Merab Beraia et al., Health Care: Current Reviews, 4:5(Suppl)
http://dx.doi.org/10.4172/2375-4273.C1.027

FREQUENCE DISPERSION OF THE SURFACE WAVE - INITIAL FACTOR OF ATHEROSCLEROSIS

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Objectives: To study the arterial blood flow with the MRI and CT and initial factors of atherosclerosis.

Methods: In 17 healthy volunteers (18-52y) at the different sites of the aorta peak velocity, net flow, flow acceleration and blood density (in Hounsfield) has been investigated.

Results: At the outer curvature of the aorta in the end systole flow separates. At the isthmus, flow acceleration in the initial diastole is 11.6±0.6 times higher than that in systole. Net flow from systole to diastole increases 2.5±0.5 folds. From the end systole to the initial diastole there is a plateau on the net flow graph: here, at the outer curvature of the isthmus, group waves at the boundary reflection, changes in phase at 1800 at the sine wave oscillation frequencies -1.25Hz and 2.5Hz. Blood density, from the aortic isthmus, to the abdominal aorta, equals to -51±3HU to- 31±4HU respectively.

Conclusion: Pulse pressure propagating in the blood and the vessel wall, at the boundary layer, forms surface wave. Blood is viscoelastic substance. At the outer wall isthmus of the aorta and all arterial branching sites, pulse pressure, at the reflection is in resonance with the end systolic pressure drop and amplitude of the wall stress increases. In the end of systole, at the outer wall of the circular flow sites, wave packets with the different frequencies forms - flow separates. Wave packets at the frequency dispersion, destroys the flow cell aggregates increasing the blood entropy, whereas at the boundary layer of the vessel, denudate the endothelial sheet.

Biography

Merab Beraia has been graduated from Tbilisi State Medical University in 1986, as a Medical Doctor, with the specialty of Internal Medicine and took a Diploma in Neurology from the Institute of Clinical and Experimental Neurology Tblisi, Georgia. Later he obtained his post-graduation diploma in Radiology from University of Graz, Austria and then started working at The Institute of Clinical Medicine Tbilisi, Georgia, where he has continued his research. Presently he is working at the Tbilisi.

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