Rescue TEE: Most Interesting Cases
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Learning Objectives:

The participant will be able to;

a. Describe the most useful TEE views during rescue echocardiography
b. Recognize common diagnoses associated with the need for rescue TEE

I. Indications for TEE in noncardiac surgical patients

Transesophageal echocardiography (TEE) is an important diagnostic monitor of cardiac performance in patients undergoing cardiac surgery. There are three major uses of TEE in the noncardiac surgical patient. TEE can be used as a diagnostic rescue tool in patients experiencing significant intraoperative hemodynamic instability, as a monitor of cardiac performance and as a tool to define cardiovascular pathology and guide interventions in the noncardiac surgical setting. Here we will focus on TEE as a rescue tool.

II. Practice guideline update for perioperative echocardiography

The 2003 ACC/AHA/ASE guideline update for clinical application of echocardiography added a section titled intraoperative echocardiography (1). This guideline was based on the ASA/SCA 1996 practice guideline. They list seven class I indications in which there is evidence or general agreement that TEE is useful or effective. Three out of seven class I indications for intraoperative echocardiography pertain to the noncardiac surgical patient. These include (1) TEE used in the rescue situation for evaluation of “acute, persistent, and life threatening disturbances in which
ventricular function and its determinants are uncertain and have not responded to treatment”; (2) TEE used to evaluate pericardial window procedures in patients with posterior or loculated pericardial effusions; (3) TEE used in the placement of intracardiac devices and the monitoring of their position during port-access and other cardiac surgical interventions. They list one Class IIa indication for TEE that pertains to TEE in the noncardiac surgical patient and this is when TEE is used as a monitoring tool in patients at high risk for myocardial ischemia or myocardial infarction or hemodynamic disturbances.

More recently, ASA/SCA 2010 practice guideline update for perioperative echocardiography update discussed indications of perioperative TEE and noted that TEE is indicated as a rescue tool and as a monitoring tool where cardiovascular pathology might result in severe hemodynamic, pulmonary or neurologic compromise(2).

III. TEE as a Rescue Tool

One of the common reasons we perform a TEE in the noncardiac surgical situation is when we are called to use TEE as a rescue tool. This is the situation where a patient is suddenly in cardiac arrest or near cardiac arrest and the team taking care of the patient would like to know what the possible causes are so they can better direct their therapies.

All causes of potentially treatable hemodynamic compromise need to be ruled out. Therefore, a TEE exam in the rescue situation is focused and goal directed. Time permitting, the 20 standard TEE views may be obtained but the main focus in the rescue TEE exam is to make the correct diagnosis in a timely fashion in order to help direct the patient’s subsequent therapy.
Common causes for such catastrophic events include the following:

- myocardial ischemia, infarction
- left ventricular dysfunction
- unanticipated hypovolemia
- dynamic left ventricular outflow tract obstruction
- pericardial effusion and/or tamponade
- pulmonary embolism
- intracardiac thrombus, mass or air
- aortic dissection
- acute valvular regurgitation
- pleural effusion or ascites

Studies have shown that the role of TEE in critical emergency intraoperative settings is beneficial in establishing a diagnosis and directing definitive therapies in up to 80% of patients (3,4). We published a retrospective study looking at patients who required emergency TEE in the noncardiac setting and found that TEE was helpful in establishing the diagnosis in 86% of the patients (5). A third of the patients benefited from the TEE diagnosis and survived the operation and were discharged from the hospital.

Although transthoracic echocardiography (TTE) can also be utilized in the rescue situation(6), TEE may be more useful because in the emergency setting, acquisition of certain TTE imaging windows, that are dependent on patient positioning (ex. parasternal
and subcostal views), may be limited. Secondly, if the surgical procedure involves the chest or abdomen, TTE probe placement may not be physically possible. Thirdly, when cardiopulmonary resuscitation is ongoing, TTE will require interruption of chest compressions to image the heart, whereas TEE does not. Note, the 2010 ACLS guidelines recommend limiting interruptions of chest compression < 10 seconds(7). Lastly, mechanical ventilation, subcutaneous air or emphysema may make image acquisition problematic. Therefore, in the perioperative setting, TEE may be more easily accessible and preferable (8).

IV. Conclusions

TEE in the noncardiac surgery setting plays an important role in patient management. Although TEE may appear to be beneficial in many situations, risk benefits should be considered as TEE has been associated with serious complications (9,10). However, when the benefits out weighs the risks, the use of TEE should be considered in the noncardiac surgical setting.

References


