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Glomerulopathies in Patients Admitted in Tertiary Care Hospital

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Introduction

Glomerular Diseases are a broad group of diseases with varying clinical presentation- asymptomatic to end stage renal disease. Glomerular Diseases are defined as diseases affecting microenvironment affecting glomerular capillaries. Inflammation of the glomerular capillaries is called glomerulonephritis. So scientific literature uses this term interchangeably with glomerular disease and glomerulopathy- which includes both nephritic and nephrotic syndromes.

The burden of glomerulonephritis is most clinically apparent in its contribution to end-stage kidney failure, which necessitates dialysis or transplantation. Glomerulonephritis is recognised as the second commonest cause of end-stage renal failure worldwide. (5).

Glomerular Disease/ Glomerulonephritis- Inflammation of the glomerular capillaries is called as glomerulonephritis. (Pathological definition) Glomerular Diseases can be classified on clinico-pathological basis with following overlapping categories-

1. Acute nephritic syndrome- e.g. PSGN, IgA nephropathy, Lupus nephritis, Henoch-Schönlein purpura, Cryoglobulinemia, Membranoproliferative glomerulonephritis, C3 Glomerulopathies, Mesangioproliferative glomerulonephritis.
2. Nephrotic syndrome- eg- Minimal Change, FSGS, Diabetic Nephropathy, Membranous glomerulonephritis, AL and AA amyloidosis, Light-chain deposition disease, Fibrillaryimmunotactoid disease, Fabry's disease.
3. Basement membrane disease eg, alports syndrome, Anti-GBM disease, Alport's syndrome, Thin basement membrane disease, Nail-patella syndrome.
4. Pulmonary renal syndrome eg, Goodpasture syndrome, ANCA small-vessel vasculitis

Granulomatosis with polyangiitis (Wegener's), Microscopic polyangiitis, Churg-Strauss syndrome, Henoch-Schönlein purpura, Cryoglobulinemia.

5. Infectious diseases associated syndromes- Poststreptococcal glomerulonephritis, Subacute bacterial endocarditis, HIV, Hepatitis B and C, Syphilis, Leprosy, Malaria, Schistosomiasis
6. Glomerular Vascular Syndromes- Atherosclerotic nephropathy, Hypertensive nephropathy, Cholesterol emboli, Sickle cell disease, Thrombotic microangiopathies, Antiphospholipid syndrome.

Glomerular diseases can be categorized into those that primarily involve the kidney (primary glomerular diseases) and those in which kidney involvement is part of a systemic disorder (secondary glomerular diseases). Primary glomerular diseases include- nephrotic syndrome, FSGS, Membranous nephropathy, membrano-proliferative glomerulonephritis, post-streptococcal glomerulonephritis, IgA nephropathy glomerulonephritis. Secondary glomerular diseases include SLE, APLA, Sjogrens, crescenteric syndrome, vasculitis like PAN, Alport syndrome, Henoch schonlein purpura, sarcoidosis, amyloidosis, Goodpasture syndrome.

This study will correlate between clinical presentation and pathology of various glomerular diseases.

Materials and Methods

The study was conducted at tertiary care center on suspected cases of glomerular injury or unexplained acute kidney injury.

Case Definition- Patient with

• Presenting complaints like facial puffiness, bipedal edema, proteinuria, hematuria or unexplained acute kidney injury

• Renal biopsy showing- glomerular involvement

Inclusion Criteria

1. Patients clinically suspected to have glomerulopathy and Renal Biopsy suggestive of Glomerular involvement
2. Patients with age above 18 years
3. Patients willing to give informed consent.

