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Non-newtonian Patient-specific Analysis of Left Atrial Blood Stasis[1] A GONZALO, [a,b], M GARCIA AVILLALBA, L ROSSINI, E DURAN, D VIGNEAULT, P MARTINEZ-LEGAZPI, O FLORES, J BERMEJO, E MCVEIGH, A M KAHN, None, J C DEL 'ALAMO, UCSD, UW, UC3M, HGUGM — Atrial fibrillation (AF) is the most common arrhythmia, affecting $\sim$ 35M people worldwide. During AF, the atria beat weakly and irregularly creating regions of blood stasis where clots may form, especially in the left atrial appendage (LAA). Some of these clots travel to the brain causing strokes or transient ischemic attacks (TIAs). Blood experiences non-Newtonian rheology when its shear rate falls below 100 s^{-1}. Blood inside substantial parts of the LAA sustains shear rates well below this threshold; however, previous CFD analyses considered Newtonian rheology. We explored the influence of non-Newtonian rheology in LAA stasis for six patient-specific anatomies obtained from 4D-CT acquisitions. Three patients had an LAA clot, which was segmented out before running the simulations, or a history of TIAs. We included a semi-implicit Carreau-Yasuda shear-thinning model in our in-house immersed-boundary solver, and tailored the CFL condition to ensure numerical stability in the presence of strong viscosity gradients. These simulations are compared with previously reported Newtonian simulations in the same patients (Garcia-Villalba et al, bioRxiv, 2020.05.07.083220).

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