

EXPERT CONSENSUS STATEMENT

Basic Perioperative Transesophageal Echocardiography Examination: A Consensus Statement of the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists

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Members of the Councils on Perioperative Echocardiography are listed in the [Appendix](#).

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INTRODUCTION

This consensus statement by the American Society of Echocardiography (ASE) and the Society of Cardiovascular Anesthesiologists (SCA) describes the significant role of a basic

Abbreviations

ASA = American Society of Anesthesiologists
ASD = Atrial septal defect
ASE = American Society of Echocardiography
AV = Aortic valve
IAS = Interatrial septum
LAD = Left anterior descending
LAX = Long-axis
LCX = Left circumflex
LV = Left ventricular
LVOT = Left ventricular outflow tract
ME = Midesophageal
MV = Mitral valve
NBE = National Board of Echocardiography
PA = Pulmonary artery
PTE = Perioperative transesophageal
PTEeXAM = Perioperative TEE Examination
PV = Pulmonic valve
RCA = Right coronary artery
RV = Right ventricular
RVOT = Right ventricular outflow tract
SCA = Society of Cardiovascular Anesthesiologists
TEE = Transesophageal echocardiography
TG = Transgastric
TV = Tricuspid valve
VAE = Venous air embolism

perioperative transesophageal (PTE) cardiac examination in the care and treatment of an unstable surgical patient. The use of a noncomprehensive basic PTE examination to delineate the cause of hemodynamic instability was originally proposed for the emergency room and neonatal intensive care unit settings and is meant to be complementary to comprehensive echocardiography.^{1,2} However, the principal goal of a basic PTE examination is intraoperative monitoring.³ Whereas this may encompass a broad range of anatomic imaging, the intent of noninvasive monitoring should focus on cardiac causes of hemodynamic or ventilatory instability, including ventricular size and function, valvular anatomy and function, volume status, pericardial abnormalities and complications from invasive procedures, as well as the clinical impact or etiology of pulmonary dysfunction. The basic PTE examination is **not** designed to prepare practitioners to use the full diagnostic potential of transesophageal echocardiography (TEE). Therefore, a basic PTE practitioner should be prepared to request consultation with an advanced PTE practitioner on issues outside the scope of practice as defined within these guidelines. Echocardiographic assessments that influence the surgical plan are specifically excluded from this consensus statement, because their acquisition requires an advanced PTE skill set.

The purposes of the current document are

1. to review concisely the history of basic PTE certification,
2. to define the prerequisite medical knowledge,
3. to define the necessary training requirements,
4. to recommend an abbreviated basic PTE examination sequence,
5. to summarize the appropriate indications of basic PTE examination, and
6. to define maintenance of competence and quality assurance.

HISTORY

TEE was introduced to cardiac operating rooms in the early 1980s.³ Many guidelines have been written that further expand on its utility to facilitate surgical decision making.⁴⁻⁸ The idea of distinguishing basic PTE skills was incorporated into the American Society of

Anesthesiologists (ASA) and SCA practice guidelines for perioperative TEE, published in 1996.⁴ In 2002, training guidelines in perioperative echocardiography that include specific case number recommendations for training in basic and advanced PTE echocardiography were endorsed by the ASE and the SCA.⁵ The evolution of the perioperative echocardiographic guidelines is summarized in Table 1.

The National Board of Echocardiography (NBE) was created in 1998 as a collaborative effort between the ASE and the SCA. The mission of the NBE is "to improve the quality of cardiovascular patient care by developing and administering examinations leading to certification of licensed physicians with special knowledge and expertise in echocardiography," which is accomplished by

1. overseeing the development and administration of the Adult Special Competency in Echocardiography Examination, the Advanced Perioperative TEE Examination (PTEeXAM), and the Basic PTEeXAM;
2. recognizing physicians who successfully complete the examinations as *testamurs*; and
3. certifying physicians who have fulfilled training and/or experience requirements in echocardiography as *diplomates* of the NBE.

In 2006, the ASA House of Delegates approved the development and implementation of a program focused on basic echocardiography education. In 2009, a memorandum of understanding between the NBE and the ASA established a strategic partnership to mutually promote an examination and certification process in basic PTE echocardiography. Specifically, the basic PTE scope of practice was defined as the **limited application** of a basic PTE examination to "non-diagnostic monitoring within the customary practice of anesthesiology. Because the goal of, and training in, Basic PTE echocardiography is focused on intraoperative monitoring rather than specific diagnosis, except in emergent situations, diagnoses requiring intraoperative cardiac surgical intervention or post-operative medical/surgical management must be confirmed by an individual with advanced skills in TEE or by an independent diagnostic technique." A comprehensive and quantitative examination is thus not in the scope of the basic PTE examination, but those performing basic PTE echocardiography must be able to recognize specific diagnoses that may require advanced imaging skills and competence.

NBE criteria for certification in basic PTE echocardiography include

1. possession of a current medical license,
2. current board certification in anesthesiology,
3. completion of one of the perioperative TEE training pathways (Table 2), and
4. passing the Basic PTEeXAM or Advanced PTEeXAM.

MEDICAL KNOWLEDGE

PTE echocardiography is an invasive medical procedure that carries rare but potentially life threatening complications and therefore must be performed only by qualified physicians. The application of basic PTE echocardiography can often dramatically influence a patient's intraoperative management. A thorough understanding of anatomy, physiology, and the surgical procedure is critical to appropriate application. Because of the risks, technical complexity, and potential impact of TEE on perioperative management, the basic PTE echocardiographer must be a *licensed physician*. Previous guidelines have addressed the cognitive knowledge and technical skills necessary for the successful use of PTE and are summarized in Table 3.⁴⁻⁷ The NBE's Basic PTEeXAM knowledge base content outline is described in Table 4.

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