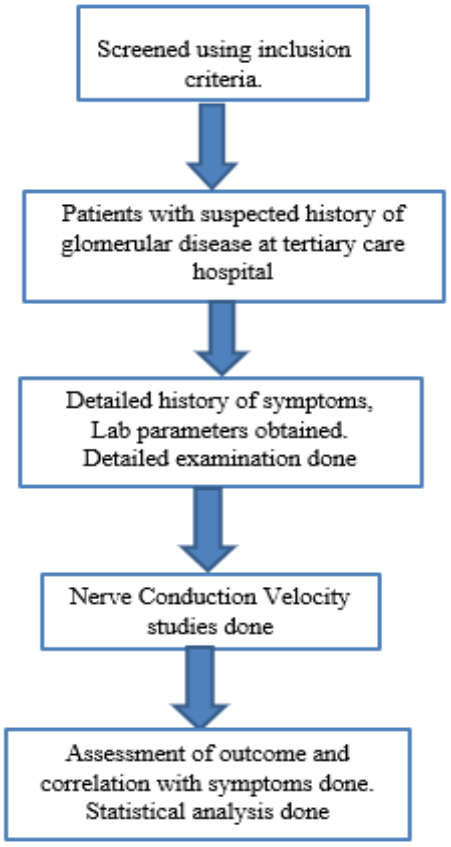
Exclusion Criteria

1. Patients with bleeding diathesis.
2. Patient not willing to give informed written consent.
3. Age less than 18 years.

Study Period: 18 months of data collection and 2 months for data analysis

Study Design: Prospective observational study

Sample Size: Total number of cases(n)= 32



Observation And Results

Table 1: Mean age of having glomerular diseases in male and female were 34. and 27.86 years with standard deviation of 11.71 and 16.86 respectively.

Gender	Mean	SD
Male	34.64	11.71
Female	27.86	16.85

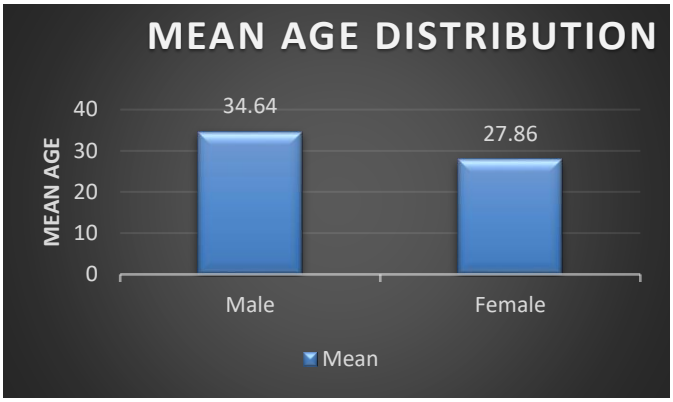


Table 2: Out of 32 patients- 15 patients (46.88%) were female whereas 17 patients (53.13%) were male.

Gender	Frequency	Percent
Female	15	46.88%
Male	17	53.13%
Total	32	100.00%

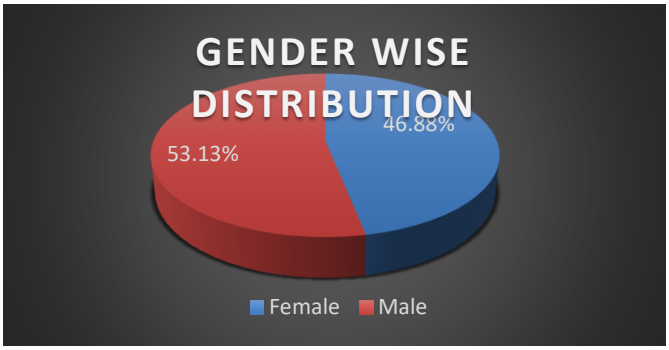


Table 3: 25 patients i.e. 78% had bipedal edema. It developed over period of 2 to 3 weeks in 83% of cases.

Swelling of lower limb	Frequency	Percent
No	07	21.88%
Yes	25	78.13%
Total	32	100.00%

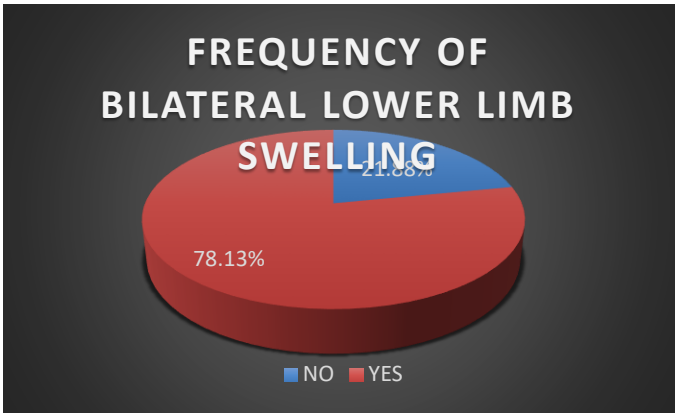


Table 4: Facial puffiness was seen in 23 patients (71.88%) patients. It developed over period of 7-14 days in 34.87% patients and over period of 14-21 days in 39.13% patients.

