Abstract Submitted
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Effect of pulmonary vein inflow on patient-specific CFD prediction of left atrial blood stasis[1] E DURAN, M GARCIA-VILLALBA, UC3M, L ROSSINI, UCSD, A GONZALO, UCSD/UW, D VIGNEAULT, UCSD, P MARTINEZ-LEGAZPI, J BERMEJO, HGUGM, E MCVEIGH, A M KAHN, UCSD, J C DEL ALAMO, UCSD/UW, O FLORES, UC3M — Atrial fibrillation (AF) disrupts left atrial (LA) blood flow, which can cause increased blood stasis leading to thrombosis in the left atrial appendage (LAA), systemic embolism, transient ischemic attacks (TIAs) and stroke. Patient-specific CFD simulations based on time-resolved, three-dimensional (4D) anatomical images can help predict LAA blood stasis. In these simulations, LA geometry and transmitral flow rate can be inferred from the 4D anatomical images. However, the specific flow rates through the pulmonary vein (PV) inlets need to be modeled and could be a major source of uncertainty. We studied how this PV flow split affects LA blood flow, with emphasis on LAA stasis, by performing simulations with 50-50% (even) and 40-60% (physiological) splits between left and right PVs. We ran our in-house immersed boundary CFD solver in six patient anatomies obtained from 4D-CT (Garcia-Villalba et al, bioRxiv, 2020.05.07.083220). Three patients were in sinus rhythm and three had AF. The AF patients also had an LAA clot, that was segmented out before running the simulations, or a history of TIAs.

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