Minimally Invasive Percutaneous Delivery System for a Whole-Heart Assist Device

Tech ID: 32501 / UC Case 2019-678-0

BRIEF DESCRIPTION

Researchers at UCI have developed a minimally invasive mechanism to help deliver and implant a cardiac assist device inside the body to help patients with heart failure.

SUGGESTED USES

·Delivery system for cardiac assist devices

·Guide, position, release, and secure a whole-heart assist device around the heart

FEATURES/BENEFITS

·Minimally invasive delivery mechanism

·Passive and active grip features help secure device to heart

·User-friendly controls to guide and release device

TECHNOLOGY DESCRIPTION

Successful delivery and implantation of medical devices into the body is a crucial for effective and positive outcomes. Specifically, implanting cardiac assist devices commonly require open heart surgery which is time intensive, invasive, and requires a lengthy recovery period. Replacement of heart valves can require open heart surgery, however, more minimally invasive procedures using a catheter mechanism for device delivery are becoming more common.

Investigators at UCI have previously developed a whole-heart assist device comprised of an implantable, flexible sleeve that wraps externally around the in-tact heart to provide additional pumping for heart failure patients. The UCI team has designed a minimally invasive, percutaneous delivery system to guide, position, release and secure the cardiac device around the heart, similar to the catheter mechanism for delivering heart valve replacements. The cardiac sleeve device is collapsed and attached to rod-like delivery arms that are contained within a delivery sheath. After making a small incision along the skin near the pericardium (the sac surrounding the heart), the sheath is inserted. Manual controls near the backend of the sheath allow for advancing of the delivery arms. As the delivery arms advance, the cardiac sleeve moves out of the sheath and expands for placement around the heart. Passive grip features along the basal and apical rings of the sleeve secure positioning around the heart; additional help is provided from active grip features and suture mechanisms that can be triggered when the device released. This unique delivery system allows doctors to implant these flexible cardiac assist devices in a minimally invasive way and offers heart failure patients alternatives to intensive surgeries.

STATE OF DEVELOPMENT

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Materials & Chemicals**
» Other
» **Medical**
» Delivery Systems
» Disease: Cardiovascular and Circulatory System

RELATED CASES

2019-678-0

Description, procedure, and drawings of delivery system are outlined.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,226,622	02/18/2025	2019-678

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Percutaneous Heart Valve Delivery System Enabling Implanted Prosthetic Valve Fracture
- A distensible wire mesh for a cardiac sleeve
- Method to Improve the Accuracy of an Independently Acquired Flow Velocity Field Within a Chamber, Such as a Heart Chamber
- Percutaneous Heart Valve Delivery System
- System for Transcatheter Grabbing and Securing the Native Mitral Valve's Leaflet to a Prosthesis
- Real-time 3D Image Processing Platform for Visualizing Blood Flow Dynamics
- Method for Synchronizing a Pulsatile Cardiac Assist Device with the Heart
- Fully Automated Multi-Organ Segmentation From Medical Imaging
- Simple, User-friendly Irrigator Device for Cleaning the Upper Aerodigestive Tract and Neighboring Areas
- Automated 3D Reconstruction of the Cardiac Chambers From MRI of Ultrasound

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