Effect of anastomosis angle on hemodynamic of side-to-end radiocephalic arteriovenous fistula (RCAVF)

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ABSTRACT
Radiocephalic arteriovenous fistula (RCAVF) at wrist is the chosen access for hemodialysis. Most studies describe access complications without considering the effect of the anastomosis angle. In the present investigation, eighteen three-dimensional, simplified models of RCAVF were used to analyze the hemodynamic effect of anastomosis angle under fixed flow rate of 900 ml/min, corresponding to Reynolds number 950. EFD. Lab software was used in the flow simulation with steady flow conditions. The results show that high pressure drop was observed for RCAVF with smaller anastomosis angle. However, for cases with anastomosis angle larger than 45°, pressure drop became relatively constant. The results also show that large vortices appeared in cases with angle smaller than 30°. For cases with angle larger than 60°, low flow zone appeared at the inner wall that may lead to promotion of intimal thickening and formation of stenosis. Overall, for average flowrate, it is recommended that anastomosis angle should be maintained between 45° and 60° to minimize adverse effects.

KEYWORDS:
anastomosis angle; Radiocephalic arteriovenous fistula (RCAVF); simplified model
REFERENCES


