Dynamic Cardiomyoplasty

Description

Dynamic cardiomyoplasty is a surgical technique that uses paced, conditioned skeletal muscle to reinforce the failing heart. Briefly, the surgical procedure is as follows: the left latissimus dorsi, the muscle most commonly used, is dissected from its surrounding tissues, preserving the neurovascular bundle. The muscle is then transposed into the left hemithorax through a window created by partial resection of an adjacent rib. A median sternotomy is then performed to provide access to the heart. The latissimus dorsi is wrapped around the ventricular surface. After a 2-week postoperative period to allow for adhesion between the latissimus dorsi and heart, the skeletal muscle is electrostimulated and conditioned to induce fatigue resistance. An epicardial lead attached to the right ventricle, pacing leads attached to the muscle itself, and an implanted pacemaker provide the electrostimulation. The conditioning program requires about 2 to 3 months. After that time the skeletal muscle graft can be paced synchronously with the heart.

Cardiomyoplasty requires the use of a unique pacemaker manufactured by Medtronic (the Cardiomyostimulator), which has not yet received approval from the U.S. Food and Drug Administration (FDA). Thus at the present time, cardiomyoplasty is only offered in the context of an FDA investigational device exemption (IDE) trial.

Policy

Dynamic cardiomyoplasty is considered investigational.

Policy Guidelines

No applicable information

Rationale

Our medical policies are designed for informational purposes only and are not an authorization, or an explanation of benefits, or a contract. Receipt of benefits is subject to satisfaction of all terms and conditions of the coverage. Medical technology is constantly changing, and we reserve the right to review and update our policies periodically.

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No applicable information
At the present time dynamic cardiomyoplasty is being investigated as an alternative to medical therapy or as an alternative/bridge to heart transplantation in patients with congestive heart failure, particularly given the shortage of donor hearts for transplant. Thus pertinent outcomes include improvement in hemodynamics of the heart, patient functional capacity, and long-term survival rates compared to medical management or transplantation.

Most recently, Furnary and colleagues have reported on a multicenter trial of cardiomyoplasty in 68 patients, comparing outcomes to a non-randomized group of patients with heart failure. (1) There were modest improvements in various hemodynamic measures, such as left ventricular ejection fraction. Modest improvements were also noted in the New York Heart Association Function class and activity of daily living score. However, there was no difference in 12-month mortality between the 2 groups. This lack of effect on mortality may be related to the fact that cardiomyoplasty does not address the underlying cardiac pathology, and patients remain at risk for lethal arrhythmias, a major cause of death in patients with congestive heart failure. Some investigators have hypothesized that any improvement may be primarily related to a simple girdling effect of the wrapped latissimus dorsi muscle, which interrupts further dilation of the heart. If this is true, then the primary effect of cardiomyoplasty occurs during diastole, not systole, and pacing of the latissimus dorsi may be unnecessary. In addition, there may be simpler methods to provide a girdling effect. It should also be noted that this study focused on patients with Class III heart failure, since prior studies had shown an unacceptably high mortality rate among patients with Class IV heart failure undergoing cardiomyoplasty. Patients with Class III heart failure are also those who respond well to medical management. (2-6)

Finally, at the present time, dynamic cardiomyoplasty requires the use of a unique pacing device, the Cardiomyostimulator, which has not received final FDA approval.

References:

A search of the literature was completed through the MEDLINE database from January 1990 through August 1997. The search strategy focused on references containing the following words:

– Dynamic cardiomyoplasty

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