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Vascular surgery tissue biobanking for the analysis of human peripheral arterial atherosclerotic occlusive disease

Mohamed A Zayed^{1,2}, Jaime Jung¹, Malik Darwech¹, Susannah Grathwohl¹, Ronnie Eugea¹, Theresa Belgeri¹ and Luis Sanchez¹

¹Washington University School of Medicine, USA

²Veterans Affairs St. Louis Health Care System, USA

Objectives: Over 3 million Americans have advanced peripheral arterial occlusive disease leading to significant patient morbidity and mortality. The lack of well-preserved human peripheral arterial tissue substrate has limited scientific exploration of this disease process and development of impactful-targeted molecular therapies. To address this, we developed an integrative biobanking strategy to collect peripheral arterial tissue specimens from patients undergoing vascular surgery.

Methods: Over 29 months, we harvested vascular specimens from consenting patients undergoing open arterial endarterectomy and revascularization procedures. All patients were enrolled in an IRB approved protocol. A biobank infrastructure was developed to manage logistics, funding, collection, and real-time processing of harvested arterial tissue.

Results: 486 patients were enrolled in the vascular surgery biobank prior to their index operation. Forty-two (42) clinical variables were evaluated for each patient during the perioperative period. Vascular specimens were successfully collected for 72.3% (349) of patients who enrolled in the biobank. The majority of specimens collected were retrieved from the peripheral arterial system (38.7% carotid artery, 9.5% anterior or posterior tibial arteries, 24.4% femoral or popliteal arteries). For all patients, blood samples were collected and processed to provide serum (85.5%) and plasma (86.1%). Each arterial specimen was sub-divided into maximally and minimally diseased portions to facilitate intra- and inter-patient biochemical and molecular analyses. Over the study period 8 collaborations (in 4 different departments at 2 universities) were fostered to provide 82 tissue specimens and 98 blood samples.

Conclusions: An integrative biobanking approach in vascular surgery patients is feasible and provides a highly unique peripheral arterial substrate for molecular and biochemical analyses. Biobanking management and daily operations requires a dedicated team approach to insure proper patient consenting, specimen collection, subsequent experimental analysis and meaningful scientific collaborations.

Biography

Mohamed A Zayed is Surgeon-Scientist at the Department of Surgery, Section of Vascular Surgery, and Washington University School of Medicine, USA. He has completed his Medical training at Stanford University and earned his Doctoral degree in Pharmacology at the University of North Carolina at Chapel Hill. He has previously served as the Chief Medical Officer for a software start-up company and has published over 30 research articles in reputable journals. His current clinical and research interests focus on the influences of diabetes on peripheral arterial disease.

Zayedm@wudosis.wustl.edu

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