Journal of Pathology of Nepal (2023) Vol. **13**, 2033 - 2036

Journal of
PATHOLOGY
of Nepal
www.acpnepal.com

Original Article

Spectrum of rapidly progressive glomerulonephritis at a referral diagnostic center in Nepal: one year study

Nirajan Mainali[1], Rupendra Thapa[2]

[1]*Department of Pathology, Kathmandu medical college teaching hospital, Kathmandu Nepal*
[2]*Department of Pathology, Pratham pathology laboratory private limited, Kathmandu, Nepal*

Keywords:

Crescentic glomerulonephritis; IgA nephropathy; Lupus nephritis; Nephritic; Nephrotic

ABSTRACT

Background: A clinical syndrome manifested by features of glomerular disease in the urinalysis and by progressive loss of kidney function over a comparatively short period is called rapidly progressive glomerulonephritis (RPGN). RPGN is also called Crescentic glomerulonephritis(CrGN). Crescentic glomerulonephritis (CrGN) is defined as active crescents involving >50% of the total glomeruli. We have done this study to find out the major cause of RPGN in Nepal.

Materials and Methods: This is a one-year prospective study done in the department of renal pathology at Pratham Pathology Private Limited over one year (1st November 2021-30th October 2022). Data of all patients were evaluated for the histopathological diagnosis. All cases of RPGN were included in the study. Evaluation of serological and demographic data, along with the number of active crescents was done.

Results: A total of 182 cases of kidney biopsies were received for evaluation during one year (1st November 2021-30th October 2022) at Pratham Pathology Laboratory Private Limited, Kathmandu, Nepal. Out of it 18 cases (9.89%) were those of Crescentic glomerulonephritis. The most common cause of Crescentic glomerulonephritis encountered was Lupus Nephritis (7/18 cases). All cases of lupus presented with Crescentic glomerulonephritis were at stage IV. % of glomeruli with crescents ranged from 50-81.25% with mean involved glomeruli 60.61%.

Conclusions: A total of 9.89% of the renal biopsies were presented with CrGN. Lupus nephritis was the most common cause of CrGN in Nepal.

Correspondence:
Dr. Nirajan Mainali, MD
Associate professor, Department of Pathology,
Kathmandu Medical College Teaching Hospital, Sinamangal, Kathmandu
ORCID ID: 0000-0002-6648-1914
Email: mainali_nirajan@hotmail.com

Received : May 24, 2023; **Accepted :** August 18, 2023

Citation: Mainali N, Thapa R. Spectrum of rapidly progressive glomerulonephritis at a referral diagnostic center in Nepal: one year study. J Pathol Nep 2023;13(2):2033-6. DOI: 10.3126/jpn.v13i2.58774

DOI : 10.3126/jpn.v13i2.58774

INTRODUCTION

A clinical syndrome manifested by features of glomerular disease in the urinalysis and by progressive loss of kidney function over a comparatively short period is called Rapidly progressive glomerulonephritis (RPGN) It is characterized morphologically by extensive crescent formation.[1] RPGN is also called Crescentic glomerulonephritis. Crescentic glomerulonephritis (CrGN) is defined as active crescents involving >50% of the total glomeruli.[2] CrGN can be divided into 3 types based on immunofluorescence microscopy: Type I is described as a linear deposition of immunoglobulin

along the glomerular basement membrane (GBM); type II is described as glomerular immune complex deposition; and type III is described as glomerular pauci-immune deposition.[1]

The pathogenesis in crescent formation remains elusive. Some studies have revealed that a key stage is the breakage of the GBM, leading to a leak of plasma proteins to Bowman's capsule.[3-5] A second key stage in crescent formation is the collection of fibrin in the Bowman's capsule, which provokes the proliferation of parietal epithelial cells. Along with it, macrophages, CD8+ T cells and CD4+ T cells are also involved in the immune pathogenesis of crescent formation.[3]

Similar studies were published in India, where the majority of the cases were those of pauci-immune glomerulonephritis (71.7%).[6] In Japan renal limited vasculitis (42.1%) was the main cause of CrGN .[7] We have done this study to find out the major cause of RPGN in Nepal.

MATERIALS AND METHODS

This is a one-year prospective study done in the department of renal pathology at Pratham Pathology Pvt. Ltd., Kathmandu, Nepal over a period of one year (1st November 2021-30th October 2022). Biopsies from all patients were received in two vials. The first tissue was in 10% formalin. It was processed for light microscopy and hematoxylin and eosin, Periodic acid-Schiff, congo red, and Masson's trichrome stain. The second tissue was in normal saline which was processed for immunofluorescence microscopy with stain IGG, IgA, IgM, C3 and C1q. Data of all patients were evaluated for the histopathological diagnosis. All cases of RPGN were included in the study. Evaluation of serological and demographic data, along with the number of active crescents was done.

