

CREATION OF AN ARTERIOVENOUS FISTULA IS ASSOCIATED WITH SIGNIFICANT POTENTIALLY BENEFICIAL CHANGES IN SYSTEMIC CARDIOVASCULAR PERFORMANCE AND ARTERIAL STIFFNESS

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Native arteriovenous fistulae (AVF) remain the vascular access of choice for haemodialysis. The use of native access c.f. catheters is associated with sustained reduction in mortality. This may be due to factors above and beyond line related sepsis rates. The aim of this study is to investigate the impact of AVF formation on the spectrum of cardiovascular functional factors that might be important in the pathophysiology of cardiovascular disease in HD patients.

We recruited 31 CKD stage 4/5 predialysis patients who underwent AVF formation. This was primarily successful in 23/31 patients (18 brachiocephalic and 5 radiocephalic). All patients were studied 2 weeks prior to planned AVF operation and restudied 2 weeks postoperatively. Haemodynamic variables were measured non-invasively using pulse wave analysis. Central blood pressures (BP), Aortic Index (AIx) and carotid femoral pulse wave velocity (CF-PWV) were assessed using applanation tonometry. AVF blood flow (Qa) was measured using Doppler ultrasound. Bioimpedance analysis was performed using a multifrequency multisegmental method and patients underwent serial transthoracic echocardiography.

Two weeks postoperatively, total peripheral resistance decreased ($-17\pm 20\%$, $p=0.004$), stroke volume tended to increase ($12\pm 30\text{ml}$, $p=0.07$), and heart rate increased ($4\pm 8.0\text{bpm}$, $p=0.03$). This was associated with an increase in cardiac output ($20\pm 30\%$, $p=0.006$). Higher flow AVFs were not associated with higher cardiac outputs, indeed there was a negative correlation between AVF flow and post operative cardiac output ($r= -0.591$, $p=0.003$). Central systolic and diastolic BP were reduced ($-11.3\pm 17.9\text{mmHg}$, $p=0.008$ and $-6.7\pm 8.5\text{ mmHg}$, $p=0.001$ respectively). There was a significant reduction in both CF-PWV ($-1.9\pm 2.1\text{m/s}$, $p=0.01$) and AIx ($-3.8\pm 5.65\%$, $p=0.006$). No change in body composition was observed.

Formation of an AVF resulted in a significant reduction in BP and arterial stiffness. Patients with lower cardiac outputs did not result in a low flow AVF, and patients with high flow AVFs were not subjected to high output cardiac states. Overall the post AVF adaptations might be characterised as potentially cardioprotective, and there was no evidence of acute cardiac decompensation.

