

EXPERIMENTAL INVESTIGATION OF FLOW THROUGH DEFORMABLE BODIES UNDER PHYSIOLOGICAL CONDITIONS

Mateusz Mese^{*}¹, Aleksander Sinek¹ Marek Rojczyk¹,
Jan Juszczuk² Wojciech Adamczyk¹, Ziemowit Ostrowski¹,
Ryszard Bialecki¹

¹Silesian University of Technology, Institute of Thermal Technology, Biomedical Engineering Lab

²Silesian University of Technology, Department of Medical Informatics and Artificial Intelligence

Key words: model validation, FSI, CFD, arteries

Abstract

In the work which is a part of ENTHRAL project, preliminary experimental data are shown. The conditions achieved during the experiment were close to physiological conditions. The experimental set-up consisting of pulsatile pump, hydraulic accumulator and radially distensible tube was presented and discussed. Construction of this set-up allowed to acquire and simulate the flow of water under physiological pressure and volumetric flowrate. The quantities of interest were measured with the use of electromagnetic flowmeters and medical pressure transducers. The rig is equipped with two high-speed cameras with high resolution to capture the deformations of elastic element. The data acquired for flow through rigid pipe and elastic pipe are presented, compared and the flow data was correlated with pictures taken by high-speed cameras. The results are also compared with the literature data for Left Common Carotid Artery, which stiffness assessment is the main goal of the ENTHRAL project.

The project is financed from Norway Grants 2014-2021 under contract UMO-2019/34/H/ST8/00624.

^{*}Corresponding author: mateusz.mese^k@polsl.pl, 44-100 Gliwice, Konarskiego 22 Street, Poland.