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## Pre-operative Dobutamine Stress Echocardiography, is it a Reliable Screening Modality?

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**Introduction:** Patients undergoing major vascular surgery may develop potentially avoidable cardiac events that have significant impact in perioperative morbidity and mortality [1]. Thus, preoperative risk assessment is central in determining the appropriate course of management prior to the proposed surgical intervention [2]. Although several non-invasive modalities have been employed in cardiovascular risk stratification, dobutamine stress echocardiography (DSE) has become an acceptable standard because of its high sensitivity (80%), specificity (86%), and negative predictive value (93-100%) [3-5]. We report a case of a patient who had a normal preoperative DSE underwent aorto-bifemoral bypass and subsequently ruled in for myocardial infarction (MI) on postoperative day two after an episode of drug induced hypotension in the ICU.

**Case:** A 65 year-old gentleman with a history of stroke, aortal occlusive disease, and a 15-pack year of tobacco use presented for aorto-bifemoral bypass surgery. Preoperative EKG revealed normal sinus rhythm with a heart rate of 65 bpm and Q-waves in antero-septal leads. DSE demonstrated normal left ventricular size, wall thickness, and ejection fraction. The ventricular wall motion was normal at rest and with no stress-induced abnormality at 75% maximal HR. The test was terminated due to hypotension. Other laboratory studies were all within normal limits. Patient had an uneventful operation under combined epidural and general anesthesia and his trachea was extubated at the end of the surgery. His intra-operative hemodynamic parameters were kept within 10-15% of his baseline levels. His postoperative hematocrit was 31. Patient did well in the ICU initially until post-operative day two when an augmentation dose of local anesthetic was given through his epidural catheter by the consulting service. His mean arterial blood pressures declined precipitately to 40's mmHg and new ST segment depression and T-waves inversion were noted in the lateral leads. His EKG abnormalities were later normalized after blood pressures were restored to his baseline. However, he was subsequently ruled in for MI by cardiac enzymes with peak troponin T 0.54 ng/mL. A cardiac catheterization was then performed and revealed severe four-vessel disease including: 70-80% ostial left main coronary artery, 80% mid left anterior descending artery, high grade mid left circumflex artery, and high grade proximal right coronary artery. This patient subsequently underwent a successful four-vessel operative revascularization on postoperative day eight and has since made a full recovery without any complications.

**Conclusion:** Despite the nearly perfect negative predictive value of DSE, patients with severe coronary artery disease could potentially be missed by this screening modality as demonstrated in this case. The advantages and limitations of this test including the effects of concomitant drug therapy (i.e. beta-blocker), baseline cardiac conduction defect (i.e. left bundle branch block), and inability to achieve heart rate goal due to angina, hypotension, or arrhythmias are described. Perioperative MI occurs most commonly in between 48-72 hours postoperatively due to catecholamine surge, fluid mobilization, reperfusion syndrome, hypercoagulable state, or adverse response to pharmacologic interventions. This case highlighted the importance of preserving baseline hemodynamics in patients with cardiac risk factors not only intraoperatively but especially in the postoperative period when patient management is not primarily the responsibility of the anesthesiologists.

### References:

1. Mongano DT. Perioperative cardiac morbidity. *Anesthesiology* 1990; 72:153-84.
2. Boersma E, Poldermans D, Bax JJ, et al. Predictors of cardiac events after major vascular surgery: Role of clinical characteristics, dobutamine echocardiography, and beta-blocker therapy. *JAMA* 2001;285:1865-73.
3. Dhond MR, Donnell K, Sigh S, et al. Value of negative dobutamine stress echocardiography in predicting long-term cardiac events. *J Am Soc Echocardiogr* 1999;12:471-5.
4. Elhendy A, Bax JJ, and Poldermans D. Dobutamine stress myocardial perfusion imaging in coronary artery disease. *J Nucl Med* 2002;43:1634-1646.
5. Mantha S, Roizen MF, Barnard J, et al. Relative effectiveness of four preoperative tests for predicting adverse cardiac outcomes after vascular surgery: a meta-analysis. *Anesth Analg* 1994;79:422-33.