HIGH LEVEL OF MALONDIALDEHYDE AND RISK OF ARTERIOVENOUS FISTULA THROMBOSIS

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OBJECTIVES

Dialysis access procedures and complications represent a major cause of morbidity, hospitalization, and cost for chronic dialysis patients. It is not well known whether enhanced oxidative stress contributes to the dysfunction of arteriovenous fistulas (AVFs) in these patients.

The aim of our study was to determine the existence of a relationship between symptomatic AVF thrombosis (AVFT) and oxidative stress level analyzed by total antioxidative capacity, malondyaldehyde (MDA) as a lipid peroxidation biomarker and reactive carbonyl groups (RCG) as a marker of oxidative modification of proteins.

METHODS

One hundred and twenty six patients aged 24-78 years with end-stage renal disease (ESRD) were evaluated prospectively for a period of 36 months. In addition to standard biochemistry, demographic and clinical data were accessed from patients' medical records. All fistulas were evaluated clinically as patent at the start of this study. Patients were followed-up for any evidence of AVFT within 36 months.

Finally, all factors (diabetes, hypertension, ultrafiltration, age, gender, hypotension during dialysis, fistula site, epoetin usage, lipid paramethers and oxidative stress level) were analyzed in a stepwise regression analysis.

RESULTS

Table 1. Univariate and multivariate analysis for the predictors of AVF stenosis

	Univariate Analysis		*Multivariate Analysis*	
Parameter	*HR (95% CI)*	*p*	*HR(95% CI)*	*p*
Age>65 yrs	*3.20 (2.71-3.63)*	*< 0.001*		
Diabetes	*2.14(1.96-2.33)*	*0.006*		
rHuEPO therapy	*3.70(3.58-3.99)*	*< 0.001*		
LDL	*1.60(1.46-1.95)*	*0.002*		
MDA	*2.44(2.30-2.77)*	*< 0.001*	*2.69 (1.33-5.08)*	*< 0.001*

The incidence of AVFT was 18% (25 of 142). Multivariable analysis found that older age (>65 years, odds ratio [OR] 3.2, P<0.001), history of diabetes (OR 2.14, P=0.006), erythropoietin beta usage (OR 3.7, P<0.001) and LDL cholesterol (OR 1.6, P=0.002) were independently associated with AVFT.

In addition, up to 67% of the patients with higher levels of MDA (>9.0µmol/L) had AVFT compared with 28% of those with lower levels (<9.0 µmol/L, P < 0.001).

In multivariate analysis, plasma **MDA independently nearly tripled the risk for AVFT** (hazard ratio 2.69; 95% confidence interval 1.33 to 5.08).

CONCLUSIONS

These results suggest a role for MDA in the AVFT and call for preventive strategies that target MDA and/or lipids peroxidation to decrease the risk for AVF thrombosis.