

عنوان مقاله:

Comparison of Pulsatile Pressure Flow through a Specific Patient's Rigid and Deformable Arteriovenous Fistula: In Vitro Study

محل انتشار:

دوماهنامه مکانیک سیالات کاربردی، دوره 14، شماره 6 (سال: 1400)

تعداد صفحات اصل مقاله: 9

نویسندگان:

J. F. Rangel - *Federal University of Rio Grande do Norte, Natal, Rio Grande do Norte, 59078-970, Brazil*

W. B. A. Santos - *Federal University of Rio Grande do Norte, Natal, Rio Grande do Norte, 59078-970, Brazil*

L. H. Pinheiro - *Federal University of Rio Grande do Norte, Natal, Rio Grande do Norte, 59078-970, Brazil*

T. H. C. Costa - *Federal University of Rio Grande do Norte, Natal, Rio Grande do Norte, 59078-970, Brazil*

K. L. Bessa - *Federal University of Rio Grande do Norte, Natal, Rio Grande do Norte, 59078-970, Brazil*

J. P. Ortiz - *University of São Paulo, São Paulo, São Paulo, 05508-030, Brazil*

خلاصه مقاله:

Arteriovenous fistula (AVF) is the most widely used vascular access by patients undergoing hemodialysis, however, even though the most widely used access to AVF has a high failure rate, and can be affected by problems during its use, among the most common highlights intimal hyperplasia, thrombosis and stenosis. Studies suggest that recurrent problems in this type of access are directly linked to geometry, flow conditions and stiffness of the vascular wall by the vessels that compose it. The present work seeks to analyze the variation of pressure and flow in rigid and flexible AVF models manufactured from data from an actual patient undergoing treatment. The study was carried out from the acquisition and processing of the patient's medical examinations (computed tomography), the creation of the geometry, treatment and modeling of said patient, the manufacturing of the AVF models by 3D printing and injection in mold, experimental analysis with pulsatile flow conditions, close to the real physiological conditions, and data analysis. The results obtained show the influence of vascular wall stiffness on flow conditions. In the rigid and flexible model, pressure peaks ranged from 170.98 mmHg to 172.44 mmHg (± 0.02) and 69.83 mmHg to 116.63 mmHg (± 0.03), respectively. The pressure drop between entry and exit in the AVF was also analyzed, presenting a greater value in the flexible model, being approximately three times that of the rigid model. The observed results show the direct relation of the deformation in the flow conditions in the system, and consequently, its direct influence on the pathologies of the vascular system, especially the AVF.

کلمات کلیدی:

Arteriovenous fistula, Rigid, Deformation, Pressure variation, Flow variation.

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1361799>

