# Thoracoabdominal Hybrid Graft

**Inventor:** Joseph V. Lombardi MD, Professor and Chief, Vascular and Endovascular Surgery

## Brief Description

Device for expediting the repair of a thoracoabdominal aortic aneurysm, type 2 or greater, allowing for distal aortic perfusion without the need for cardio pulmonary bypass.

## Problem

Surgical repairs involving stents have become the standard when treating aortic aneurysms and recent advances have led to the use of hybrid stent-grafts. While use of such technology has proven revolutionary in treating aneurysms in the aortic arch, it has been harder to utilize the technology in repairing the more invasive thoracoabdominal aortic aneurysms. In addition, surgeons are still often required to utilize heart bypass techniques which increase the difficulty of successfully performing these already arduous surgical repairs. Thus, there is a need for a hybrid stent-graft with an attached perfusion apparatus that allows a surgeon to repair a thoracoabdominal aneurysm while minimizing the need for a heart by-pass.

## Solution

In response, the Inventor has proposed a surgical kit (Fig- 1A for repairing an aortic aneurysm comprising a vascular prosthesis and perfusion apparatus which can be deployed to efficiently perform the procedure, without the need for a heart by-pass.

## Technology

Dr. Lombardi's technology helps complete aortic aneurysm repair by coupling one end of the vascular prosthesis to the aorta upstream of the aneurysm, with the other end connected to the aorta downstream of the aneurysm. The perfusion apparatus maintains blood flow to the aortic branches while the surgeon is able to secure the prosthesis in place, completing the connections between the branches of the prostheses to the aortic branches.

## Advantages

- Existing methods dependent on how fast the surgeon can sew, leading to unsatisfactory outcomes.
- This kit would greatly improve safety and quality of procedure.

## Stage of Development

Design stage

## Partnerships

Co-Development, Licensing

## Intellectual Property

US Provisional Patent Application

## Contact

Neal Lemon, PhD, MBA
Director, Cooper Innovation Center
lemon-neal@cooperheatlh.edu

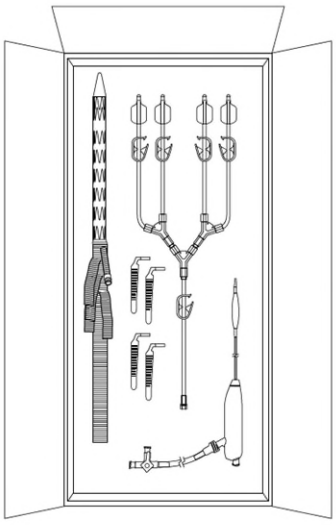

FIG. 1

**Fig1.** A Surgical kit including the vascular prosthesis, perfusion apparatus and accessories necessary for repairing an aortic aneurysm.

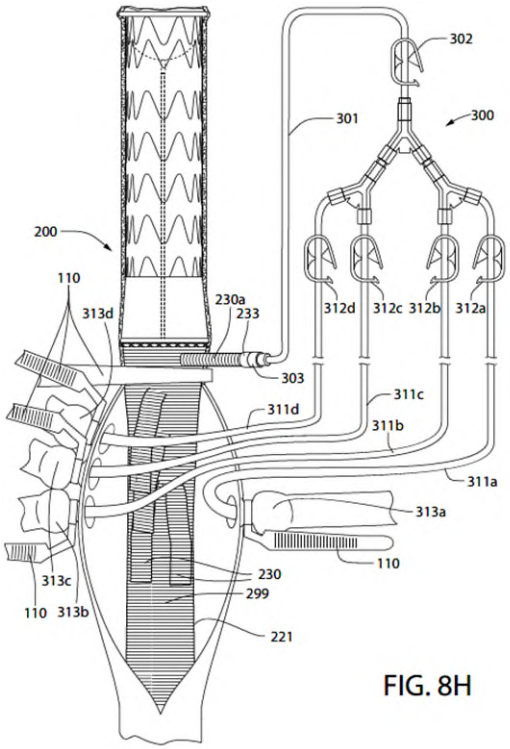


FIG. 8H

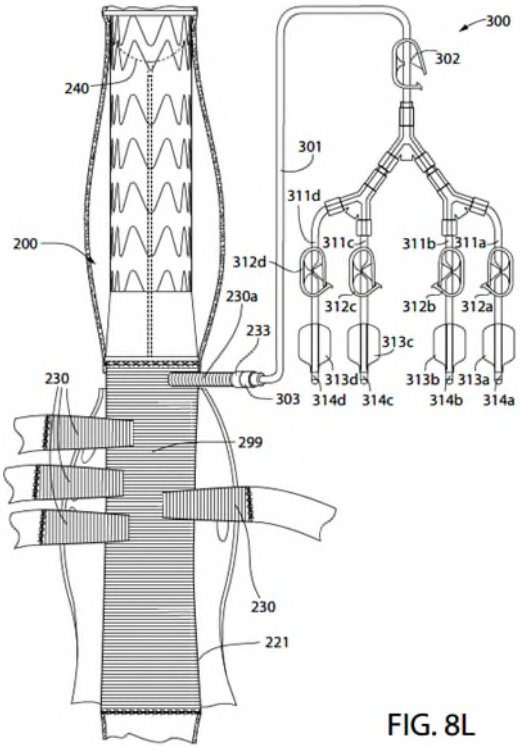


FIG. 8L

**Fig 8H.** After the perfusion apparatus (300) is connected to the vascular prosthesis (200), one or more secondary conduits (311) may then be fluidly coupled to aortic branches. Once the secondary conduit is fluidly coupled to an aortic branch, the valve apparatus (302, 312) is altered to an open flow state to restore blood flow to aortic branches. **Fig 8L.** The new distal end of the vascular prostheses (200) is then cut and attached to a downstream portion of the aorta.