Case Series of Five Patients with End-stage Renal Disease with Reversible Dyspnea, Heart Failure and Pulmonary Hypertension Related to Arteriovenous Dialysis Access

F. Rogers, F. Raza, M. Alkhouli, A. Vaidya, P. Forfia

**Purpose:** Our objective was to identify hemodynamic parameters that define resolution of symptoms of heart failure and pulmonary hypertension (PH) in end-stage renal disease (ESRD) patients with arteriovenous dialysis access (AVDA).

**Background:** ESRD patients with AVDA can develop symptoms of heart failure and PH. In patients with dyspnea and PH, the role of the AVDA must be considered, particularly given that closure of AVDA may represent a reversible cause of dyspnea, heart failure and PH in these patients.

**Methods:** We report on five patients with ESRD and AVDA presenting with shortness of breath, heart failure and PH. All patients had partial or complete closure of AVDA and were reevaluated following AVDA revision.

**Results:**

Figure 1. New York Heart Association (NYHA) functional classification at baseline and following arteriovenous dialysis access closure.
Figure 2. Cardiac output and echocardiographic-Doppler parameters before and after arteriovenous dialysis access closure (Mean ± SD).

All five subjects had clinical and echocardiographic evidence of heart failure, hypertensive heart disease, left ventricular diastolic dysfunction and PH at baseline.

After complete closure (n=4) or partial banding (n=1) of AVDA, median NYHA class improved from 3.4 ± 0.4 to 1.8 ± 0.4 (p=0.016). Median 6 minute walk distance improved from 236 ± 115 to 366 ± 51 (p=0.021) meters. Serial echocardiography revealed a fall in the RV:LV ratio from 1.12 ± 0.17 to 0.8 ± 0.06 (p=0.005) and improved diastolic dysfunction parameters. On right heart catheterization prior to definitive AVDA revision, acute manual fistula or graft occlusion led to an average fall in cardiac output of 1.1 L/min with no other changes in hemodynamics: 9.88 ± 2.2 to 8.71 ± 2.2 L/min (p=0.059). However, the average fall in cardiac output following definitive revision of the AVDA (mean 90 days) was 4.0 L/min with marked improvements in biventricular filling pressures and pulmonary artery pressure.

**Conclusion:** In ESRD patients with AVDA presenting with heart failure and PH, revision or closure of the AVDA patients can markedly improve dyspnea as well as the clinical, echocardiographic and hemodynamic manifestations of heart failure and PH.