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Histopathological Pattern and Outcome of Patients Presenting With Rapidly Progressive Renal Failure: A Single Centre Experience.

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Abstract:
Back Ground*: Rapidly Progressive Renal Failure (RPRF) is a clinical syndrome characterized by rapid deterioration of renal function, over a period of few weeks. The present study was conducted to evaluate the pattern of histopathology in patients presenting with RPRF and to correlate the outcome of the patients with reference to the histological pattern.*
Materials and Methods*: A prospective observational study was conducted in the department of nephrology, Andhra Medical College and King George Hospital , Visakhapatnam over a period of 2 years between 2017 January to December 2018 with 3 months of follow-up. 66 patients who presented with RPRF were included in the study.*
Results: *There was male preponderance with male to female ratio of 1.27: 1 , mean age was 38 ± 8 years. All the 66 patients underwent renal biopsy and cresenticGN was seen in 51 patients (77%) . Out of the 66 patients the most common histological diagnosis was PIGN (21.2%) followed by Lupus Nephritis 9(13.6%) , C3 glomerulopathy (12.1%) , ATN/ATIN (12.1%)and IgA Nephropathy (10.6%).*
Conclusions: *Rapidly Progressive Renal Failure is a useful initial clinical diagnosis for patients who present with progressive renal impairment of short duration. It is not the final definitive diagnosis and needs proper work up, a prompt diagnosis and appropriate treatment is most essential to prevent progression to ESRD.*
Key words: *Rapidly Progressive Renal Failure , histological diagnosis, ESRD, Andhra Medical College.*

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I. Introduction

In clinical medicine physicians encounter patients whopresent with progressive renal impairment of seeminglyunknown etiology. The duration of disease is brief or may evenbe undefined. These patients are neither Acute Kidney Injury(previously called acute renal failure) nor Chronic KidneyDisease (previously called chronic renal failure). The initialclinical diagnosisof these cases may be called Rapidly ProgressiveRenal Failure (RPRF), which may be defined as progressive renalimpairment over a period of few weeks.[1] On ultrasonographyof the kidneys, patients with RPRF have normal sized kidneys,while the presence of small contracted echogenic kidneysestablishes the diagnosis of CKD. [2]RPRF encompasses aheterogeneous group of clinical syndromes. [3] Since a wide variety of different diseases may present with a similar clinical picture, it is essential to properly work-up cases of RPRF so that the exact diagnosis is established. Time is a valuable factor since if the appropriate treatment is not initiated, then the patient may progress to irreversible end-stage renal disease (ESRD) needing life-long renal replacement therapy. RPRF may in fact be considered as 'Renal Emergency.[2]

The renal histopathologyshows lesions affecting any or a combination of the threetraditional renal compartments: glomerular, tubulointerstitial or vascular. Good history taking, clinical examination and relevant investigations including serology and ultimately kidney biopsy are helpful in clinching the diagnosis. Early definitive diagnosis of RPRF is essential to reverse the otherwise relentless progression to end-stage kidney disease.

II. Aim

The aim of the study is to know thehistopathological pattern and outcome of rapidly progressive renal failure patients who presented to a tertiary care hospital in Visakhapatnam,Andhra Pradesh.

III. Materials And Methods

The study was conducted in the department of nephrology, Andhra Medical College / King George Hospital , Visakhapatnam. It is a prospective observational study over a period of 2 years between 2017 January to December 2018 with 3 months of follow-up. 66 patients who presented with RPRF were included in the study .

Diagnosis was suggested by presence of proteinuria, active sediments in urine, deranged renal function, some special serological investigations like ANA(antinuclear antibody, dsDNA (anti double stranded DNA), ANCA (anti neutrophillic cytoplasmic antibody), Complement level, ASO (anti streptolysin O) titre, serum electrophoresis and ultrasonography. Renal biopsy was performed in all the cases

Inclusion Criteria: Patients of any age and gender presenting with features of RPRF.

