Peningkatan Blood Flow Rate dan Peak Systolic Velocity Arteri Brakhialis Intraoperasi sebagai Prediktor Maturitas Fistula Arterivenosa Brakiosefalika pada Pasien Penyakit Ginjal Tahap Akhir = Increased Intraoperative Brachial Artery Blood Flow Rate and Peak Systolic Velocity as Predictor of Maturity Brachiocephalic Arteriovenous Fistula in End Stage Kidney Disease Patients

Andre Grahana Baskara Saharui, author

Abstrak

Latar Belakang : Hemodialisis merupakan terapi pengganti ginjal yang paling banyak digunakan di dunia. Fistula Arteriovenosa (FAV) merupakan pilihan akses vaskular terbaik bagi penderita Penyakit Ginjal Tahap Akhir (PGTA) yang menjalani hemodialisis. Akan tetapi, kegagalan maturasi FAV masihrelatif tinggi akibat gangguan dari înflow dan/atau outflow. Pengukuran peningkatan Blood Flow Rate (BFR) dan Peak Systolic Velocity (PSV) intraoperasi pada arteri brakialis diharapkan dapat mengidentifikasi masalah inflow sekaligus outflow sebagai penyebab kegagalan maturasi FAV.
Tujuan : Mengetahui hubungan peningkatan BFR dan PSV arteri brakialis intraoperasi serta nilai batasannya yang dapat dijadikan prediktor maturasi FAV Brakiosefalika.
Subjek dan Metode : PGTA yang menjalani operasi FAV brakiosefalika di lima Rumah Sakit (RSCM, RSUP Fatmawati, RSUD Kab. Tangerang, RS Hermina Depok dan RS Hermina Bekasi) pada periode Juli 2019 – Februari 2022. Desain penelitian kohort retrospektif menggunakan data sekunder dari penelitian sebelumnya Data yang diteliti meliputi: usia, jenis kelamin, tekanan darah, merokok, diabetes melitus, dan hasil pengukuran USG doppler berupa diameter arteri brakialis dan vena sefalika preoperasi serta peningkatan BFR dan PSV arteri brakialis intraoperasi, kemudian data subjek dengan FAV brakiosefalika yang mengalami maturasi dalam 6 minggu sesuai kriteria rule of 6 dari NKF-KDOQI. Selanjutnya dilakukan analisa statistik adanya korelasi peningkatan BFR dan PSV arteri brakialis intraoperasi terhadap maturitas FAV brakiosefalika serta ditetapkannya nilai batasan sebagai prediktor maturasi. dengan memakai uji diagnostik grafik Receiver Operator Curve (ROC).
Hasil : Dari total 83 subjek yang memenuhi kriteria inklusi dan eksklusi, terdapat 50 (60,24%) subjek yang mengalami maturasi dalam 6 minggu pascaoperasi. Dengan menggunakan analisis multivariat dengan uji regresi logistik, peningkatan BFR arteri brakialis intraoperasi ($p<0,001$) merupakan faktor yang paling berhubungan dengan maturasi FAV brakiosefalika setelah 6 minggu pascaoperasi dengan nilai batasan 184,58 ml/menit, sensitivitas 100%, spesifisitas 84,8%, Nilai Duga Positif 90,9%, Nilai Duga Negatif 100%, Akurasi 93,98%
Kesimpulan : Peningkatan BFR arteri brakialis intraoperasi dapat dipakai sebagai prediktor maturasi FAV brakiosefalika 6 minggu pascaoperasi
.....Background : Hemodialysis is the most widely used renal replacement therapy in the world. Arteriovenous fistula (AVF) is the best vascular access option for patients with End Stage Kidney Disease (ESKD) undergoing hemodialysis. However, the AVF maturation failure rate is still high due to inflow and/or outflow problem. Measurement of intraoperative increase in Blood Flow Rate (BFR) and Peak Systolic Velocity (PSV) in the brachial artery is expected to identify inflow and outflow problems as the

cause of AVF maturation failure.
Objective: To determine the relationship between intraoperative increase in BFR and PSV of the brachial artery and the cut off point that can be used as a predictor of Brachiocephalic AVF maturation.
Subjects and Methods : ESKD who underwent AVF brachiocephalic surgery in five hospitals (RSCM, Fatmawati Hospital, Tangerang Hospital, Hermina Hospital Depok and Hermina Hospital Bekasi) in the period July 2019 – February 2022. The retrospective cohort study design used secondary data from the study previously. The data studied included: age, sex, blood pressure, smoking, diabetes mellitus, and the results of Doppler ultrasound measurements of preoperative brachial artery and cephalic vein diameters and an increase in intraoperative BFR and PSV brachial artery, then data on subjects with maturation of brachiocephalic AVF within 6 weeks according to the rule of 6 criteria of the NKF-KDOQI. Furthermore, statistical analysis was carried out on the correlation between increased intraoperative brachial artery BFR and PSV on brachiocephalic FAV maturity and the determination of cut off value as a predictor of maturation using the Receiver Operator Curve (ROC) graphic diagnostic test.
Results: From a total of 83 subjects who met the inclusion and exclusion criteria, there were 50 (60.24%) subjects who matured within 6 weeks postoperatively. Using multivariate analysis with logistic regression, the increase in intraoperative brachial artery BFR ($p<0.001$) was the most associated factor of brachiocephalic FAV maturation after 6 weeks postoperatively with a cut off value of 184.58 ml/min, sensitivity 100%, specificity 84.8%, Positive Predictive Value 90.9%, Negative Predictive Value 100%, Accuracy 93.98%
Conclusion: Increased intraoperative brachial artery BFR can be used as a predictor of brachiocephalic FAV maturation 6 weeks postoperatively.