PURDUE INNOVATES | Office of Technology Commercialization

Magnetic Microactuator Enabled Self Clearing Catheter for Intraventricular Hemorrhage Treatment

Magnetically actuated catheter that prevents brain-drainage blockages, improving survival in hemorrhage patients.

Researchers at Purdue University have developed a self-clearing catheter that uses time-varying magnetic fields to clear blood clots in the ventricles of the brain. Brain hemorrhages affect 2 million people each year across the world, causing clots in the brain that prevent cerebrospinal fluid (CSF) or blood flow and even deadlier conditions like hydrocephalus. Typical intervention methods include open surgery, catheter-based drainage, and thrombolytic agents. Although these achieve the purpose of relieving cranial pressure and reducing ventricle exposure, subsequent surgeries risk higher infection or lasting damage to surrounding tissues. Purdue researchers have developed a self-clearing implantable catheter that is enabled by externally controlled microscale magnetic actuators. The microactuators generate time varying magnetic fields that can rapidly break down intraventricular thrombosis and remove blockage in implantable catheters.

Technology Validation: The magnetic microactuator-embedded smart catheter was validated by measuring its ability to sustain low pressure and remain unclogged in pigs treated with a version of Intraventricular Hemorrhage (IVH). 86% of the treated pigs survived over the course of 6 weeks whereas none of the pigs from the control set did.

Advantages :

-Self-clearing

-Detected clots & reduced size of clots

-Improved drainage device reliability

-Increased survival rate

Applications:

Technology ID
2021-LEE-69527

Category
Digital Health & Medtech/Implantable Medical Devices

Authors
R. Bentley
Hyowon Lee
Qi Yang

Further information
Patrick Finnerty
pwfinnerty@prf.org

View online

-Chronic disease management

-Drug delivery

-Stem cell transplantation

TRL: 4

Intellectual Property:

Provisional-Gov. Funding, 2022-04-21, United States

Utility-Gov. Funding, 2023-04-19, United States

Keywords: Brain, Catheters, Clots, Hemorrhage, Neuroscience, Stroke