Changes in Right Ventricular Dimensions and Performance After Passive Cardiac Containment


Background
Previous studies have shown that the cardiac support device (CSD) improves left ventricular structure and function in patients with heart failure by preventing further cardiac enlargement. The aim of this study was to identify effects on the right ventricle (RV).

Methods
Ten male patients with idiopathic dilated cardiomyopathy underwent electron-beam computed tomographic (CT) examination within 1 month before, and 6 to 9 months after CSD implantation. The RV enddiastolic and end-systolic volumes (EDV, ESV) and diameters (EDD, ESD), stroke volume (SV), ejection fraction (EF), total and forward RV output (RVO, fRVO), and tricuspid regurgitation fraction (TRF) were calculated.

Results
The EDV measurements decreased from 182.1 ± 49.6 to 137.5 ± 37.0 mL, ESV from 114.8 ± 47.0 to 68.3 ± 23.8 mL, EDD from 48.2 ± 6.6 to 41.6 ± 7.1 mm, and ESD from 39.6 ± 6.9 to 32.7 ± 6.5 mm (p < 0.05 for each). Ejection fraction increased from 38.5 ± 8.9 to 52.0% ± 7.7% and fRVO from 4.0 ± 0.8 to 6.4 ± 1.1 L/min (each with p < 0.05). TRF decreased from 18.2 ± 14.1 to 10.4% ± 13.5%, whereas SV and RVO remained nearly unchanged. Postoperatively, RV volumes, EF, and fRVO were not different from 15 age- and gender-matched normal control patients.

Conclusions
Implantation of a CSD leads to a decrease in RV size and improved RV performance. These data together with the results of previous studies demonstrating improved left ventricular structure and function confirm the biventricular nature of recovery with the CSD.

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