RESULTS

A total of 182 cases of kidney biopsies were received for evaluation during one year (1st November 2021-30th October 2022) at Pratham Pathology Laboratory Private Limited. Out of it 18 cases (9.89%) were those of Crescentic glomerulonephritis. The most common cause of Crescentic glomerulonephritis encountered was that of Lupus Nephritis (7/18 cases). 2019 EULAR/ACR classification of lupus was used to diagnose SLE.[8] ISN/RPS classification was used to classify lupus nephritis.[6] B All cases of lupus presented with Crescentic glomerulonephritis were at stage IV (fig. 1). However, Lupus was the most common diagnosis encountered overall (57/182 cases, 31.32%), but only 12.28% of lupus nephritis presented as Crescentic glomerulonephritis. All patients were female (Table 1) and ages ranged from 15 to 42 years with a mean age of 29 years. % of glomeruli with crescents ranged from 50-81.25% with a mean of 60.61%.

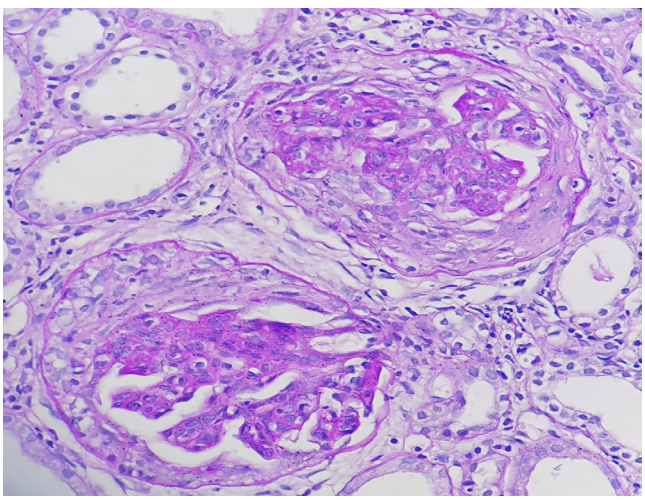

Figure 1: *H&E section showing cellular and fibrocellular crescents associated with lupus nephritis (HE stain, X40).*

Table 1: Baseline demographic and pathological characteristics of patients with Crescentic glomerulonephritis

Diagnosis	Number of cases (%)	Age of the patient in years (range)	Mean age in year	Male: female ratio	% of glomeruli involved (range)	Mean % of glomeruli involved
Lupus nephritis	7 (38.89%)	15-42	29	0:3	50-81.25	60.61
P-ANCA associated Pauci immune glomerulonephritis	6 (33.34%)	34-72	55.5	3:3	50-100	77.58
Anti GBM disease	3 (16.67%)	37-46	40.3	2:1	100	100
C-ANCA associated Pauci immune glomerulonephritis	1 (5.56%)	53	53	1 Female	81.25	81.25
C3 GN	1 (5.56%)	15	15	1 female	70	70
Total	**18**					

The second common cause of Crescentic glomerulonephritis was P–ANCA associated pauci immune glomerulonephritis (6/18 cases, 33.34%). Out of six patients, 3 were male and 3 were female. The age of the patients ranged from 34 years to 72 years with a mean age of 55.5 years. % of glomeruli involved ranged from 50 to 100 with a mean % of 77.58. A total number of P-ANCA positive cases were 8 out of which 6 presented as Crescentic glomerulonephritis. The remaining 2 cases had cellular crescents but their number was less to qualify for Crescentic glomerulonephritis.

The third common cause encountered was that of anti–GBM antibody disease (3/18 cases, 16.67%)(Table 2). Patients' ages ranged from 37 to 46 years. Two patients were male and one was female. All cases with positive anti-GBM antibodies presented with Crescentic glomerulonephritis (fig. 2). 100% of glomeruli were involved in all three cases.

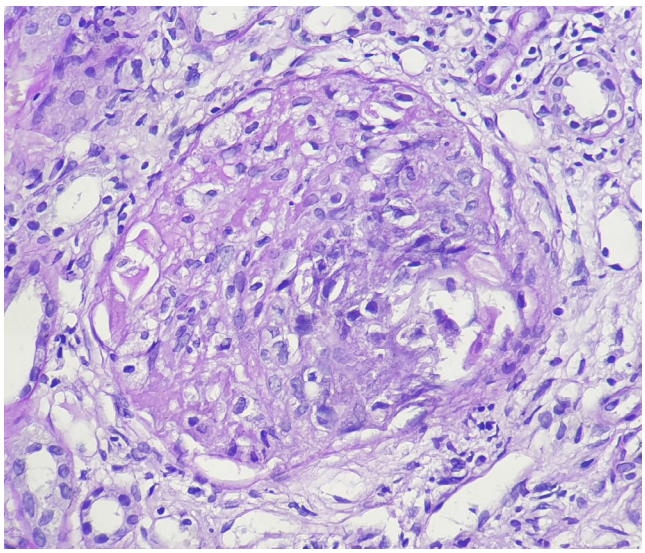

Figure 2: *H&E section showing cellular crescents associated with Anti GBM antibody disease (HE stain, X40).*

One case was that of Wagener's granulomatosis. Anti-PR3 was strongly positive in Wagener's granulomatosis. The age/ sex of the patient was 53 years/ female. 81.25% of glomeruli were involved by crescents.

