



# Metabolic Profile and Cardiovascular Risk in Patients with Glomerular diseases treated with Immunosuppressants

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## OBJECTIVES

Immunosuppressants (IS) are often required to treat glomerulonephritis (GN) to prevent subsequent renal failure. However, metabolic complications arising from IS therapy may also lead to undesirable outcomes such as cardiovascular disease (CVD). We compared diabetics (DM) and non-diabetics who received IS therapy for GN and evaluated risk factors for CVD.

## METHODS

This was a retrospective cohort study of adults with biopsy-proven GN diagnosed between 13th January 2011 and 28th July 2015. Patients <21 years and those who received IS prior to kidney biopsy were excluded.

Demographic, comorbidity, clinical and pharmacotherapy data were retrieved from electronic medical records. Pre-biopsy fasting glucose, triglyceride (TG), low-density lipoprotein (LDL) and high-density lipoprotein (HDL) within 6 months preceding kidney biopsy and peak values within 6 months after IS therapy were obtained.

CVD was present if there was an admission for acute myocardial infarction, congestive cardiac failure, or if coronary angiogram found >50% stenosis in the coronary vessels.

## RESULTS (1)

We studied 285 patients [median age 49.3 (IQR 34.6, 62.6) years, male 44.6%]. Comorbidities included DM (14.4%), hypertension (46.3%) or hyperlipidemia (29.1%). Minimal change disease or focal segmental glomerulosclerosis (26.7%), IgA nephropathy (18.6%), lupus nephritis (17.9%) and membranous nephropathy (14.4%) were the common GN diagnoses.

Median follow up was 28.5 (13.2, 51.4) months.

Table 1 shows a comparison of diabetics and non-diabetic patients who received IS to treat GN. Patients with DM were older, more had hypertension and dyslipidemia than non-diabetics. Diabetics received lower prednisolone doses [30 (20, 50) mg vs. 50 (30, 60) mg/day, p=0.007] but more received cyclosporine (36.6% vs. 12.3%, p<0.001). After IS therapy, patients with DM had greater increase in fasting glucose and TG, and were more likely to have CVD, than non-diabetics. There was no difference in follow up duration [24.6 (13.0, 56.9) months vs. 29.4 (13.1, 50.7) months, p>0.05].

## RESULTS (2)

CVD occurred in 14 patients at 11.7 (4.2, 28.2) months after biopsy.

After adjusting for age, gender, comorbidities, renal function, proteinuria and post-IS therapy levels of glucose and lipid, DM [adjusted OR 4.98 (95% CI: 1.18, 21.01), p=0.03] was independently associated with CVD.

## CONCLUSION

Diabetics with GN were more likely than non-diabetics to have concomitant cardiovascular risk factors and increased glucose and lipid levels after IS therapy. DM was an independent risk factor for CVD after IS therapy.

	Diabetic N = 41	Non-diabetic N = 244	P value
Age at diagnosis, years	55.9 (45.9, 66.3)	47.1 (33.6, 62.1)	0.003
Male, n (%)	23 (56.1)	104 (42.6)	0.11
<i>Comorbidities, metabolic profile and medications before biopsy</i>			
Hypertension, n (%)	32 (78.0)	100 (41.0)	<0.001
Dyslipidemia, n (%)	26 (63.4)	57 (23.4)	<0.001
Serum creatinine, $\mu$ mol/L	124 (84, 197)	107 (73, 189)	0.19
UPCR, g/g	5.38 (3.03, 11.51)	5.45 (2.41, 9.35)	0.23
<sup>a</sup> Glucose	6.2 (5.4, 8.1)	5.2 (4.8, 5.8)	<0.001
<sup>a</sup> TG, mmol/L	1.61 (1.21, 2.66)	1.81 (1.21, 2.36)	0.71
<sup>a</sup> LDL, mmol/L	3.29 (4.14, 2.26)	4.04 (2.80, 6.52)	0.02
<sup>a</sup> HDL, mmol/L	1.07 (0.88, 1.37)	1.34 (1.10, 1.77)	0.006
Anti-lipid medications	33 (80.5)	94 (38.5)	<0.001
<i>Clinical and laboratory parameters after immunosuppressive therapy</i>			
Change in <sup>a</sup> glucose, %	46.9 (3.2, 80.8)	12.4 (0, 38.6)	0.003
Change in <sup>a</sup> TG, %	18.6 (-19.9, 53.2)	-8.9 (-40.9, 25.5)	0.03
Change in <sup>a</sup> LDL, %	-3.8 (-40.2, 52.2)	-15.1 (-55.6, 16.5)	0.16
Change in <sup>a</sup> HDL, %	15.6 (-7.2, 35.2)	18.8 (-14.1, 46.0)	0.73

<sup>a</sup>All glucose and lipid values were obtained from fasting samples  
UPCR, urine protein to creatinine ratio; TG, triglyceride; LDL, low density lipoprotein; HDL, high density lipoprotein; CVD, cardiovascular disease  
Categorical variables are expressed as number (percentage) and compared using chi-square or Fisher's exact test as appropriate.  
Continuous variables are expressed as median (interquartile range) and compared using Mann-Whitney U test.

