Device to Control Atrial Arrhythmias After Open Heart Surgery

Arrhythmia is a condition involving a rapid heart rhythm that temporarily complicates the postoperative recovery from open heart surgery in both children and adults. Current temporary treatments for arrhythmias are medications or external electrical cardioversion shocks. These treatments result in unwanted side effects and risks, including significant pain and application of general anaesthetic. The inventors’ new method uses selective internal stimulation of the atrioventricular (AV) node fat pad. The treatment is painless and without obvious side effects.

The device includes a multipolar plaque electrode implanted on the AV node fat pad during the initial open heart surgery, electrical leads that exit the body, an external controller connected to the leads that delivers an electrical stimulus, and a system to monitor the heart in order to optimize the stimulus parameters. Direct electrical stimulus to the AV node lowers the heart rate to achieve a normal rhythm without medications or powerful shocks. In addition to developing the device, the inventors have also developed the first animal model for junctional ectopic tachycardia (JET), an arrhythmia common for pediatric open heart surgery patients. The JET model continues to enable testing and improvement of the device and treatment method. In addition to JET, the device can also be used to treat atrial fibrillation (A-fib), common in adults.

Advantages

- Painless direct heart stimulation
- No general anesthetics required
- Eliminates need for drugs with adverse side effects
- A temporary solution for a temporary problem

Applications

- Control arrhythmias after open heart surgery
- Pediatric and adult patients
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