

TRANSIENT SEVERE LEFT VENTRICULAR DIASTOLIC DYSFUNCTION DURING INTRAOPERATIVE TRANSESOPHAGEAL ECHOCARDIOGRAPHY

- A Case Report -

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Abstract

A 55-year-old man with significant lesion of left anterior descending artery and left ventricular systolic dysfunction, became candidate for coronary artery bypass grafts surgery. Intraoperative transesophageal echocardiography (TEE) was done for evaluation of severity of mitral regurgitation. During surgery, suddenly systolic blood pressure dropped to 50 mmHg and lasted for 2 minutes and grade III left ventricular (LV) diastolic dysfunction occurred. After restoring blood pressure to 110/60 mmHg, LV diastolic pattern returned to baseline pattern. The decreased coronary perfusion pressure and its effect on diastolic function may be responsible for this pattern of diastolic dysfunction.

Keywords: diastolic dysfunction, transesophageal echocardiography.

Case Report

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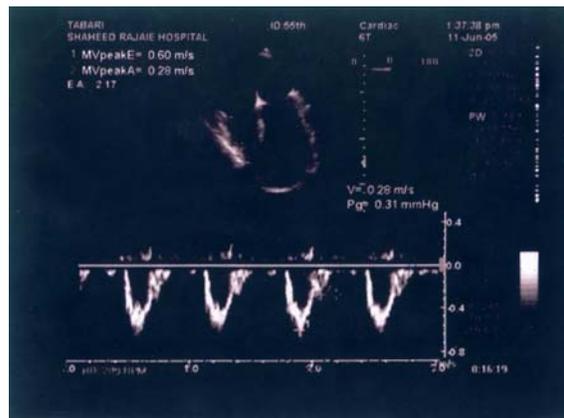
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A 55-year-old man with history of anterior myocardial infarction was admitted with complaint of chest pain. Selective coronary angiography showed significant proximal lesion of left anterior descending artery that was not suitable for percutaneous coronary angioplasty. Therefore he became candidate for coronary artery bypass graft surgery.

Intraoperative transesophageal echocardiography (TEE) was requested for evaluation of severity of mitral regurgitation (MR). TEE findings were as follows: mildly enlarged LV size with severely reduced LV systolic function, LV ejection fraction (LVEF) was 30%, with hypokinesia in base and mid septal wall and apical segments. Mitral inflow velocity showed E-wave velocity = 0.3 m/s, A wave velocity = 0.45 m/s, and E/A ratio = 0.06. Systolic pulmonary vein flow (SPV) = 0.31 m/s and diastolic pulmonary vein (DPV) = 0.3 m/s and atrial reversal (AR) velocity = 0.18 m/s, compatible with impaired relaxation pattern (grade I). There was also mild to moderate MR. Other echocardiographic findings were unremarkable.

During surgery, after bypass grafting, systolic blood pressure suddenly dropped to 50 mmHg without obvious evidence of significant ischemia. There was no significant electrocardiographic changes. Mitral inflow velocity showed: E wave = 0.6 m/s, A wave = 0.28 m/s and E/A ratio = 2.17 (Fig. 1). Pulmonary vein velocities showed blunted S wave with prominent D wave velocity = 0.5 m/s, compatible with diastolic dysfunction (grade III). No new wall motion abnormality was detected. Evaluation of valves and cardiac chambers dimensions and volume

Fig. 1
Mitral inflow
velocity during
unstable
hemodynamic
condition



showed no significant changes compared to baseline findings. This drop in blood pressure (BP) lasted about 2 minutes. By volume expanding and low dose inotropic agent, BP rose to 110/60 mmHg and diastolic function returned to impaired relaxation. After full revascularization, LV systolic function was 35% with mild MR.

Discussion

Left ventricular systolic function is a powerful predictor of clinical outcome for a wide range of cardiovascular diseases including ischemic heart disease. Echocardiography provides both a quantitative and qualitative measure of systolic and diastolic function¹. Intraoperative TEE is a useful monitoring tool for assessing systolic and diastolic function and regional wall motion abnormalities and severity of valvular diseases. During intraoperative TEE mitral inflow velocity and pulmonary vein flow can be obtained easily and estimation of diastolic function can be made^{2,3}. There are several classic mitral valve inflow patterns that have been attributed varying degrees to diastolic dysfunction. These include, delayed relaxation, pseudonormal pattern, reversible restrictive pattern and irreversible restrictive pattern^{4,5}.

Decrease in systemic blood pressure during surgery would result in reduction of coronary perfusion and induces ischemia that is apparent by wall motion abnormalities, decreased contractility and diastolic dysfunction. Although we rarely evaluate diastolic function when patient became hemodynamically unstable during TEE, we can evaluate adverse effects of varying conditions on systolic and diastolic functions during intraoperative TEE. Thus efficiency and adequacy of our management could be evaluated safely. This case indicated that intraoperative TEE should be used as an important guide for managing cardiac function during surgery.

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