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Magnetic Robotic Surgery Solution for Minimally Invasive Endovascular Procedures

Stanford researchers have created a magnetic spinner designed to revolutionize minimally invasive endovascular procedures. Currently, state-of-the-art technologies in this field rely heavily on the expertise of interventional radiologists who use catheters and guidewires to treat patients with various diseases, such as stroke, deep vein thrombosis, endovascular coiling, and transcatheter aortic valve replacement. However, these procedures often encounter challenges when navigating through complex arterial tortuosity in elderly patients, leading to increased procedure time and technical failures. Furthermore, patients may need to be transferred to specialized hospitals where interventional surgeons are available to perform these intricate procedures.

The magnetic spinner presents an ingenious solution to address these pressing challenges. By harnessing magnets to move freely inside blood vessels, this device offers a multitude of benefits. Firstly, it enhances navigation within multi-branched blood vessels, reducing procedure time and improving success rates. The device's spinning-enabled propelling enables smooth movement through tortuous paths, making it ideal for elderly patients with complex vascular anatomy. Additionally, the magnetic spinner can be operated remotely, potentially eliminating the need for patient transfer to specialized hospitals. This capability significantly enhances accessibility to high-quality interventional procedures, especially in remote or underserved areas, and ensures patients receive timely and effective treatment.

Applications

- Drug delivery
- Robotic interventional surgery

Advantages

- Minimally invasive
- Remote operation
- Improved patient outcomes

Patents

- Published Application: WO2023219964
- Published Application: 20250176992

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