Implantable Device to Detect Rejection of Cardiac Allograft

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Technology description

Introduction

The most effective treatment for patients with end-stage heart failure or severe coronary artery disease is a heart transplantation. The leading cause of death after heart transplantation is an allograft rejection, or when the recipient's immune system attacks the transplanted organ. To prevent allograft rejection, heart transplant recipients must take a regimen of immunosuppressant drugs for the remainder of their life. To mitigate the effects of immunosuppressant therapy, the dosage that the transplant recipient receives is limited as much as possible. The balance between limiting the dosage of the immunosuppressant regimen and combating transplant rejection is maintained by constant monitoring of the patient. Currently, the standard monitoring method is an endomyocardial biopsy. Despite its widespread use, endomyocardial biopsies have several serious limitations, including the possibility of arrhythmias, nerve injury, and damage to surrounding tissue. Consequently, there is a need for alternative methods to detect cardiac allograft rejection.

Technology Description

To answer this unmet need, Dr. Lawrence Czer from the Cedars-Sinai Medical Center has developed an implantable device that comprises of a plurality of sensors to measure different physiological parameters, such as core body temperature, cardiac output, and electrical activity (e.g., voltages) of the allograft at specified intervals after the transplant procedure. These measured parameters are subsequently compared with baseline data to detect signs of allograft rejection.

Application area

Monitor signs of cardiac allograft rejection

Advantages

- Does not require the implantation of pacemaker leads into the tissue of the cardiac allograft
- Reduces risk of infection after implantation
- Correlates the electrical signal data from the cardiac allograft with other physiological data, such as

overall cardiac output and core body temperature, to provide a more robust assessment of cardiac allograft rejection

Institution

Cedars-Sinai Medical Center