Facial puffiness	Frequency	Percent
No	09	28.13%
Yes	23	71.88%
Total	32	100.00%

Table 5: Hyperbilirubinemia was seen in 3.13% patients. Hypoproteinemia and hypoalbuminemia was seen in 68.75% and 84.38% patients. Transaminitis (raised SGOT and SGPT) was seen in 25% and 28% patients respectively.

LFT	Hyperbilirubinemia	Hypoproteinemia	Hypoalbuminemia	Increased SGOT	Increased SGPT
Frequency	01 (03.13%)	22(68.75%)	27(84.38%)	08(25%)	09 (28%)

Table 6: Deranged creatinine and urea was seen in 43.73% and 40.63% patients respectively. Hyponatremia and hypokalemiawas seen in 3.13% and 9.38% patients. Whereas hyperkalemia was seen in 9.38% patients.

RFT	Increased Creatinine	Increased urea
Frequency	14 (43.73%)	13 (40.63%)

Table 7: The most common etiologies were lupus nephritis (18.75%) followed by FSGS(15.62%), RPGN (15.62%), Chronic Glomerulonephritis (15.62%).

Minimal change disease was found in 9.375% patients , membranous nephropathy, MPGN and IgA nephropathy were found in 6.25% patients respectively.

Histopathology	Cases	Percentage
FSGS	05	15.62%
RPGN	05	15.62%
Lupus Nephritis	06	18.75%
Chronic	05	15.52%
Glomerulonephritis	02	06.25%
Membranous Nephropathy	02	06.25%
MPGN	03	09.375%
Minimal change disease	02	06.25%
IgA Nephropathy	02	06.25%
Other	32	100%
Total		

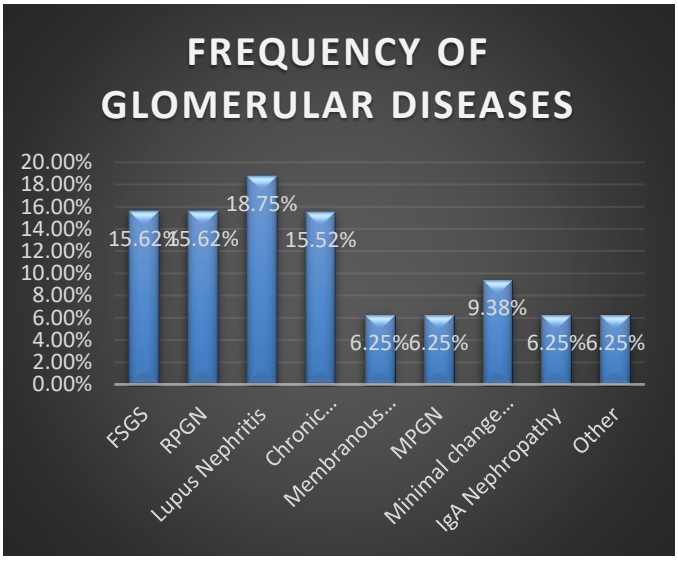


Table 8: Facial puffiness was the most common presenting complaint in most diseases (CGN, FSGS, RPGN, Lupus Nephritis, MCD, IgA Nephropathy, Membranous nephropathy, MPGN) followed by bilateral lower limb swelling.

Frequency	CGN	FSGS	RPGN	LUPUS NEPHRITIS	MCD	IgA NEPHROPATHY	MEMB NEPHROPATHY	MPGN
Facial puffiness	04 (80%)	04 (80%)	03 (60%)	05 (83.33%)	03 (100%)	02 (100%)	02 (100%)	02 (100%)
Abdominal distension	0 (0%)	01 (20%)	01 (20%)	02 (33.66%)	01 (33.33%)	01 (50%)	0 (0%)	0 (0%)
Blood in urine	02 (40%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Frothing of urine	0 (0%)	0 (0%)	01 (20%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Swelling of bilat. Ll	03 (60%)	02 (40%)	01 (20%)	05 (83.33%)	03 (100%)	02 (100%)	02 (100%)	02 (100%)
Shortness of breath	0 (0%)	0 (0%)	O2 (40%)	01 (16.67%)	01 (33.33%)	0 (0%)	0 (0%)	01 (50%)

