Abstract Submitted
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Patient-specific analysis of blood stasis in the left atrium[1] OSCAR FLORES, ALEJANDRO GONZALO, MANUEL GARCIA-VILLALBA, Universidad Carlos III de Madrid, LORENZO ROSSINI, ALBERT HSIAO, ELLIOT MCVEIGH, ANDREW M. KAHN, JUAN C. DEL ALAMO, University of California, San Diego — Atrial fibrillation (AF) is a common arrhythmia in which the left atrium (LA) beats rapidly and irregularly. Patients with AF are at increased risk of thromboembolic events (TE), particularly stroke. Anticoagulant therapy can reduce the risk of TE in AF, but it can also increase the risks of adverse events such as internal bleeding. The current lack of tools to predict each patient's risk of LA thrombogenesis makes it difficult to decide whether to anticoagulate patients with AF. The aim of this work is to evaluate blood stasis in patient-specific models of the LA, because stasis is a known thrombogenesis risk factor. To achieve our aim, we performed direct numerical simulations of left atrial flow using an immersed boundary solver developed at the UC3M, coupled to a 0D model for the pulmonary circulation. The LA geometry is obtained from time-resolved CT scans and the parameters of the 0D model are found by fitting pulmonary vein flow data obtained by 4D phase contrast MRI. Blood stasis is evaluated from the flow data by computing blood residence time together with other kinematic indices of the velocity field (e.g. strain and kinetic energy). We focus on the flow in the left atrial appendage, including a sensitivity analysis of the effect of the parameters of the 0D model.

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