University of Pittsburgh

ID: 3900 and 4041

Featured Inventors: Puneeth Shridhar MD, Youngjae Chun PhD

PerQ

(The End of Bypass Surgery Starts Here)

Value Proposition

Coronary artery bypass surgery (CABG) is an open-heart surgery which requires cutting the sternum to access the heart resulting in significant complications and morbidity in high risk patients. An even higher number of patients are considered inoperable by current standards, and can only be medically managed. For patients who are too sick or too old to have open heart bypass surgery, our product is a catheter based system that bypasses coronary arteries, and assures to promote quick recovery and prolong life. Unlike minimally invasive bypass surgery, we can bypass all arteries of the heart through a single port.

Market Opportunity

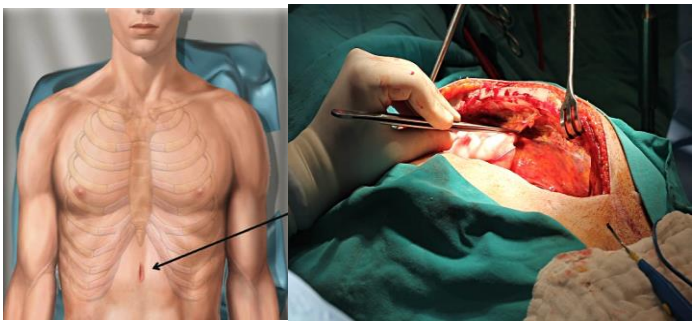
Coronary artery disease is the leading cause of death among both men and women in the US. Its prevalence is roughly 26 million with 6 million new cases every year. Each year, about 161,000 high risk bypass surgeries are performed, accounting for one third of bypass procedures. Over 30,000 of these procedures fail, an extraordinarily high rate for modern medicine, costing up to $23 billion per year. There are a further 500,000 inoperable patients who don't undergo intervention each year, each experiencing annual hospitalizations costing approximately $28,000/year, or nearly $14 billion total. Our technology will grow the market for CABG by over 500,000 per year, by improving clinical outcomes.

Competitive Landscape

PerQ enables bypass to be carried out more quickly and accurately than existing technologies. Unlike anastomosis devices used in minimally invasive bypass surgeries, our solution needs only one access port on the chest.

IP Landscape

Invention Disclosures filed with the University of Pittsburgh, April 2016 and October 2016



PerQ uses TINY SINGLE PORT (left) for CORONARY BYPASS in order to avoid OPEN HEART SURGERY (right) in sick and old patients

Technology

PerQ utilizes a novel anchor which seals bypass grafts without the need for sutures, clips, or staples. Furthermore, it can not only bypass arteries on the back and side of the heart, but also inflicts minimal intimal wall damage resulting in less narrowing of the arteries. We use smaller catheters for non-invasive graft manipulation through leg arteries.

Stage of Development

We are currently in the stage of development of functional prototype and in vitro evaluations. Our next plan is to perform pig-based (animal) studies and human testing with optimized prototype design.

Funding

University of Pittsburgh/Central Research Development Award

FEATURED INVENTORS:

Puneeth Shridhar MD

I am in the path of establishing myself as an Entrepreneur/Translational Scientist in the field of cardiac interventions with specific focus on transcatheter coronary bypass. Being a cardiac patient, I realize the benefits of catheter based solutions in the prevention of open heart surgery. Also, as a Founder of Curehub, an innovative medical device marketplace, I am aiming to bridge gaps in supply chain in order to reduce global healthcare costs. I have focused my last two years conducting post-doctoral research in the field of Bioengineering, Interventional Cardiology, Structural Heart Disease and Supportive Care Medicine with a sole intention to eliminate the need for bypass surgery in elderly patients. Winner of PinCh 25K Prize (2016).

Education

MD, Rajiv Gandhi University of Health Sciences, India (2006-12)

MS, Center for Medical Innovation, University of Pittsburgh, USA (2015-17)

Publications

1. **P. Shridhar** et al. A Review of PMMA Bone Cement and Intra-Cardiac Embolism. *Materials September 2016.*
2. **P. Shridhar** et al**.** A Unique Case of Successful Mechanical Thrombectomy and Stenting of Cabrol Graft. World Journal of Cardiovascular Diseases 2016, 6, 295.
3. **P. Shridhar** et al**.** Mechanical Thrombectomy in Post-Transplant Heart. *World Journal of Cardiovascular Diseases (September 2016).*
4. **P. Shridhar** et al**.** Angiographic Significance of recognizing Right Coronary Artery as a Feeding Artery of the Right Atrial Myxoma. *Imaging in Medicine (September 2016).*
5. M. Shayan, Y. Chen, **P. Shridhar** et al. Invitro Study of a Superhydrophilic Thin Film Nitinol Endograft that is Electrostatically Endothelized in a Catheter Prior to the Endovascular Procedure. *Journal of Functional Biomaterials (September 2016)*

Youngjae Chun PhD

My primary research interests include designing/manufacturing the smart metallic structure, investigating biocompatibility, analyzing the mechanical and physical behaviors, and testing biomedical devices. In current research, I combine the comprehensive knowledge from diverse fields such as material processing, MEMS/Nano fabrication, biomedical science, and surface engineering that is crucially important to successfully fulfill the goal of interdisciplinary projects of metallic biomaterial-based medical devices for vascular repair. I have developed various metallic biomaterial-based endovascular devices for treating brain/aortic aneurysms, cardiovascular disease, peripheral arterial disease (PAD), vascular injuries, trauma, and iatrogenic injuries.

Education

PhD, Mechanical Engineering, University of California, Los Angeles, USA

MS, Mechanical Engineering, University of California, Los Angeles, USA

BS, Mechanical, Aerospace, and Automations Engineering, Inha University, South Korea

Publications

1. B.W. Tillman, **Y. Chun** et al. A Dual Chamber Stent Prevents Organ Malperfusion in a Model of Donation after Cardiac Death. *Surgery* 2016, 160, 892–901.
2. Y. Chen, C. Howe… **Y. Chun**. Microstructured Thin Film Nitinol for a Neurovascular Flow-Diverter. *Nature Scientific Report*, 2016, 6, 1–10.
3. **Y. Chun**, et al. Novel micro-patterning processes for thin film NiTi vascular devices. *Smart Materials and Structures*, 2010, 19, 1–9.
4. **Y. Chun**, et al. Superhydrophilic surface treatment for thin film NiTi vascular applications. *Materials Science and Engineering: C*, 2009, 29, 2436–41.

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