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WITHDRAWN: Modeling of Transient Phenomena in an Axial Flow Blood Pump HOUSTON WOOD, ALEXANDRINA UNTAROIU, University of Virginia — A fully implantable axial flow Ventricular Assist Device (VAD) has been developed with a magnetically suspended impeller (LEV-VAD). The LEV-VAD's flow path design provides a single pass blood path with minimal turbulence. The pump design included the extensive use of CFD modeling and experimental validation under steady-state flow conditions. This CFD study explores transient flow phenomena in the pump simulating in vivo flow conditions. The LEV-VAD operates under transient conditions due to the pulsatile inlet flow rate induced by the patient's native heart and the spinning of the impeller. This study considered: (1) Time varying boundary conditions (TVBC); (2) Stationary-rotating blades interaction or transient sliding interfaces (TSI). The LEV-VAD performance and pressure-flow correlations were investigated under transient flow conditions. The fluid forces acting on the impeller were calculated to facilitate the suspension system and motor design. The transient simulations illustrate the LEV-VAD's response to dynamic flow conditions and demonstrated the ability to deliver flows from 2 to 10 LPM at rotational speeds varying from 5,000 to 8,000 RPM for physiological pressures corresponding to adult CHF patients.

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