Modeling vasomotion

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Abstract

We study the flow of a Newtonian fluid through a vessel provided with valves ensuring a unidirectional motion and whose walls are animated by periodic peristaltic waves. The ultimate target is to describe the phenomenon of vasomotion, consisting in periodic oscillations of blood vessels walls which is particularly important for the blood flow in veins. Here we formulate a mathematical model based on approximations of the flow equa- tions due to the smallness of the radius-to-length ratio. In particular we examine venules equipped with just two valves, showing that the model reproduces the periodic pressure pulses that have been experimentally detected in venules of the bat wing. The flow generated by the synchronous vessel oscillations is recovered in the limit of large peristaltic wavelength.

References

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