Exclusion Criteria: Known patients of hypertension, diabetes mellitus or significant past history of renal diseases.

Statistical analysis: Data was entered in the Microsoft excel spread sheet ver 2016.Later exported to SPSS (Statistical package for social science) version 16 . Quantitative variables were described in the forms of mean and standard deviation. Qualitative variables were described in the form of frequency and percentages. Statistical testslike ANOVA and Fischer's exact was applied. A p value of 0.05 or less was considered as statistically significant.

IV. Results

Table 1: Gender Distribution

	Frequency	**Percent**
Male	37	56.1
Female	29	43.9
Total	66	100

A total of 66 patients were included in the study among them 6 patients lost followup. Male to female ratio was 1.27:1. Mean age was 38 ± 8 years .

Table 2: Systolic and Diastolic BP readings

Systolic BP	**FREQUENCY**	**PERCENT**
<140	20	30.3
>140	46	69.6
Diastolic BP		
<90	17	25.75
>90	49	74.24

Systolic BP in hypertensive range was in 69.6% cases.Mean systolic BP was 150 ± 20 mm of Hg . Mean diastolic BP was 96 ± 15 mm of Hg.

Table 3: Table showing various clinical and lab parameters

	Minimum	**Maximum**	**Mean**
Age	10	67	37.92
Systolic	100	180	149.24
Diastolic	70	120	96.36
S.Creatinine	2	18	6.209
Urea	9	260	102.88
T.Protein	3	10.2	5.6091
S.Albumin	2	5	3.102
S.Cholesterol	73	360	184.42
Hb	6	13	9.256
TLC	4400	16000	8877.12
24 hr Protein	0.1	6	2.594

Table 4: Showing Various Histopathological patterns in RPRF

REPORT	**FREQUENCY**	**PERCENT**
PIGN	14	21.2
SLE	9	13.6
ATN/ATIN	8	12.1
C3 Glomerulopathy	8	12.1
IgA Nephropathy	7	10.6
MPGNPattern	6	9.1

C1q Nephropathy	4	6.1
HTN Nephrosclerosis	3	4.5
PAUCIIMMUNE GN	3	4.5
LCN	2	3
ANTI GBM	1	1.5
Post Partum TMA	1	1.5

* LCN= Light Chain Cast nephropathy ,ATN= Acute Tubular necrosis
PIGN= Post infective GN , GBM = Glomerular basement membrane ,TMA = Thrombotic Micro Angiopathy
Patient underwent renal biopsy and they showed Crescentic pattern in 51 of 66 patients(77%). Most common lesion are PIGN (21.2%) followed by Lupus Nephritis 9(13.6%) , C3 glomerulopathy,ATN/ATIN and IgA Nephropathy.

Table 5 : Table showing outcome of the study group during follow up period.

OUTCOME	FREQUENCY	PERCENT
Death	11	16.7
Dialysis Dependent	20	30.3
Recovery Partial/Complete	29	43.9
Lost Followup	6	9.1

Out of 66 patients 6 people lost to followup. In the remaining 60 patients, death occurred in 17% and 30% of patients became dialysis dependent.Out of 66 patients 4 were found to beHbsAg positive.Most common histopathological pattern in these patients isMPGN followed by C3 glomerulopathy and DPGN.

Statistical test ANOVA is applied to see whether a significant difference in the means of lab parameters in relation to the three outcome groups exists. There is significant difference in the mean values of diastolic BP,blood urea and haemoglobin betweenthe groups(Death ,Dialysis Dependence And Recovery)

Table 6: Gender Vs Outcome

Gender	Death	Nonrecovery	Recovery
Females	4	10	13
Males	7	10	16

Table 7: Histopathological pattern in relation to outcome

Histopathological Pattern	Total(n)	Death	Recovery	Nonrecovery	P value
PauciimmueGN	3	3	0	0	0.013*
SLE	9	3	6	0	
C3 glomerulopathy	8	2	2	4	
ATN	8	0	8	0	

* Fischer's exact

Fischer's exact test was applied (after clubbing the recovery and Nonrecovery group) to correlate the outcome (Death or Survival) of the patients with reference to the histological pattern, which was found to be statistically significant.

