

Hypoalbuminemia Is a Risk Factor of Venous Thromboembolism in Membranous Nephropathy (MN)

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OBJECTIVES: To assess the frequency and risk factors of venous thromboembolic events (VTE) in patients with MN.

METHODS: Patients with biopsy-proven idiopathic MN from the Glomerular Disease Collaborative Network (n=412) & the Toronto Glomerulonephritis Registry (n=395) inception cohorts were reviewed. The cohorts were similar with respect to demographics, eGFR, proteinuria and serum albumin at biopsy, and were pooled. Cases with at least one VTE (pulmonary embolus, deep vein or renal vein thrombosis, or other) were identified. Groups were compared by Fisher's exact and Wilcoxon rank tests. Logistic regression models were used to estimate odds ratios (OR) for VTE.

RESULTS: Of 807 patients, 62(7.7%) had at least one VTE, and this rate did not differ between registries (7.04% vs. 8.35%, p>0.05). Mean time to VTE was 11±53 months from the first clinical assessment. Hypoalbuminemia was associated with a 2.5 fold increased risk of VTE with each g/dl decrease in serum concentration (OR= 2.5, 95% CI:1.5-4.1, p=.0003). At serum albumin levels of 2.0 to <2.5 mg/dl the adjusted OR of VTE was 2.50 (95% CI: 1.1-5, p=0.02) and at <2.0 mg/dl the adjusted OR of VTE was 3.8 (95% CI: 1.7-8.6, p=0.002), compared to albumin >2.5 g/dl after controlling for age, gender, proteinuria, and immunosuppressive therapy. Smoking status did not influence these results.

	With VTE, N=62	Without VTE, N=745	p-value
Age at MN diagnosis (yrs)	46±14	50±16	0.11
Gender, males, N(%)	45(73%)	454(61%)	0.08
Race, Caucasian, N(%)	44 (71%)	496 (67%)	0.22
Serum albumin (g/dl)	2.2±0.6	2.7±2.3	<0.0001
eGFR (ml/min)	71±29	73±34	0.731
24hour proteinuria (g/day)	8.6±5.1	7.7±5.5	0.07

CONCLUSIONS: In a large cohort of patients with MN, the frequency of VTE was 7.7%. Hypoalbuminemia, particularly at levels below 2.5 mg/dL, was the strongest independent predictor of VTE risk.