

Method for Minimally Invasive Heart Valve Procedures

A method to perform heart valve repair using a minimally invasive system

Inventors at Georgia Tech have designed a method to perform heart valve repair using a minimally invasive system. The design is broken down into four main categories: (1) an external shape adjustment system, (2) an annuloplasty delivery system, (3) a suturing and anchoring system, and (4) a temporary adjustable annuloplasty system. The external shape adjustment system applies pressure to reduce the size of the valve annulus, while the delivery system is used to position an annuloplasty implant. The delivery device is made of a unitary tube connected to a deployment head that is operated by an apparatus controller and guided using biomedical imaging technology. The deployment head is manufactured with suture hooks which are able to detach from the deployment head and connect the annuloplasty implant to the heart. A temporary adjustment system allows for the implant to be adjusted to the desired shape and size for the valve to function. This new system provides a less invasive approach to heart-valve repair and eliminates the need for cardiopulmonary bypass.

Summary Bullets

- **Minimally invasive:** heart valve repair system breakdown allows for a smoother process
- **Futuristic:** eliminates the need for cardiopulmonary bypass
- **Reduced risk:** intends a lower mortality rate during procedure

Solution Advantages

- **Minimally invasive:** heart valve repair system breakdown allows for a smoother process
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Potential Commercial Applications

- Medical applications for treatment of cardiovascular disease
- Altering, adjusting, and maintaining the shape of heart-valves

Background and More Information

The human heart is an essential organ that provides oxygen and blood flow to the rest of the body. It is made up of four chambers encapsulated by thick muscle layers. The muscle layers contract and expand to pump blood between different chambers through the mitral and tricuspid valves. A common heart malfunction involves the annulus of the tricuspid/mitral valve- it can become diseased and enlarged, which inhibits it from closing properly. This malfunction results in valvular prolapse and regurgitation of blood through the valve. Currently, the only method for correcting heart valve disorders involves open heart surgery in which the patient's heart is stopped and placed on bypass. This invasive procedure causes an increase in mortality and involves a recovery time of 8-12 weeks. With the recent refinement of 3D-echocardiography, a minimally invasive alternative is feasible that could result in a lower mortality rate and recovery time.

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