Common histopathological lesions associated with death are pauci-immune GN followed by SLE,C3 glomerulopathy and MPGN pattern. Most common histopathological pattern associated with non recovery /dialysis dependency are Immune complex GN followed by C3 glomerulopathy and MPGN.

Among various lesions,ATN/ATIN has the best prognosis for outcome, out of 8 patients who were found to have ATN/ATINall showed either complete or partial recovery. Patients with pauciimmune pattern has worst prognosis of all lesions with 100% mortality.Common histopathological lesion in patients with HbsAg positivity is MPGN pattern.

V. Discussion

Theprevalenceofbiopsyprovenglomerulonephritisvariesaccordingtothe geographicarea,socioeconomiccondition, race, age, demography and indication ofbiopsy. In a study of biopsy proven renal disease over 19 years, RPRF was seen in 12% of the patients.[4]A recent retrospective study from the Spanish Registry of patients with RPRF, in whom kidney biopsy was done, has shown that crescentic glomerulonephritis accounted for 33% cases, AIN 11%, IgA 9%, ATN 5%, and lupus nephritis, PIGN, myeloma kidney and TMA approx 3% each. [5]In another similar study in elderly patients with RPRF, crescentic GN accounted for 71% cases of RPRF, and AIN 17%.In an Indian study of 46 cases of crescenticglomerulonephritis , 71.7% were pauci immune and28.3% immune complex mediated.[6] In a recent Indian study of children withcrescentic glomerulonephritis, out of 36 children, 17 hadimmune complex GN and 19 had pauci immune GN.Theetiologies of the former were LN (4), PIGN (3) andIgAN, HSP and MPGN type II . RPGN waspresent in 33 patients.[7]

In the study conducted by Sharma M et al, most of the patients were found tobe LN followed by IgAN. This may be because majoritypatients were in the younger age group.[1]

Approximately 20% myeloma patients developprogressive renal failure during course of disease.[8,9] Inthe study by Prakash J et al. with multiple myeloma,oliguric ARF was seen in 73% patients.[10] In the present study cast nephropathy was seen in 2 patients ,in a study done by Sharma M etal out of 6 patients out of 6patients of multiple myeloma, 5 had cast nephropathyand 1 had amyloidosis.[1]

Table 8: Comparison between different studies on RPRF

Etiology of RPRF	Present study (%)	Spanish registry study (%)	Uezono S et al (%)	Sharma M et al (%)
CresenticGN	77	33.4	71	----
ANTI GBM	1.5	2.0	----	----
ATN/ATIN	12.1	16.3	17	5
C1q Nephropathy	6.1	---	----	----
C3 Glomerulopathy	12.1	---	----	----
PIGN	21.2	2.5	4	8.75
IgA Nephropathy	10.6	8.8	33	25
LCN	3	0.7	---	6.25
HTN Nephrosclerosis	4.5	3.8	---	----
MPGN TYPE 1	9.1	2.7	---	5
PauciimmuneGN	4.5	----	43	10
TMA	1.5	2.8	---	----
SLE	9.1	3.3	---	37.5

VI. Conclusions

The present study provides comprehensive informationabout the pattern of kidneydiseases in patients presenting as RPRF.Most common histological pattern in patients presenting with RPRF is immune complex GN . There is significant difference in the mean values of diastolic BP, blood urea and haemoglobin between different outcome groups. The common histopathological pattern associated with high mortality is pauciimmune GN .The histopathological pattern associated with good prognosis is ATN/ATIN.Renal biopsy isvery essential for determining the underlying pathology which has important implications for therapy and outcome lateron.A prompt proper diagnosis of RPRF and appropriatetreatment is most essential to decrease the morbidity andmortality of the patients and also prevent progression toESRD.

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