Docket #: S20-034

A Customizable, Modular Catheter for Hemodialysis Patients of All Ages

Brief Description

The Thakor lab invented a small caliber central venous catheter with adjustable cuff positioning for customizable lumen length. It can be placed with a subcutaneous tunnel into any pediatric patient with kidney injury in order to perform hemodialysis. The pediatric modular catheter (PMC) supports pediatric blood flow rates and higher heart rates with an optimized symmetric tip that decreases arterial-related damage and cardiovascular risks with customizable cuff-to-tip lengths.

Technology Summary

Acute and end stage renal disease affects patients across all ages. Pediatric patients are usually treated with hemodialysis, which requires them to be surgically implanted with a central venous catheter (CVC) for dialysis access. Unfortunately, current CVCs have a fixed length and are designed for adult patients. This leaves pediatric patients at an increased risk for arrhythmia, thrombosis, poor dialysis, and unnecessary discomfort. The Thakor lab invented a modular CVC with adjustable cuff positioning to produce the optimal catheter length for each patient and decrease arterial-related damage and cardiovascular risks in the process. The more favorable cuff-to-tip and tip-to-hub lengths help prevent catheter migration. The pediatric modular catheter (PMC) supports pediatric blood flow rates and higher heart rates, customizable lumen lengths, and reverse tunneling. It can be placed through the internal jugular vein, subclavian vein, or the femoral vein. Although pediatric CVCs are currently available on the market, they have fixed catheter lengths and diameters not suitable for the wide range of body types that occur from infant to adolescent patients. The modular design of the PMC offers customizability that can not only be applied to pediatric patients but can also be extended to adults of various body sizes. The invention offers a safer technology vital to reducing the risks and complications within patients undergoing hemodialysis.

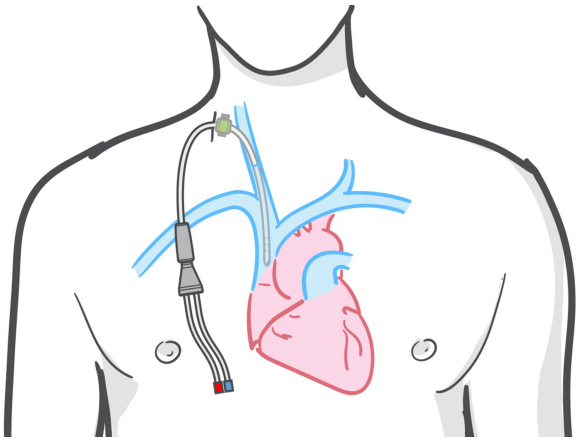

Figure Description: Modular catheter with adjustable lengths to accommodate patient body size
Image credit: inventors

Stage of Development

Proof of Concept

Applications

- Hemodialysis patients

Advantages

- Compatible for pediatric patients
- Adjustable catheter to accommodate patient size
- Modular design allows for custom positioning

Patents

- Published Application: WO2021163200
- Published Application: 20230090684

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