IMPROVING FISTULA CREATION AND MATURATION WITH A NOVEL DEVICE

Neelima Katragunta, MBBS
Bradley Dixon, MD
University of Iowa Hospitals and Clinics

No conflicts of interest

Background

• Over 400,000 people currently receive hemodialysis in the US
• About 100,000 additional people develop end stage renal disease every year
• Every patient on hemodialysis requires an adequate vascular access

Background

• Autogenous arteriovenous fistula (AVF) has the best patient outcomes
• Arteriovenous grafts (AVG) and Central Venous Catheters (CVC) are associated with increased morbidity and mortality

The Problem

• AVF constitute only about 55% of hemodialysis access
• Over 80% of patients initiate hemodialysis with a CVC
• Major problem limiting the use of AVF is impaired fistula maturation

The Problem

• If we could improve the percent of fistulae that are mature at initiation of dialysis from 16% to 50% it would save CMS $500 million dollars a year
The goal of our study is to address this problem of impaired AVF maturation.

Thermovasc

Thermovasc is a device that combines the application of heat and constrictive pressure to improve vessel size and compliance.

- Application of heat to the arm increases blood flow and vein size.
- Application of constrictive pressure to the upper arm increases vein size and compliance.
- Exercise also causes increase in blood flow and vein size.

Effect of Heat and Exercise on Brachial Artery Flow

Effect of Heat and Exercise on Cephalic Vein Diameter

Collaboration

- Department of Vascular Surgery
- Department of Nephrology
- Vascular laboratory
- Bioengineering
- Research coordinator and assistants at University of Iowa
Thermovasc
A novel device that delivers controlled heat and pressure to the arm

Device Testing: Aims
1. To determine optimum parameters of heat and constrictive pressure for vascular preconditioning
2. To determine whether 6 weeks of pre-operative vascular pre-conditioning with Thermovasc will improve vein size and compliance
3. To determine whether pre-operative and post-operative vascular conditioning will improve AVF maturation

Progress
- The device has been developed and tested
- Prototype to be evaluated by the Bioengineering department for evaluation of its safety
- We have thus far enrolled nine patients (of the eleven planned)

Variation in Cephalic Vn Diameter

Variation in Br Artery Flow
What Lies Ahead

• Funding to initiate a clinical trial to address Aim 2
• For this part of the study additional Thermovasc units will be manufactured and distributed to the patients
• Plan to gather preliminary data to address Aim 3 in a larger clinical trial

References


Thank you