Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Influence of Slippery Pacemaker Leads on Lead-Induced Venous Occlusion WEIGUANG YANG, Stanford University, SAGAR BHATIA, DAYNA OBENAUF, MAX RESSE, Santa Clara University, MAHDI ESMAILY-MOGHADAM, JEFFREY FEINSTEIN, Stanford University, ON SHUN PAK, Santa Clara University — The use of medical devices such as pacemakers and implantable cardiac defibrillators have become commonplace to treat arrhythmias. Pacing leads with electrodes are used to send electrical pulses to the heart to treat either abnormally slow heart rates, or abnormal rhythms. Lead induced vessel occlusion, which is commonly seen after placement of pacemaker or ICD leads, may result in lead malfunction and/or SVC syndrome, and makes lead extraction difficult. The association between the anatomic locations at risk for thrombosis and regions of venous stasis have been reported previously. The computational studies reveal obvious flow stasis in the proximity of the leads, due to the no-slip boundary condition imposed on the lead surface. With the advent of recent technologies capable of creating slippery surfaces that can repel complex fluids including blood, we explore computationally how local flow structures may be altered in the regions around the leads when the no-slip boundary condition on the lead surface is relaxed using various slip lengths. The findings evaluate the possibility of mitigating risks of lead-induced thrombosis and occlusion by implementing novel surface conditions (i.e. theoretical coatings) on the leads.

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Date submitted: 01 Aug 2016 Electronic form version 1.4