

Comparison of clinical, functional, histologic and proteinuric parameters in the functional outcomes remission and ESRD in 170 patients with Glomerulonephritis (GN) and Nephrotic Syndrome (NS) and 190 patients with GN and Persistent Non-Nephrotic Proteinuria (PP)

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Abstract

Background: The first aim of this study is to compare the clinical, functional, histologic and proteinuric parameters of patients with Remission or ESRD in 170 patients with glomerulonephritis (GN) and Nephrotic Syndrome (NS) and 190 GN patients with persistent non-nephrotic proteinuria (PP).

Methods: The parameters considered were: age, percentage of high blood pressure, baseline and last eGFR, baseline and last 24 hours proteinuria, percentage of global glomerular sclerosis (GGS%). Tubule-interstitial damage (TID) and Arteriolar Hyalinosis (AH) evaluated by a score; total urinary proteins, urinary IgG, α 2macroglobulin (α 2m), Albumin and α 1microglobulin (α 1m) were expressed per gram of urinary creatinine.

Results: Among the 170 patients with GN & NS 92 patients (54%) entered Remission and 38 (22%) progressed to ESRD. The patients with Remission shows lower percentage of high BP (52 vs 85%), higher values of baseline eGFR, lower values of TID and AH score, and lower values of all proteinuric parameters of last 24 h P. In 190 patients with GN and PP 129 patients entered Remission (68%) and 18 patients progressed to ESRD (9%). The patients with Remission in comparison with 18 patients progressing to ESRD show lower percentage of high BP (28% vs 94%), higher values of baseline eGFR, lower values of GGS%, TID score and AH score and lower values of all proteinuric parameters.

Conclusions: The patients with GN&NS and those with GN&PP are characterized by clinical outcomes Remission and ESRD significantly different for all the clinical, functional, histologic and proteinuric parameters.

Introduction

The etiopathogenesis of glomerulonephritis is not completely known and several different factors have been suggested as responsible of development of various types of glomerulonephritis (GN). Glomerulonephritis is a renal disease in which immune-mediated glomerular damage is the initiating factor. The hallmark of glomerulonephritis is increased permeability of the glomerular barrier. Proliferative glomerulonephritis is characterized by proliferation of the mesangial cells with influx of inflammatory cells. Membranous glomerulonephritis is characterized by accumulation of matrix and thickening of the glomerular basement membrane (GBM) and capillary wall. The patients with GN&NS and GN&PP are different for Remission and ESRD. The objective of my article is to compare the clinical, functional, histologic and proteinuric parameters

in patients with functional outcomes (Remission and ESRD) in 170 patients with GN and NS and 190 patients with GN and PP; the functional outcome of these patients was assessed after a rather long follow up: 87 ± 74 months in NS patients and 63 ± 38 months in PP patients.

Patients

Between 1969 and 2006 469 patients were diagnosed by renal biopsy as glomerulonephritis in the Nephrology and Dialysis Unit of San Carlo Borromeo Hospital in Milan, Italy. 360 of these patients were followed over time and their functional outcome was assessed: 170 patients have glomerulonephritis (GN) and nephrotic syndrome (NS) and 190 patients have GN & PERSISTENT NON-NEPHROTIC PROTEINURIA (PP). Among the 170 patients with GN & NS n. 92 (54.1%) entered in Re-

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Table 1:

GN diagnosis	Cresc. IgAN	IgAN	IMN	FSGS	MPGN	LN	MCD	
Pts with GN & PP n. 190 Remission n. 126	17	77	9	3	5	14	1	ok
Pts with GN & NS n. 170 Remission n. 91	1	0	37	23	6	10	14	ok

GN diagnosis	Cresc. IgAN	IgAN	IMN	FSGS	MPGN	LN	MCD	
Pts with GN & PP n. 190 ESRD n. 18	3	9	5	0	0	1	0	ok
Pts with GN & NS n. 170 ESRD n. 38	8	0	15	9	6	0	0	ok

Table 2: Functional outcome of 170 patients with glomerulonephritis (GN) and nephrotic syndrome (NS).

Pts with GN and NS n.170	Age High BP	eGFR	eGFR last	GGs%	TID score	AH score	TUP/C	IgG/C	α2m/C	Alb/C	α1m/C	Last& basel 24h P
Remission n.92(54.1%)	40.8 51 (52%)	82.05	82.09	6.9	1.42	0.30	4100	187	6.42	3474	32.2	0.55 6.64
REM n. 92 vs ESRD n.38		<0.0001	<0.0001	0.0016	0.00048	0.0001	<0.0001	0.0016	0.001	0.0001	<0.0001	<0.0001
ESRD n.38 (22.3%)	41.4 33 (85%)	45.6	8.0	19.7	2.79	0.87	6956	374	18.95	5497	86.7	7.30 8.09
eGFR<50% n. 10 (6%)	40.1	66.1	26.2	25.8	2.40	0.60	3228	283	10.011	2619	48.6	3.54

Table 3: Functional outcome of 190 patients with GN and PP.