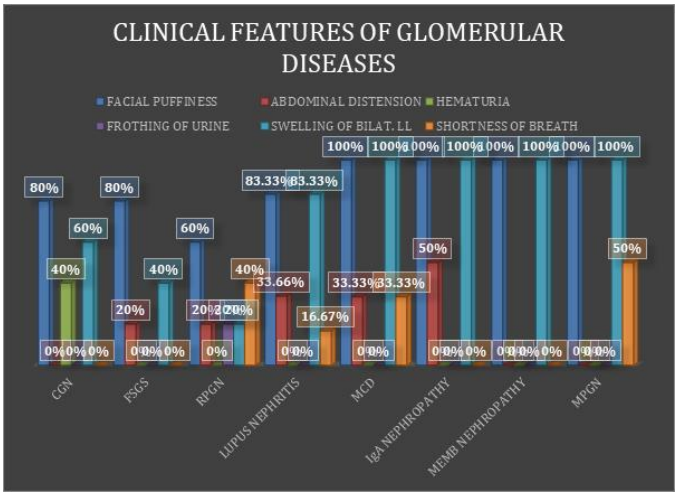


Table 9: Lab parameters in various glomerular diseases.

	CGN	FSGS	RPGN	LUPUS NEPHRITIS	MCD	IgA NEPHROPATHY	MEMB NEPHROPATHY	MPGN
Anemia	03 (60%)	02 (40%)	05 (100%)	04 (66.66%)	0 (0%)	0 (0%)	01 (50%)	01 (50%)
Increased Creatinine	05 (100%)	03 (60%)	03 (60%)	0 (0%)	0 (0%)	0 (0%)	01 (50%)	01 (50%)
Increased Urea	05 (100%)	02 (40%)	03 (60%)	01 (16.67%)	0 (0%)	0 (0%)	01 (50%)	01 (50%)
Hypoalbuminemia	04 (80%)	05 (100%)	05 (100%)	04 (66.66%)	03 (100%)	02 (100%)	01 (50%)	02 (100%)

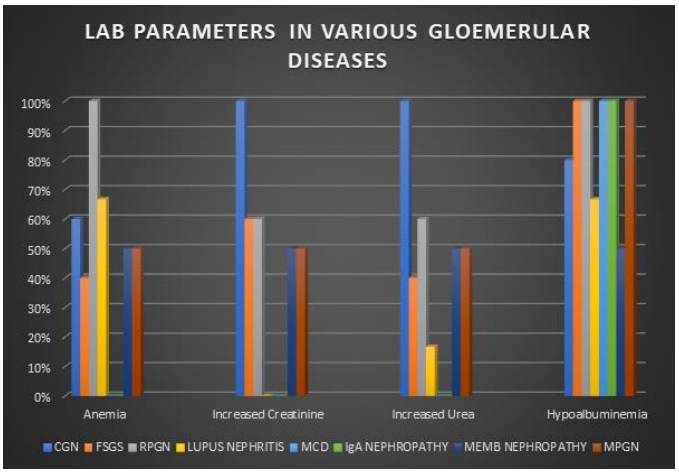


Table 9: Glomerular basement membrane involvement and bowman capsule involvement was seen in alomst all cases except in minimal change disease patients. Sclerosis and crescent formation was seen in 18.75%. Cellular infiltrates either polymorphonuclear or lymphocytic were seen in 43.75% patients whereas associated tubular involvement was seen in 12.5% patients.

Etiology	GBM Involvement	Bowman Capsule Involvement	Sclerosis	Crescent Formation	Cellular Infiltration	Tubular Involvement
FSGS	100% (5)	100% (5)	20% (1)	0% (0)	20% (1)	20% (1)
RPGN	100% (5)	100% (5)	0% (0)	100% (5)	100% (5)	20% (1)
Lupus Nephritis	100% (6)	100% (6)	0% (0)	16.67% (1)	100% (6)	0% (0)
CGN	100% (5)	100% (5)	100% (5)	0% (0)	0% (0)	40% (2)
Memb Nephropathy	100% (2)	100% (2)	0% (0)	0% (0)	50% (1)	0% (0)
MPGN	100% (2)	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)
MCD	33.33% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
IgA Nephropathy	100% (2)	100% (2)	0% (0)	0% (0)	0% (0)	50% (1)
Other	100% (2)	100% (2)	0% (0)	0% (0)	50% (1)	0% (0)
Total	93.75% (30)	90.625% (29)	18.75% (6)	18.75% (6)	43.75% (14)	12.5% (4)

