Dr. Prism Schneider

"Multi-modal Investigation of Trauma-induced Coagulopathy for Prevention of Venous Thromboembolism "

Pulmonary embolism (PE) is a significant cause of preventable death in orthopaedic patients requiring surgical treatment. Deep vein thrombosis (DVT) causes substantial morbidity and negatively impacts quality of life. Life-threatening PE and debilitating DVT, together known as venous thromboembolism (VTE), continue to be devastating complications that can result in prolonged medical treatment, hospital stays, or even death. There is limited consensus regarding guidelines for pharmacologic thromboprophylaxis after major orthopaedic surgery (i.e., wide range of recommended agents and durations ranging from a minimum of 10 days up to 35 days). In addition, there is bleeding risk and substantial cost associated with using blood thinners. Therefore, there is a need to better understand who is at increased risk for blood clots, what medication is best, and for how long to prescribe for, in order to balance blood clot prevention with bleeding risk.

Thrombelastography (TEG) technology is a point-of-care assay that uses a small sample of blood to evaluate a person's clotting ability and can identify hypercoagulable states. TEG and multi-modal analysis can be used to evaluate platelet function and activation to characterize the diverse processes underlying the hypercoagulable state. This discovery will be directly translatable to clinical practice through individual risk stratification and personalized thromboprophylaxis use. My research has demonstrated that a major orthopaedic fracture results in a 7-fold increased risk for a VTE event and TEG analysis has demonstrated that maximal amplitude (MA), a measure of clot strength, strongly predicts VTE events. My research interest also involves correlating TEG parameters with inflammatory markers, conventional coagulation measures, and compression ultrasound for DVT surveillance.

My research program is comprised of a number of prospective, longitudinal cohort studies of adult patients with orthopaedic fractures who will undergo serial TEG, platelet procoagulant membrane dynamics (PMD), coagulation and inflammatory marker measurement, proteomics analysis, and surveillance lower extremity compression ultrasound. The results of my study have the potential for clinical integration by supporting a point-of-care precision medicine approach to personalized thromboprophylaxis and for providing novel data to inform thromboprophylaxis guideline development. The goal of my research program is to provide information for preventing the mortality and morbidity associated with VTE.