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Proteinuria Does Not Need to Be Standardized to Body Surface Area in Adults with Glomerulonephritis

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BACKGROUND: Baseline proteinuria (Prot) is an important but poorly defined determinant of renal outcome in glomerulonephritis (GN). While it is conventional in children to adjust proteinuria to body surface area (ProtBSA) this is not common in adults. We sought to determine if ProtBSA is more closely associated with the risk of kidney failure than traditional unadjusted proteinuria.

METHODS: We analyzed an adult cohort with IgA nephropathy (IgAN N=445), focal segmental glomerulosclerosis (FSGS N=472) and membranous nephropathy (MN N=434) from the Toronto GN Registry followed for a median of 54 months. The primary outcome (ESRD or 50% drop in eGFR N=385) was analyzed using Cox regression to compare model fit between Prot and ProtBSA at biopsy, which were log-transformed due to non-linearity.

RESULTS: The median baseline Prot was 3.7g/d and ProtBSA was 3.5g/d/1.73m^2. As shown in the table, in MN and IgAN both Prot and ProtBSA were associated with a similar and increased risk of renal progression ($p<0.001$ for all HR). The R^2, AIC, and C-statistic were similar between Prot and ProtBSA and the continuous (c)NRI and IDI were very small or not different from zero. As in previous studies neither baseline Prot nor ProtBSA were associated with renal progression in FSGS (HR=1.11 95%CI 0.94-1.32, HR 1.12 95%CI 0.95-1.33 both p=0.2).

	HR	R^2	AIC	C statistic	Δ C statistic		IDI
IgAN							
Prot	1.66 (1.36, 2.02)	0.062	1343	0.65 (0.60, 0.71)			
ProtBSA	1.71 (1.41, 2.08)	0.071	1339	0.66 (0.61, 0.72)	0.01 (0.001, 0.02)	, 0.65)	0.006 (-0.0005, 0.02)
MN							

	HR	R^2	AIC	C statistic	Δ C statistic		IDI
Prot	1.89 (1.39, 2.56)	0.048	920	0.63 (0.56, 0.70)			
ProtBSA	1.92 (1.40, 2.63)	0.048	920	0.63 (0.55, 0.70)	-0.0004 (-0.01, 0.01)	0.52)	-0.0006 (-0.005, 0.005)

CONCLUSIONS: In a large cohort of adults with GN, Prot and ProtBSA similarly predict the risk of renal outcome. BSA adjustment does not improve the prognostic value of baseline proteinuria measurements.