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Is aspect ratio sufficient to classify intra-aneurysmal hemodynamics- a parametric approach MICHAEL DURKA, ANNE ROBERTSON, University of Pittsburgh — Intracranial aneurysms are a vascular pathology in which a localized bulge is formed in the arterial wall, most often in a saccular shape. It is believed that the blood flow field within the aneurysm plays a critical role in the degradation of the wall. Aneurysm rupture has a high mortality risk. Since only a small fracture of aneurysms rupture, and common treatments have their own risks, it is desirable to identify a useful means of assessing rupture risk. Therefore, numerous groups have endeavored to identify a correlation between rupture risk and sac geometry or flow dynamics. However, no clinically useful parameters have been identified to date. Prior work has suggested that the aspect ratio (sac height/neck) could be useful for risk stratification due to its influence on the sac hemodynamics. In this work, we make of a previously developed parametric model of the aneurysm geometry to evaluate the influence of aspect ratio (sac height/sac neck) on flow dynamics, using computational fluid dynamics. In particular, we assess the influence of aspect ratio on the number of vortices in the aneurysm sac over a wide range of sac geometries. The conclusions obtained for the parametric model are then assessed in 20 clinical cases.

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