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Hemodynamic effects in aneurysm models with virtual stenting

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An important medical problem of the non-invasive treatment of brain aneurysm has attracted growing interest. Aneurysm surgery remains dangerous because surgeons have limited knowledge of blood flow patterns and complex 3D geometry of aneurysms. This information is essential to determine if the aneurysm is suitable for a certain surgical technique. Therefore, a virtual stenting research was initiated to make it possible for medical specialists to obtain such detailed information. Flow dynamics plays an important role in the pathogenesis and treatment of cerebral aneurysms. The temporal and spatial variations of wall shear stress in the aneurysm are hypothesized to be correlated with its growth and rupture. This work describes the flow dynamics in a Virtual Aneurysm (VA) model for patient specific geometries studied under Newtonian and non-Newtonian fluid assumptions. Stent model were generated using CAD geometry and later meshed using Meshing tool ICEM CFD. Prism layers were generated on the walls and tetrahedral layers on the remaining parts of the model. The placement of a stent across the neck of an aneurysm has the potential to alter the hemodynamic in such a way as to induce self-thrombosis within the aneurysm sac, stopping its further growth and preventing its rupture. This study is focused on quantitative understanding and characterization of flow through non-stented and stented aneurysm models using Computational Fluid Dynamics (CFD) analysis. Our results can help explain in vivo thrombus formation within an aneurysm after placement of a stent that is compatible with local hemodynamics.

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Lateral flow immune-assays: Limitations and perspectives

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Lateral flow immune-assays (Rapid tests) are currently used for qualitative, semi quantitative and to some extent quantitative monitoring in resource-poor or non-laboratory environments. Applications include tests on pathogens, drugs, hormones and metabolites in biomedical, phyto-sanitary, veterinary, food and environmental factors. We describe principles of current formats, applications, limitations and perspectives for qualitative monitoring. We illustrate the potentials and limitations of analysis with lateral flow immune-assays using a literature survey and described its strengths, weaknesses, opportunities, threats.

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