Incidence, Survival and Risk Factors for Central Venous Stenosis in Haemodialysis Patients

**Background**

Central venous catheters have traditionally provided haemodialysis access when a fistula is declined or not achieved. They are increasingly advocated as an acceptable option for older or more comorbid patients. Adverse effects of this type of dialysis access include central vein stenosis (CVS), which can lead to significant morbidity including access dysfunction or failure. The pathogenesis and risk factors for CVS are poorly understood.

**Methods**

All patients starting haemodialysis in a single centre between December 2005 and February 2015 were retrospectively analysed for the presence of CVS defined by cross-sectional or angiographic imaging. Outcomes were compared to matched controls within the same cohort. A subset of patients with a history of catheter access were analysed to determine CVS risk factors.

**Results**

Out of 2811 patients (aged 16-91, mean 61.0 years, 62.8% male), with a mean follow up of 3.5 years, CVS was radiologically identified in 120 patients (4.2%) at a median dialysis vintage of 2.9 (1.8-4.6) years. At diagnosis, 96 patients (80.0%) were receiving haemodialysis via a catheter.

Compared to a control group matched for age, gender, comorbidity and vintage, CVS patients exhibited similar outcomes for survival (median 5.10 vs 5.21 years, p=0.54) and transplantation (27.5% vs 21.8%, p=0.37).

Of 500 patients (aged 17-90, mean age 61.7 years, 65.4% male) with a history of catheter access, followed until the end of their haemodialysis career (72.2%) or for a mean of 5.2 years, 34 (6.8%) developed CVS. Compared to those unaffected, patients with CVS had a longer history of catheter use (3.4 vs 2.6 years, p=0.057) and a greater number of catheters previously used (2.6 vs 1.6, p=<0.001) along with younger age at dialysis initiation (51.7 vs 62.5, p<0.001). Pacemaker use was also more common (22.6 vs 5.8%, p=0.003).

In a multivariable logistic regression model with CVS as the dependent variable, catheter number, pacemakers and age at dialysis initiation were all highly significant independent risk factors.

**Conclusions**

In haemodialysis patients with a history of tunnelled catheter use, a significant minority may develop CVS, though this does not impact survival or transplantation. Risk relates to the number of catheters used rather than the catheter duration. Factors unrelated to dialysis (such as pacemakers) are also relevant. The finding that older patients are less likely to develop CVS, supports the selective use of tunneled catheters in this group.