

Theoretical approach on vein graft survival: Simulation on vein graft

Abstract

Artery reconstruction in upper extremities is rare performed compared to artery reconstruction in lower extremities. Primary vascular repair was performed in many cases. An interposition vein graft or venous bypass grafting were applied in order to alleviate thrombus in blood vessel. However, one or more of the applied vein graft are blocked or severely narrowed due to the mismatched internal diameter failure on vein graft. The objective of this study is to investigate the blood flow influence on vein graft with the mismatched internal diameter failure. The applied three dimension computational fluid dynamic was employed to determine velocity, pressure gradient, resistances of blood flow and wall shear stress on the kinked vein graft. We expect that velocity, pressure gradient, resistance of blood flow and wall shear stress on the mismatched internal diameter of vein graft model to behave non-hydraulically compared to an ideal straight graft. Furthermore, longitudinal impedance modulus (ZL) is expected to be insufficient due to the mismatched internal diameter failure on vein graft.

Keywords

Blood flow; CFDs; Computational fluid dynamics; Digital artery; Keywords-upper extremity; Thrombosis