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Clinical Implications of Glomerular Basement Membrane Thickness in Focal Segmental Glomerulosclerosis: A Retrospective Cohort Study

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Objectives : Attention to the glomerular basement membrane (GBM) in focal segmental glomerulosclerosis (FSGS) is increasing, as some cases initially diagnosed as FSGS are later reclassified as Alport syndrome due to overlapping features. However, whether GBM thickness is related to the clinical characteristics or outcomes of FSGS remains unclear.
Methods : We retrospectively reviewed the records of 82 FSGS patients from a cohort of 1,097 individuals who underwent kidney biopsy between January 2009 and December 2024. GBM thickness was assessed in glomerular capillary loops using electron microscopy, with the mean value calculated from multiple measurements. Patients with a GBM thickness of less than 250 nm were classified as having thin GBM. The clinicopathological features, treatment response, and clinical outcomes were compared between FSGS patients with thin and standard GBM.
Results : Among 82 FSGS patients, excluding one reclassified as Alport syndrome, 39 had thin GBM, and 42 had standard GBM. Patients with thin GBM were significantly more likely to be women and had lower blood pressure compared to those with standard GBM. The mean GBM thickness was significantly lower in the thin GBM group (199.4 ± 25.0 nm vs. 307.5 ± 41.7 nm, $p<0.001$). No significant differences between the groups were observed in age, body mass index, foot process effacement, or other laboratory findings at biopsy. Hematuria was more common in the thin GBM group (46.2% vs. 22.4%, $p=0.02$), while the use of immunosuppressant therapy did not differ significantly between the groups.
Conclusions : The findings suggest that thin GBM in FSGS is associated with a higher prevalence of hematuria. However, no significant differences were observed in treatment response or other clinical parameters between patients with thin and standard GBM. Further studies are needed to clarify the clinical implications of GBM thickness in FSGS and its potential role in disease management and prognosis.

Figure 1.jpg

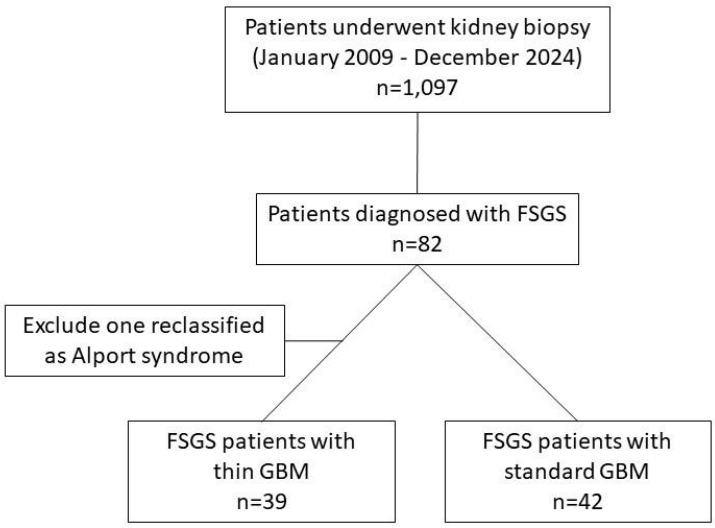
Patients underwent kidney biopsy
(January 2009 - December 2024)
n=1,097
Patients diagnosed with FSGS
n=82
Exclude one reclassified
as Alport syndrome
FSGS patients with
thin GBM
n=39
FSGS patients with
standard GBM
n=42

Figure 1.jpg

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Table 1. The clinicopathologic characteristics at biopsy

		Thin GBM (N = 39)	Standard GBM (N = 42)	P-value*
Sex	Men	17 (43.6%)	29 (69.0%)	0.02
	Women	22 (56.4%)	13 (31.0%)	
Age, y		45.0 ± 14.2	40.6 ± 15.8	0.19
Body mass index, kg/m²		24.5 ± 4.2	25.6 ± 4.3	0.24
Systolic blood pressure, mmHg		124.9 ± 16.2	133.8 ± 18.8	0.04
Diastolic blood pressure, mmHg		75.75 ± 12.43	83.0 ± 13.1	0.02
GBM thickness, nm		199.4 ± 25.0	307.5 ± 41.7	< 0.001
Foot process effacement, %		64.2 ± 8.1	69.5 ± 10.2	0.07
Albumin, g/dL		3.3 ± 1.0	3.2 ± 1.1	0.65
Creatinine, mg/dL		1.2 ± 0.7	1.5 ± 1.1	0.17
Estimated glomerular filtration rate, ml/m/1.73m²		79.0 ± 35.6	63.2 ± 33.2	0.09
Total cholesterol, mg/dL		270.8 ± 107.6	320.6 ± 213.7	0.27
Urine protein to creatinine ratio, mg/g		3493.1 ± 2883.3	4608.3 ± 8180.5	0.42
Hematuria	No	21 (53.8%)	33 (78.6%)	0.02
	Yes	18 (46.2%)	9 (22.4%)	
Immunosuppressant therapy	No	20 (51.3%)	24 (57.1%)	0.60
	Yes	19 (48.7%)	18 (42.9%)	