE finding for interval change (e.g., resolution of thrombus after anticoagulation, resolution of vegetation after antibiotic therapy) when a change in therapy is would be based upon the findings
- Any **ONE** of the following for procedural and surgical guidance, especially when TEE is superior or complimentary to TTE (Thys 2010; Porter 2015):
  - Guidance during percutaneous/transcatheter noncoronary cardiac interventions including but not limited to closure device placement, left atrial appendage closure, ASD closure, radiofrequency ablation, and percutaneous valve procedures (Flachskampf 2014).
  - For intraoperative noncoronary cardiac repair, including, but not limited to, valve repair, congenital defect repair, unanticipated findings or complications of cardiac surgery requiring intraoperative imaging.
  - Suspected acute aortic pathology including but not limited to dissection/transsection when computed tomography angiogram (CTA) and magnetic resonance imaging (MRI) are either not available or not conclusive or not thought to be the optimal first imaging test for clinical reasons (Bhave 2018).
- Dilated aortic sinuses or ascending aorta or a bicuspid aortic valve (stages A and B), to evaluate the presence and severity of AR, when TTE is inadequate.

#### **TEE as Initial or Supplemental Test—Valvular Disease (Nishimura 2014; Doherty 2017)**

- Evaluation of valvular structure, native and prosthetic, and function to assess suitability for, and assist in planning of, an intervention
- Evaluation of the mean mitral gradient and pulmonary artery pressure in mitral stenosis, when there is a discrepancy between resting Doppler echocardiographic findings and clinical symptoms or signs, exercise stress echocardiography is not possible, **AND** TTE is inadequate
- Discordance between clinical assessment and TTE assessment of the severity of MR
- Discordance between clinical assessment and TTE assessment of the severity of AR
- To diagnose infective endocarditis and cardiac complications of infective endocarditis, with a moderate or high pretest probability (e.g., staph bacteremia, fungemia, prosthetic heart valve, or intracardiac device)
- Re-evaluation of infective endocarditis (IE) in a patient with a change in clinical status or cardiac examination (e.g., new murmur, embolism, persistent fever, heart failure (HF), abscess, or atrioventricular heart block (Saric 2016)
- Re-evaluation of IE if the patient is at high risk for progression/complications or for other potential treatment-altering changes, when TTE is inadequate.

#### **TEE as Initial or Supplemental Test—Embolic Event**

- Evaluation of suspected cardiac mass, tumor, or thrombus, or for evaluation of potential cardiac source of embolism when there is no identified noncardiac source (Saric 2016)

#### **TEE as Initial Test—Atrial Fibrillation/Flutter**

- Evaluation to facilitate clinical decision making with regards to anticoagulation, cardioversion, and/or radiofrequency ablation

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| <b>TAVR (Transcatheter Aortic Valve Replacement/Repair) (Doherty 2017, Otto 2017)</b>   |
| <ul style="list-style-type: none"> <li>• Accurate pre-procedural assessment of annular size and shape, number of cusps, and degree of calcification, when computed tomography (CT) cannot be performed (i.e. limited role)</li> <li>• Pre-, peri- and post procedural assessment of degree of aortic regurgitation (including valvular and paravalvular) with suspicion of valve dysfunction, if TTE is inadequate</li> <li>• Intraprocedural guidance of TAVR or paravalvular leak closure (Thys 2010; Porter 2015; Flachskampf 2014)</li> <li>• Assessment of post procedural stroke with suspicion of valve dysfunction, if TTE is inadequate</li> </ul> |
| <b>Percutaneous/Transcatheter Mitral Valve Repair/Replacement (Doherty 2017)</b>  |
| <ul style="list-style-type: none"> <li>• Determination of patient eligibility for procedures such as PMBV, TMVR, edge-to-edge repair, artificial chord implantation, annuloplasty, PVML closure</li> <li>• Pre-procedural evaluation for TMVR, mitral annuloplasty, or PVML closure can be performed in addition to CT imaging (Wunderlich 2018)</li> <li>• Exclude the presence of intracardiac mass, thrombus, or vegetation prior to (within 3 days) the procedure</li> <li>• Intraprocedural guidance of transcatheter mitral valve repair or replacement (Thys 2010; Porter 2015; Flachskampf 2014)</li> </ul>   |
| <b>Left Ventricular Assist Devices (Stainback 2015)</b>   |
| <ul style="list-style-type: none"> <li>• Preoperative evaluation for suitability, intraoperative monitoring during placement, and immediate postoperative evaluation of function</li> </ul>   |

## ADDITIONAL INFORMATION

### Frequency of Echocardiography Studies

- Judgement required, based upon:
  - Stability or change in patient symptoms, exam, lab, and/or X ray data
  - Stability of underlying condition being followed
  - Likelihood of repeat test affecting management

Examples of non-approvable repeat imaging:

- For same imaging test less than 52 weeks (1 year) apart unless specific guideline criteria states otherwise.
- For different imaging tests of same anatomical structure but different imaging type less than six (6) weeks ago (for example, a recent CT or MRI and currently requesting echocardiogram), unless specific guideline criteria states otherwise, and/or there is approval following high level review.
- Additional images from same type of study (e.g. due to poor quality).

## Abbreviations

|      |   |
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| AR   | aortic regurgitation                      |
| CABG | coronary artery bypass grafting surgery   |
| CAD  | coronary artery disease                   |
| CMR  | cardiovascular magnetic resonance         |
| CT   | computed tomography                       |
| ECG  | electrocardiogram                         |
| HF   | heart failure                             |
| LV   | left ventricular                          |
| MI   | myocardial infarction                     |
| MR   | mitral regurgitation                      |
| PBMV | percutaneous balloon mitral valvuloplasty |
| PVML | paravalvular mitral leak                  |
| RV   | right ventricle                           |
| TEE  | transesophageal echocardiography          |
| TIA  | transient ischemic attack                 |
| TTE  | transthoracic echocardiography            |
| TMVR | transcatheter mitral valve replacement    |
| TR   | tricuspid regurgitation                   |

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Reviewed / Approved by  Caroline Carney, MD, Chief Medical Officer