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Hypertriglyceridemia is related to glomerulosclerosis in IgA Nephropathy

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Objectives: IgA nephropathy is most common glomerulonephritis disease in world wide. There are many clinical factors that affect IgAN prognosis or histopathology. However, there are only few studies that analysis focused on the histopathologic features between IgA nephropathy with hypertriglyceridemia and related lipid profiles. So, we evaluate histopathologic features in IgAN between HyperTG group compared to normal TG group.

Methods: This study is a cross-sectional study of a multi-center cohort that underwent kidney biopsy at 8 university hospitals affiliated with the College of Medicine Catholic University of Korea between January 2015 and May 2020 were diagnosed with IgAN.
A total of 480 patients were enrolled in final cohort. Patient were divided into 2 groups that according to following diagnostic criteria, group 1; <150mg/dL, group 2; ≥150mg/dL.

Results: In Multivariable linear regression analysis showed that the that percent of GS, SS and CA, MME, MCP, ECP scores were positively associated with TG level after adjusting for clinical and laboratory parameters.
The odd ratio and 95% CI for high score of GS, SS, MME, MCP and ECP between two TG groups. Serum TG <150mg/dL group was considered as reference group in binary logistic regression. HyperTG group showed more higher risk for global sclerosis and segmental sclerosis, after adjusting for age, sex, systolic BP (Model 1) and with model 1 plus glucose, ALT, HDL-C, Total cholesterol, uric acid, UPCR (Model 2) and Model 2 plus eGFR, BMI (Model 3)

Conclusions: In linear multivariable analysis, the percentage of glomerular sclerosis and mesangial proliferation and capsular adhesion were positively associated with TG level. Multivariable logistic

regression demonstrates that hyperTG is independently increase risk for glomerular sclerosis compared with normal TG group considering clinical variables.

Table 4. Linear regression analysis for TG and the histopathologic parameters

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	TG							
	Univariable				Multivariable			
	β	t	r^2	*p*	β	t	r^2	*p*
Global sclerosis	0.187	4.128	0.033	<0.001	0.173	3.544	0.060	<0.001
Segmental sclerosis	0.174	3.850	0.028	<0.001	0.149	2.995	0.107	0.003
Capsular adhesion	0.161	3.480	0.024	0.001	0.129	2.643	0.094	0.009
Mesangial matrix expansion	0.115	2.525	0.011	0.012	0.109	2.129	0.024	0.034
Mesangial cell proliferation	0.117	2.564	0.012	0.011	0.139	2.825	0.017	0.005
Endocapillary proliferation	0.039	0.845	0.001	0.398	-	-	-	-
Monocyte infiltration	0.004	0.086	0.000	0.931	-	-	-	-
Neutrophil infiltration	0.076	1.654	0.004	0.099	-	-	-	-
Interstitial Fibrosis	0.054	1.182	0.001	0.238	-	-	-	-
Tubular Atrophy	0.057	1.233	0.001	0.218	-	-	-	-
Arterial intimal hyalinosis	0.002	0.043	0.000	0.965	-	-	-	-
IgA Mesangial Deposit	0.012	0.264	0.000	0.792	-	-	-	-
C3 Mesangial Deposit	0.036	0.784	0.001	0.433	-	-	-	-
C4d Mesangial Deposit	0.000	-0.010	0.000	0.992	-	-	-	-

TG, triglyceride; AIH: Arterial intimal hyalinosis C3, complement 3; C4d, cleavage product of complement 4

Multivariable analysis was adjusted for each histologic parameter and clinical parameters, including age, sex, Systolic BP, BMI, haemoglobin, uric acid, glucose, ALT, eGFR, spot urine P/Cr, HDL-C, LDL-C, total cholesterol, and serum IgA levels.

Table 5. Logistic regression analysis for TG groups and histopathologic parameters

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	Crude	p	Model 1	p	Model 2	p	Model 3	p
Global sclerosis								
Group1	Ref.		Ref.		Ref.		Ref.	
Group2	1.715(1.131-2.601)	0.011	1.701(1.122-2.579)	0.012	1.695(1.055-2.723)	0.029	1.791(1.111-2.887)	0.017
Segmental sclerosis								
Group1	Ref.		Ref.		Ref.		Ref.	
Group2	2.382(1.325-4.282)	<0.001	2.366(1.316-4.253)	0.004	2.334(1.213-4.492)	0.011	2.310(1.200-4.446)	0.012
Mesangial matrix expansion								
Group1	Ref.		Ref.		Ref.		Ref.	
Group2	1.689(0.998-2.859)	0.051	1.703(1.006-2.882)	0.047	1.586(0.907-2.774)	0.106	1.563(0.893-2.737)	0.118
Mesangial cell proliferation								
Group1	Ref.		Ref.		Ref.			
Group2	1.587(0.952-2.646)	0.076	1.600 (0.960-2.668)	0.072	1.409(0.818-2.428)	0.216	1.303(0.745-2.281)	0.353

Model 1: adjusted for age, sex, systolic BP

Model 2: adjusted for Model 1+ glucose,-ALT, HDL-C, Total cholesterol, uric acid, UPCR

Model 3: adjusted for Model 2 + eGFR, BMI