

The Importance of Histopathological Classification of ANCA-Associated Glomerulonephritis in Renal Function and Renal Survival

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Background/Purpose: Histological changes in renal biopsy are the gold standard for establishing the diagnosis of antineutrophil cytoplasmic antibody (ANCA)-associated glomerulonephritis (GN). In 2010 a new histopathological classification for ANCA-associated GN (ANCA GN) was developed by an international working group of renal pathologist. The scheme divides ANCA GN into 4 categories: focal ($\geq 50\%$ normal glomeruli), crescentic ($\geq 50\%$ glomeruli with cellular crescents), mixed ($< 50\%$ normal, $< 50\%$ crescentic, $< 50\%$ globally sclerotic glomeruli) and sclerotic ($\geq 50\%$ globally sclerotic glomeruli). It has been demonstrated that these categories at baseline correlate strongly and independently with renal function at 1 and 5-years follow up.

Objective: The aim of this study was to determine whether the new histopathologic classification scheme is associated to changes in renal function and renal survival in a cohort of patients with ANCA associated vasculitis (AAV) who underwent kidney biopsy in a single center.

Methods: We included retrospectively all patients with diagnosis of ANCA GN between January 2002 and May 2013 and had at least 1 year of follow-up. Baseline date was defined as the date of the biopsy. Renal biopsies were reviewed and classified according to the new classification. Serum creatinine, estimated glomerular filtration rate (eGFR) at time of the biopsy, death, requirement of dialysis, use of immune suppression and plasmapheresis at follow up were recorded.

Results: Forty-four patients (77.2% females) were included (table 1). The mean age was 63.7 (SD:17.5). 25 (56.8%) patients were pANCA positive, 14 (31.8%) cANCA positive, and 5 (11.3%) were ANCA negative. Four patients died during first year of follow up (1 within each biopsy category). Among surviving patients, overall mean improvement in eGFR at 1 year was 13.2-ml/min/1.73 m². Age and sex were not significantly associated with the 1-year eGFR change. There was a significant difference in the mean change in eGFR at 1 year based on the histopathologic class (table 2). Focal biopsies were associated with the highest eGFR at presentation, whereas crescentic, mixed and sclerotic were associated with lower eGFRs. Crescentic class was associated with the greatest 1-year improvement in eGFR while sclerotic class did not show significant improvement.

Conclusion: Our study shows association between crescentic class and improvement in eGFR and association between sclerotic class and reduction in eGFR at 1-year. These results support the use of the histopathologic classification in determining renal prognosis of patients with ANCA GN.

	Focal (n 11)	Crescentic n (14)	Mixed n (15)	Sclerotic n (4)	P
Age, mean (SD)	68.6 (15.4)	54.0 (16.9)	69.2 (15.3)	63.5 (24.5)	.25
Female, n (%)	10 (90.9)	9 (64.2)	12 (80.0)	3 (75)	
Baseline eGFR (mL/min/1.73 m ²), mean (IQR)	46.9 (12-78)	13.6 (9-17)	33.4 (20-53)	13.4 (6-17)	.0008
Baseline eGFR category (mL/min/1.73 m ²), n (%)					
≥ 90	2 (18)	0 (0)	0 (0)	0 (0)	
60-89	3 (27)	0 (0)	1 (7)	0 (0)	
30-59	2 (18)	0 (0)	5 (33)	0 (0)	
15-29	1 (9)	6 (43)	6 (40)	2 (50)	
< 15	3 (27)	8 (57)	3(20)	2 (50)	
ANCA immunofluorescence, n (%)					
cANCA	4 (36)	6 (43)	3 (20)	1 (25)	
pANCA	6 (55)	7 (50)	9 (60)	3 (75)	
Both negative	1 (9)	1 (7)	3 (20)	0 (0)	
BVAS at diagnosis, mean (SD)	14.8 (5.5)	16.7 (3.7)	13.4 (5.4)	12.7 (0.9)	.25
Treatments, n (%)					
Methylprednisolone	8 (66)	14 (100)	8 (53)	2 (50)	
Cyclophosphamide	9 (82)	13 (93)	12 (80)	2 (50)	
Rituximab	0 (0)	0 (0)	2 (13)	0 (0)	
Plasmapheresis	1 (9)	5 (36)	0 (0)	0 (0)	
Dialysis at diagnosis, n (%)	1 (9)	4 (29)	2 (13)	3 (75)	
Dialysis at 1 year, n (%)	0 (0)	1 (7.4)	0 (0)	2 (50)	

Histologic class	n	Basal mean eGFR (mL/min/1.73 m ²), mean	1 year mean eGFR (mL/min/1.73 m ²), mean	Delta mean eGFR improvement (1year-basal)	Death within 1 year, n (%)
Focal	11	46.9	57.1	5.2*	1 (9.0)
Crescentic	14	13.6	49.7	35.8*#	1 (7.1)
Mixed	15	33.4	46.9	12.1#	1 (6.6)
Sclerotic	4	13.4	12	-1.5	1 (25)

* p=0.008; # p=0.026.