

The Rupture Potential of Nerve Tissue Constrained Intracranial Saccular Aneurysm

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Abstract : The rupture predictability of intracranial aneurysm is one of the most important parameters for physicians in surgical treatment. As most of the intracranial aneurysms are asymptomatic, still the rupture potential of both symptomatic and asymptomatic lesions is relatively unknown. Moreover, an intracranial aneurysm constrained by a nerve tissue might be a common scenario for a physician to deal with during the treatment process. Here, we perform a computational modeling of nerve tissue constrained intracranial saccular aneurysm to show a protective role of constrained tissue on the aneurysm. A comparative parametric study of the model also performs taking long constraint, medium constraint, short constraint, point contact, narrow neck aneurysm, wide neck aneurysm as parameters for the analysis. Results show that contact constraint aneurysm generates less stress near the fundus compared to no constraint aneurysm, hence works as a protective wall for the aneurysm not to be ruptured.

Keywords : rupture potential, intracranial saccular aneurysm, anisotropic hyper-elastic material, finite element analysis

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