Aortic Research Consortium

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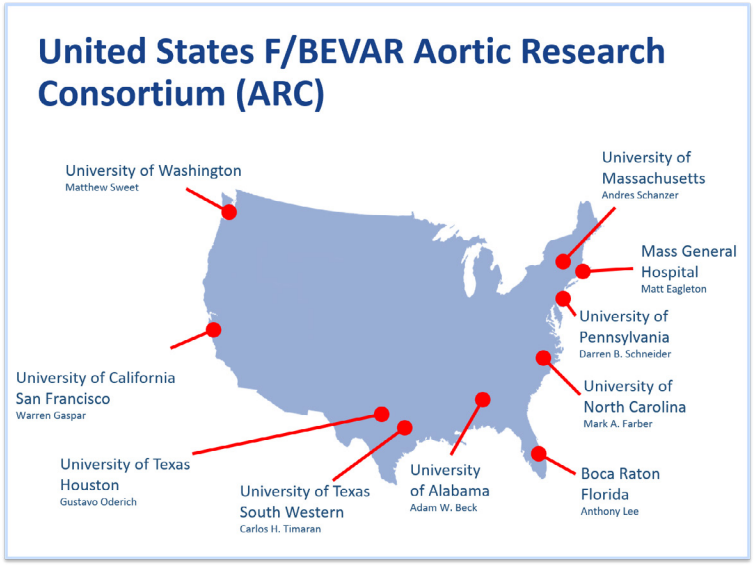
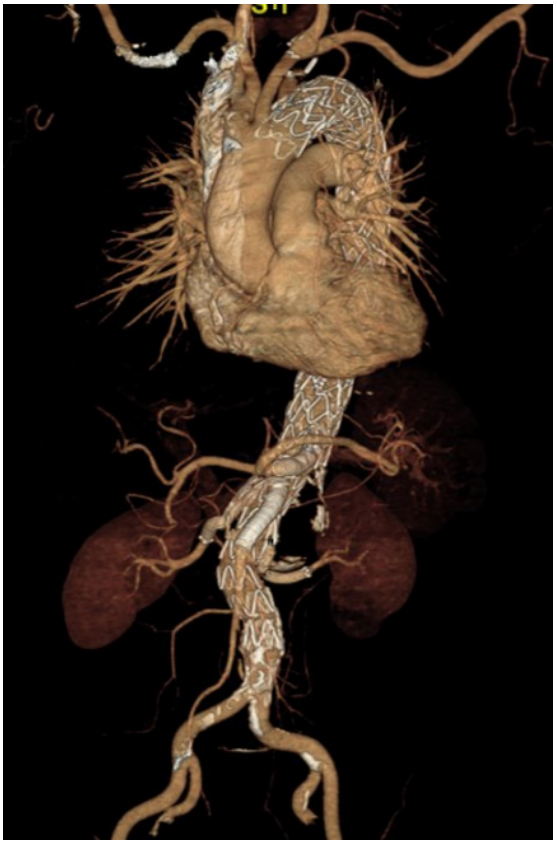
Aortic aneurysms involving the thoraco-abdominal aorta (TAAA) pose a threat to life if they rupture. TAAA are one of the most difficult surgical conditions to treat due to the high morbidity and mortality associated with the complex procedures needed to treat them. Open operation requires opening the chest and abdomen, various strategies for distal aortic perfusion, aortic cross-clamping, viscero-renal ischemia-reperfusion, and significant blood loss. This is a major undertaking with significant stress to the patient. Endovascular treatment using branched stent grafts provides the opportunity to treat patients who otherwise would not be candidates for open repair and has been found to be safer in the short term than open operation, but it is technically complex and has less well-defined long-term durability.

Branched stent grafts are not currently commercially available in the United States. To date, the University of Washington is one of only 10 sites in the U.S. with access to these devices through a Physician-Sponsored Investigational Device Exemption (IDE) study. Under the direction of Dr. Matthew Sweet, Associate Professor, the study opened in 2012 here at UW and now has expanded with the addition of Dr. Sara Zettervall, Assistant Professor, Division of Vascular Surgery. In 2016, these 10 sites began collaborating on the Aortic Research Consortium (ARC), a multi-center study using the data from the 10 IDE studies. These data are prospective, standardized and audited for completeness. The studies are monitored by each hospital's Institutional Review Board and the U.S. Food and Drug Administration.