Pts with GN and PP n.190	Age High BP	eGFR	eGFR last	GGs%	TID score	AH score	TUP/C	IgG/C	α2m/C	Alb/C	α1m/C	Last & bas 24hour P
Remission n.129 (67.9%)	39.8 35 (28%)	87.8	88.8	6.9	1.27	0.43	484	27.5	0.82	371	7.8	0.46 0.77
Rem. n 129 vs ESRD n. 18		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.002	0.51	0.0001	0.06	<0.0001 0.0005
ESRD n.18 (9.5%).	39.2 16 (94%)	33.9	9.9	37.7	4.06	1.60	1463	110	1.09	1174	38.2	2.09 1.85
eGFR<50% n. 2 (1%)	31.0	80.0	26.0	20.0	2.00	1.00	364	324	0	255	3.02	1.13

Table 4: Comparison between 123 remission patients with GN&PP and 100 remission patients with GN&NS.

	Age high BP	eGFR	eGFR last	GGs%	TID score	AH score	TUP/C	IgG/C	α2m/C	Alb/C	α1m/C	Last & basel 24 hours P
GN PP Remission n.129 (67.9%)	39.8 35 (28%)	87.8	88.8	6.9	1.27	0.43	484	27.5	0.82	371	7.8	0.46 0.77
GN NS Remission n.92 (54.1%)	40.8 51 (52%)	82.05	82.09	6.9	1.42	0.30	4100	187	6.42	3474	32.2	0.55 6.64
		0.12	0.03	0.89	0.45	0.16	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.19 <0.0001

Table 5: Comparison between 38 patients with GN&NS and ESRD and 18 patients with GN&PP and ESRD.

	Age high BP	eGFR	eGFR last	GGs%	TID score	AH score	TUP/C	IgG/C	α2m/C	Alb/C	α1m/C	Last & basel 24 hours P
ESRD in GN NS vs GN PP		0.07	0.04	0.008	0.005	0.003	<0.0001	0.0001	<0.0001	<0.0001	0.007	<0.0001 <0.0001
GN&NS ESRD n.38(22.3%)	41.4 33 (85%)	45.6	8.0	19.7	2.79	0.87	6956	374	18.95	5497	86.7	7.30 8.09
GN&PP ESRD n. 18 (9.5%)	39.2 16 (94%)	33.9	9.9	37.7	4.06	1.60	1463	110	1.09	1174	38.2	2.09 1.85

mission and 39 progressed to ESRD (38%). The patients with GN & NS entering Remission are significantly different from patients GN & NS progressing to ESRD (Table 2); the Remission patients show higher baseline and last eGFR (<0.0001) and significantly lower values of all histologic and proteinuric parameters. The patients with GN & NS progressing to ESRD show lower values of baseline and last eGFR and significantly higher values of GGS% (0.0016), TID score (0.00048), AH score (0.0001), TUP/C (<0.0001), IgG/C (0.0016), α 2m/C (0.001), Alb/C (0.0001), α 1m/C (0.0001) and last 24 hours proteinuria (<0.0001). The patients with GN and PP and ESRD show lower values of baseline and last eGFR and higher values of all histologic and proteinuric parameters (Table 5).

Results

Among the 170 patients with GN & NS 91 (53.5%) entered in Remission and 38 progressed to ESRD (22.5%). The patients with GN & NS entering Remission are significantly different from patients GN & NS progressing to ESRD; the Remission patients show higher baseline and last eGFR (<0.0001) and significantly lower values of all histologic and proteinuric parameters. The patients with GN & NS progressing to ESRD show lower values of baseline and last eGFR and significantly higher values of GGS% (0.0016), TID score (0.00048), AH score (0.0001), TUP/C (<0.0001), IgG/C (0.0016), α 2m/C (0.001), Alb/C (0.0001), α 1m/C (0.0001) and last 24 hours proteinuria (<0.0001) (Table 2). In synthesis the patients GN & NS progressing to ESRD show lower values of baseline and last eGFR and higher values of all histologic and proteinuric parameters (Table 2). Among the 190 patients with GN & PP 126 patients (66.3%) entered Remission and 18 patients progressed to ESRD (9.5%). The patients GN and PP with Remission in comparison with patients progressing to ESRD show higher values of basal and last eGFR (<0.0001); the patients progressing to ESRD show higher values of GGS% (<0.0001), and TID score (<0.0001) and AH score (<0.0001) and higher values of all proteinuric parameters with exclusion of α 2m/C ($p=0.06$). In conclusion the patients with GN & NS and remission show significantly higher values of baseline and last eGFR and significantly lower values of all histologic and proteinuric parameters in comparison with patients with ESRD. Conversely the patients with GN and PP and ESRD show lower values of baseline and last eGFR and higher values of all histologic and proteinuric parameters while the patients GN&PP and ESRD.

Conclusions

Remission: The patients with GN&PP are characterized by a little higher percentage of remission (66.3%) in comparison with GN&NS patients (53.5%). Conversely the GN&NS are characterized by higher percentage of ESRD (22.5%) in comparison with GN&PP patients (9.5%). The patients GN&NS with Remission are characterized by significantly higher values of all proteinuric parameters (UPT/C, IgG/C, α 2m/C, Alb/C and α 1m/C), and low values of histologic parameters (GGS%, TID score, AH score). ESRD: The patients GN&NS with ESRD (22.3%) are characterized by significant higher values of all proteinuric param-

eters and low values of histologic parameters. The patients GN&PP with ESRD (9.3%) are characterized by low values of all proteinuric parameters and significant higher values of all histologic parameters (GGS%, TID score, AH score).

The data reported in this study may be useful to assess in another study the responsiveness of the different outcomes to various types of therapy such as Steroids & Cyclophosphamide and Acei drugs alone and in combination.

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