Implantable Prosthetic Valves

Tech ID: 33463 / UC Case 2023-733-0

BRIEF DESCRIPTION

The invention pertains to a prosthetic valve featuring a saddle-shaped annulus that synchronously transforms between concave and convex configurations, facilitating seamless opening and closure synchronized with cardiac cycles. Comprising leaflets and support elements, the valve mimics natural heart valve function, enabling effective blood flow regulation and offering versatile deployment options for cardiac and vascular applications.

SUGGESTED USES

The prosthetic valve described in the patent is suggested for use as a replacement for dysfunctional heart valves or similar organs, such as venous valves. It can be deployed in various positions within the heart, including the mitral and aortic positions, as well as in right-sided heart valves like the pulmonary and tricuspid valves. Additionally, it offers potential applications in vascular surgeries and other body channels where a functional valve is required for proper flow regulation.

FEATURES/BENEFITS

·Saddle-Shaped Annulus:

The valve incorporates a saddle-shaped annulus, allowing for synchronized transformation between concave and convex configurations in response to pressure changes.

·Synchronized Movement:

The annulus and its periphery portions move simultaneously, enabling seamless opening and closure of the valve synchronized with the cardiac cycle.

·Leaflet Design:

The valve includes leaflets made of various materials such as synthetic material, biological tissue, or pericardial tissue, ensuring effective sealing and flow regulation.

·Support Elements:

Support elements aid in maintaining the position and function of the leaflets, preventing prolapse and ensuring proper valve function.

·Material Selection:

The valve components are made of super-elastic or elastic materials, including shape memory materials like nickel titanium alloys, ensuring durability, stability, and biocompatibility.

·Versatile Deployment:

The valve can be delivered and deployed through various methods, including minimally invasive approaches, offering flexibility in surgical procedures.

·Bioactive Agent Compatibility:

The valve can be loaded with bioactive agents such as drugs or stem cells, providing additional therapeutic benefits.

·Applications:

The valve can be implanted in different positions within the heart and in various body channels, serving as a replacement for dysfunctional heart valves or similar organs, and facilitating effective blood flow regulation.

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OTHER INFORMATION

KEYWORDS

Prosthetic valve, Saddle-shaped annulus, Heart valve replacement, Bi-leaflet valve, Shape memory materials, Cardiac surgery, Valve function, Leaflet design, Blood flow regulation, Minimally invasive deployment

CATEGORIZED AS

- **Medical**
  - Delivery Systems
  - Devices
  - Disease: Cardiovascular and Circulatory System

Overall, the prosthetic valve offers a comprehensive solution for restoring proper cardiac function and regulating blood flow in patients with valve diseases or dysfunction, while also providing versatility, durability, and compatibility with therapeutic agents.

RELATED CASES

2023-733-0

TECHNOLOGY DESCRIPTION

The prosthetic valve technology described in the patent innovatively utilizes a saddle-shaped annulus, mimicking the function of natural heart valves. This annulus undergoes synchronized transformation between concave and convex configurations in response to pressure changes within the cardiac chambers. This transformation enables seamless opening and closure of the valve, synchronized with the cardiac cycle, ensuring efficient blood flow regulation. The valve comprises leaflets and support elements extending from the annulus, which maintain proper positioning and function of the valve components. Leaflets can be made of synthetic materials, biological tissues, or pericardial tissue sourced from various animals, enhancing biocompatibility and durability. Support elements aid in preventing leaflet prolapse and contribute to the valve's stability during operation. The valve components are constructed from super-elastic or elastic materials, including shape memory materials like nickel titanium alloys, ensuring resilience and longevity. Versatile deployment methods, including minimally invasive approaches, offer flexibility in surgical procedures, expanding the valve's applicability across different patient populations and surgical scenarios. Additionally, the valve can be loaded with bioactive agents, enhancing therapeutic potential for targeted treatment delivery. Overall, this technology represents a significant advancement in prosthetic valve design, addressing key challenges in cardiac surgery and improving patient outcomes.

STATE OF DEVELOPMENT

Prototype developed

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,876,897	11/04/2014	2023-733

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