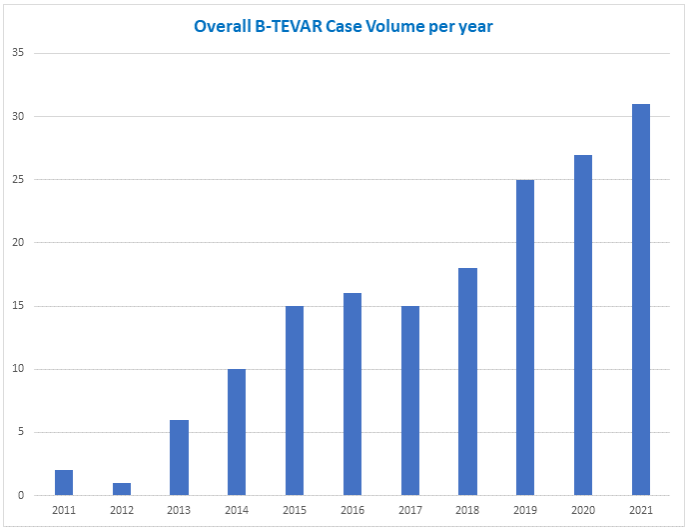
Over the ensuing years, the study has continued to grow and the dataset now includes in excess of 2,000 treated patients.



This project offers us a unique opportunity to study a complex surgical procedure with analytic power far beyond what any single site could achieve, and with better long-term follow-up data and clinical granularity than is currently available in any administrative quality improvement database. Thus far, seven separate research projects have been completed looking at various topics such as treatment of patients with post-dissection TAAA, how outcomes differ for women and



3D reconstruction of a B-TEVAR case



men, use of pre-loaded systems, strategies for spinal cord injury prevention and treatment of failed prior endovascular repair. The most recent publication was led by our UW team. Dr. Zettervall examined the frequency and clinical impact of reintervention on patient survival. In the process, she helped demonstrate that the standardized reporting scheme for reinterventions fails to fully discriminate between high and low physiologic stress reinterventions and determined that reinterventions improve long term survival in these medically complex patients.

The ARC is a powerful tool for studying a complex surgical procedure. Thus far, we have focused on answering clinically relevant questions using the data in a retrospective fashion. The greater power of the study, however, lies in the ability to use it in a prospective way in two areas. First, the structure is in place to conduct prospective randomized clinical trials (RCT). This provides the exciting opportunity as the heavy lifting of RCT study infrastructure and implementation is already complete. Second, these data can be used to establish objective performance goals of safety and effectiveness. As the branched endografts become clinically available, these data will serve to set standards that can guide the broader use of this technology, hopefully improving the safety of these procedures in the years to come.

Reception at the Regional Vascular Center at Harborview Medical Center.

Research Staff Highlights

Heidi Kenerson

Research Scientist/Engineer III
HPB Surgical Oncology Lab

How did you get into this line of research?

From a young age I had the desire to work in the field of cancer research. Upon completion of my MS in Bioengineering at the UW, I was looking for an opportunity to gain experience in molecular and cancer biology and joined Dr. Raymond Yeung's lab.

What does your typical workday look like/what do you do?

My typical day consists of a variety of tasks such as collecting, processing, and distributing tumor tissue procured from liver resections, running experiments utilizing collected tumor tissue and cell culture lines, managing the laboratory and the liver research biorepository, as well as supporting rotating research residents and our multiple research collaborations.

What has been your most significant accomplishment/finding?

The set up and development of the Tissue Slice Culture (TSC) platform in our laboratory. TSCs are established from solid tumors and are an effective in vitro model for studying human cancer that preserves the tumor microenvironment. We have standardized this method to assess and compare human cancer growth ex vivo across a wide spectrum of tumors. Tumor slices cultures can be utilized for short-term studies including experiments using drugs and cell-based therapies and response can be assessed using multiple readouts.[1,2]

[1]Protocol for tissue slice cultures from human solid tumors to study therapeutic response.

[2]Tumor slice culture as a biologic surrogate of human cancer.