Abstract Submitted
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Towards reducing thrombogenicity of LVAD therapy: optimizing surgical and patient management strategies[1] VENKAT KESHAV CHIVUKULA, ALI LAFZI, Mechanical Engineering, University of Washington, NAHUSH MOKADAM, Division of Cardiothoracic Surgery, University of Washington, JENNIFER BECKMAN, CLAUDIUS MAHR, Division of Cardiology, University of Washington, ALBERTO ALISEDA, Mechanical Engineering, University of Washington — Unfavourable hemodynamics in heart failure patients implanted with left ventricular assist devices (LVAD), due to non-optimal surgical configurations and patient management, strongly influence thrombogenicity. This is consistent with the increase in devastating thromboembolic complications (specifically thrombosis and stroke) in patients, even as the risk of thrombosis inside the device decreases with modern designs. Inflow cannula and outflow graft surgical configurations have been optimized via patient-specific modeling that computes the thrombogenic potential with a combination of Eulerian (endothelial) wall shear stress and Lagrangian (platelet shear history) tracking. Using this view of hemodynamics, the benefits of intermittent aortic valve opening (promoting washout and reducing stagnant flow in the aortic valve region) have been assessed in managing the patient's residual native cardiac output. The use of this methodology to understand the contribution of the hemodynamics in the flow surrounding the LVAD itself to thrombogenesis show promise in developing holistic patient-specific management strategies to minimize stroke risk and enhance efficacy of LVAD therapy.

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