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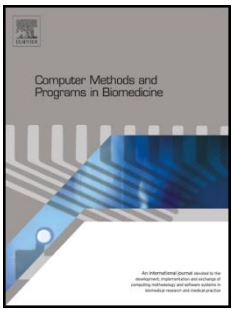

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Computational Analysis of Magnetic Effects on Pulsatile Flow of Couple Stress Fluid Through a Bifurcated Artery

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Research Highlights

1. The blood flow through a bifurcated artery with mild stenosis is investigated.
2. Blood is assumed as couple stress fluid.
3. Flow rate increased with an increase of all the parameters except for magnetic parameter
4. Impedance decreased with an increase of all parameters except for magnetic parameter
5. Shear stress is increasing with an increase in the values of couple stress fluid parameter
6. Shear stress decreased with increase of bifurcation angle along the inner wall of daughter artery.

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Abstract

Background and objectives: The objective of the present study is to investigate the magnetic field effect on pulsatile flow of blood through a bifurcated artery with mild stenosis in its parent lumen by taking blood as couple stress fluid.

Methods: The equations governing the flow are made non-dimensional and coordinate transformation is employed to convert the irregular boundary to a regular boundary. The resulting system of equations is solved numerically using the finite difference method.

Results : The shear stress, flow rate and impedance near the apex with pertinent parameters are obtained numerically and analysed graphically.

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