Passive Containment and Reverse Remodeling by a Novel Textile Cardiac Support Device


Background
Progressive remodeling and dilation of cardiac chambers is responsible in part for myocardial dysfunction in chronic heart failure. Preclinical studies with suitable animal models indicate that a passive cardiac constraint device can promote reverse remodeling, with improvement in cardiac function. We hypothesize that such a device could provide benefit for stable heart failure patients in New York Heart Association (NYHA) class II and III.

Methods and Results
From April 1999 to March 2000, 27 patients received Acorn's Cardiac Support Device (CSD) during an initial safety/feasibility study. In 11 patients, the only surgical measure was CSD placement. Most patients suffered from idiopathic cardiomyopathy; 4 were in NYHA class II, one was in class II/III, and 6 were in class III. All were stable on intensive medical treatment. The CSD, a textile polyester device, fitted snugly around the heart during surgery. All patients survived surgery and recovered smoothly. Three months after surgery, 56% of patients were in NYHA class I, 33% were in class II, and 11% were in class II/III. Echocardiography showed an improvement in left ventricular ejection fraction from an average of 22% to 28% and 33% at 3 and 6 months, respectively. Simultaneously, the left ventricular end-diastolic dimension decreased from 74 mm to 68 mm and 65 mm, respectively. Mitral valve regurgitation (on a scale of 0 to 4+) decreased from 1.3 to 0.7 by 3 months. Quality-of-life indices correlated with the apparent reversal of ventricular remodeling. Preoperative cardiac medications remained virtually unchanged after implant.

Conclusions
In the short- and intermediate-term, CSD implantation seems to ameliorate symptoms and improve cardiac and functional performance in heart failure patients. Worldwide randomized trials are currently underway.

Circulation 2001; 104(Suppl I):I-270

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