Evaluation of Left and Right Ventricular Diastolic Function by Electron-beam Computed Tomography in Patients With Passive Epicardial Constraint


Objective
Previous investigations have shown the usefulness of electron-beam computed tomography (EBCT) to describe ventricular diastolic function and to detect constrictive filling pattern. We used EBCT to analyze diastolic function in patients who underwent passive epicardial constraint because data describing ventricular filling in these patients are still incomplete.

Methods
Ten patients with dilated cardiomyopathy (group 1) underwent EBCT examination before and again 6 months after surgery. Ten patients with normal diastolic function (group 2) and 5 male patients with constrictive pericarditis (group 3) served for comparison. Volume-time curves throughout the entire diastole were generated, and the rapidity of diastolic filling was assessed by calculating the percent filling fraction at consecutive EBCT frames throughout the diastole. Pericardial thickness was measured in a standardized fashion at different locations around both ventricles.

Results
Early left ventricular filling pattern in group I did not change postoperatively (filling fraction at third diastolic frame was 50.0 ± 15.4% and 53.8 ± 14.4% before and after surgery, respectively) and was not significantly different from group 2 (48.7 ± 8.5%). In contrast, in group 3, early left ventricular filling was significantly accelerated (71.4 ± 9.3%) when compared with groups 1 and 2. A similar pattern was observed for the right ventricle. Pericardial thickness between groups 1 (1.22 ± 4.22 and 1.43 ± 0.39 mm before and after surgery, respectively) and 2 (1.38 ± 0.43 mm) did not differ significantly. In contrast, pericardium in group 3 was significantly thickened (4.93 ± 1.11 mm) when compared with both groups 1 and 2.

Conclusions
The EBCT identified an abnormal accelerated diastolic filling and thickened pericardium in patients with constrictive pericarditis. Conversely, a normal diastolic filling pattern and pericardial thickness seem to be preserved in patients after passive epicardial constraint, when compared with baseline values and with normal subjects.

Key Words
cardiac surgery, computed tomography, congestive heart failure, dilated cardiomyopathy, heart assist

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