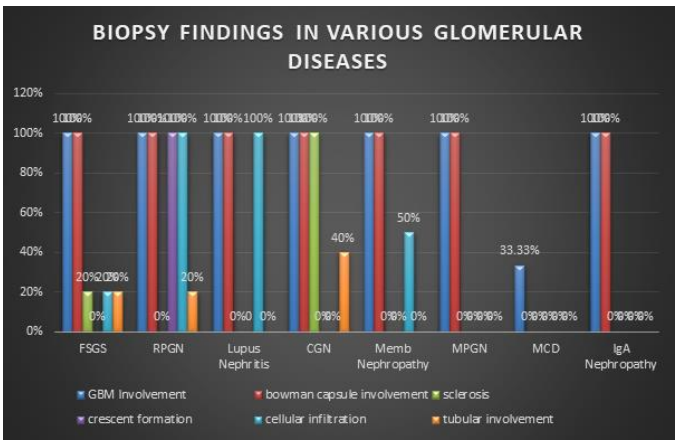
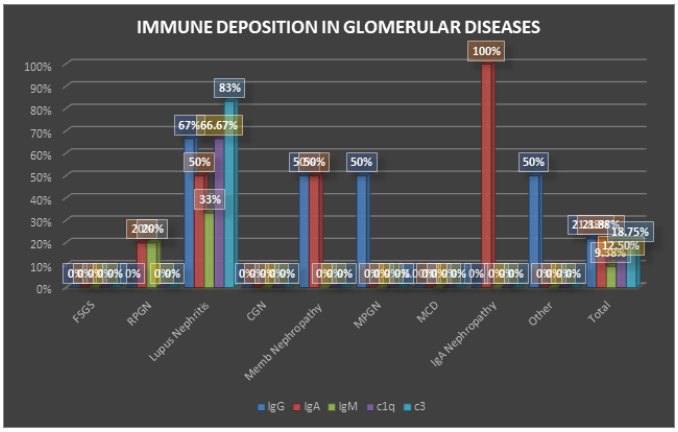


Table 10: On immunofluoroscence, lupus nephritis cases showed deposits in all spectra- IgG, IgA, IgM, c1q and c3. One case of RPGN (crescenteric glomerulopathy) showed deposits in IgA and IgM. FSGS and MCD cases didn't show any deposits.

Etiology	IgG	IgA	IgM	c1q	c3
FSGS	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
RPGN	0% (0)	20% (1)	20% (1)	0% (0)	0% (0)
Lupus Nephritis	66.67% (4)	50% (3)	33.33% (2)	66.67% (4)	83.33% (5)
CGN	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Memb Nephropathy	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)

MPGN	50% (1)	0% (0)	0% (0)	0% (0)	0% (0)
MCD	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
IgA Nephropathy	0% (0)	100% (2)	0% (0)	0% (0)	0% (0)
Other	50% (1)	0% (0)	0% (0)	0% (0)	0% (0)
Total	21.875% (7)	21.875% (7)	9.375% (3)	12.5% (4)	18.75% (6)



Conclusion

1) Various types of glomerular diseases found were minimal change disease, Focal Segmental Glomerulosclerosis, Lupus nephritis, membranous nephropathy, membrano-proliferative glomerulonephritis and IgA nephropathy.

2) Lupus nephritis was the most common cause of glomerular involvement followed by focal segmental glomerulosclerosis, chronic glomerulonephritis and rapidly progressive glomerulonephritis.

3) Glomerular basement membrane and bowman capsule involvement was seen in almost all cases except in minimal change disease.

4) Polymorphonuclear or lymphocytic cellular infiltrates were most commonly observed on HP

5) Lupus nephritis cases showed deposits in- IgG, IgA, IgM, c1q & c3 on immunofluorescence.

6) In Lupus nephritis ANA positivity was seen in all of the patients.

7) All patients with crescenteric glomerulonephritis had acute kidney injury at presentation whereas minimal change disease had relatively milder course without AKI at presentation.

Abbreviations

AKI- Acute Kidney Injury

SLE- systemic Lupus Erythematous

CKD- Chronic Kidney Disease

CGN- Chronic Glomerulonephritis

FSGS- Focal Segmental Glomerulosclerosis

LN- Lupus Nephritis

PSGN- Post Streptococcal Glomerulonephritis

RPGN- Rapidly Progressive Glomerulonephritis

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