One case was that of C3 glomerulonephritis (C3 GN). The patient was 15 years old female. 70% of the glomeruli were involved by crescents. A total of 2 cases of C3 GN were encountered during this period. Out of the two, only one presented with Crescentic glomerulonephritis.

Table 2: Frequency of of cases presented as CrGN

Diagnosis	Number of cases encountered	Number of cases (%) with Crescentic glomerulonephritis
Lupus nephritis	57	7 (12.28%)
P ANCA associated pauci immune glomerulonephritis	8	6 (75%)
Anti GBM disease	3	3 (100%)
C ANCA associated pauci immune glomerulonephritis	1	1(100%)
C3 GN	1	1(100%)
Total	**70**	**18**

DISCUSSION

Various studies of epidemiologic data on CrGN have been performed in different parts of the world with varying results. A study from India included a total of 46 Crescentic glomerulonephritis in their study[9] over 26 months, whereas as a study done in Saudi Arabia [10] 72 cases were included, but the study period was 10 years. Wu et al included 49 cases of RPGN in their study and the study period was 4.5 years.[11]

In our present study, 9.89% of the total biopsies had CrGN over a study period. In the study done by Ting Wu et al., it was 3.73%. [11]

In our study, the main cause of RPGN was lupus nephritis. In the study done by Gupta et al. pauci immune disease was the main cause of RPGN.[1] In the study done by Ting Wu et al it was IgA nephropathy.[11] None of the IgA nephropathy presented with CrGN during our study period.

Of the 18 CrGN biopsies, 14 (77.68%) were females whereas only 23/49 cases (46.94%) were females in the study done by Ting Wu et al.[11]

In our study, the average percentage of patients who presented with RPGN was 12.28%, 75%, and 100% in lupus nephritis, P-ANCA and anti-GBM respectively, whereas it was 12.9%, 50.3%, and 84.8% respectively in a study done by Jennette JC.[11]

Limitation of the study

Most of the samples were received from Kathmandu based hospitals. Hence, people from other geographical locations may not have been included in the study.

CONCLUSIONS

A total of 9.89% of the renal biopsies were presented with CrGN. Lupus nephritis was the most common cause of CrGN in Nepal. Anti-GBM disease, pauci immune glomerulo nephritis also presented with Crescentic glomerulonephritis. However, only 12.28% of total lupus nephritis presented with CrGN. Of it, all cases were in Stage IV. All of the anti-GBM disease presented with 100% crescents.

Conflict of Inerest: None

REFERENCES

1. Couser WG. Rapidly progressive glomerulonephritis: classification, pathogenetic mechanisms, and therapy. Am J Kidney Dis 1988; 11:449. Crossref
2. Pettersson EE, Sundelin B, Heigl Z. Incidence and outcome of pauci-immune necrotizing and crescentic glomerulonephritis in adults. *Clin Nephrol*. 1995;43(3):141-49. Website
3. Moroni G and Ponticelli C: Rapidly progressive crescentic glomerulonephritis: Early treatment is a must. Autoimmune Rev. 13:723–9. 2014. Crossref
4. Chen A, Lee K, Guan T, He J, Schlondorff D. Role of CD8+ T cells in crescentic glomerulonephritis . Nephrol Dial Transplant. 2020;35(4):564-72. Crossref

5. McAdoo SP and Pusey CD: Anti-glomerular basement membrane disease. Clin J Am SocNephrol. 2017(13):1162–72. Crossref

6. Gupta R, Singh L, Sharma A, Bagga A, Agarwal SK, Dinda AK. Crescentic glomerulonephritis: a clinical and histomorphological analysis of 46 cases. *Indian J Pathol Microbiol*. 2011;54(3):497-500. Crossref

7. Koyama A, Yamagata K, Makino H, et al. A nationwide survey of rapidly progressive glomerulonephritis in Japan: etiology, prognosis and treatment diversity. *Clin Exp Nephrol*. 2009;13(6):633-50. Crossref

8. Aringer M, Costenbader K, Daikh D, et al. 2019 European League Against Rheumatism/American College of Rheumatology Classification Criteria for Systemic Lupus Erythematosus. *Arthritis Rheumatol*. 2019;71(9):1400-12. Crossref

9. Ingenorg M Bajema et al, Revision of the International Society of Nephrology/ Renal Pathology Society classification of lupus nep[hritis: classification of definitions, and modified National Institutes of Health activity and chronic indice. Kidney international, 2018;93:789-96. Crossref

10. Oudah, N., Al Duhailib, Z., Alsaad, K. *et al.* Glomerulonephritis with crescents among adult Saudi patients outcome and its predictors. *Clin Exp Med* 2012;**12:**121–5. Crossref

11. Wu T, Peng J, Meng T, et al. Clinicopathological features and prognostic analysis of 49 cases with crescentic glomerulonephritis. *Exp Ther Med*. 2019;18(5):3984-90. Crossref

12. Jennette Jc. Rapidly progressive crescentic glomerulonephritis. Kidney Int. 2003;63:1164. Crossref

DOI : 10.3126/jpn.v13i2.58774