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"Study of Clinical,Biochemical,Histopathological features and response to steroids in recentlydiagnosed adult nephrotic syndrome"

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Abstract
Nephrotic syndrome may be caused by primary (idiopathic) renal disease or by a variety of secondary causes. Patients present with generalisededema, proteinuria, hypoalbuminemia, and often hyperlipidemia. In adults, diabetes mellitus is the most common secondary cause,focal segmental glomerulosclerosis and membranous nephropathy are the most common primary causes. There are no established guidelines on the diagnostic workup or management of nephrotic syndrome. Renal biopsy may be useful in some cases to confirm an underlying disease or to identify idiopathic disease that is more likely to respond to corticosteroids.Spectrum of Nephrotic syndrome varies in different ethnic populations,age groups and socio economic strata. For instance IgA nephropathy is common in northwest regions of Italy,far east and eastern Europe[1,2] while FSGS appear tobe more prevalent in USA and Saudi Arabia.[3,4] In Italy, Japan, China, Singapore,Hong Kong and Taiwan IgA nephropathy is the most common primaryglomerulonephropathy,followed by MGN and FSGS.[3,5]In India the pattern varies according to demographic location,mesangioproliferative glomerular nephritisrepresents the most common cause ofAdultNephrotic Syndrome in south India[7] ,MCN dominates Northern India andEasternIndia,[8,9]where as IgA nephropathy is common in Western India.[10]LupusNephritisfollowed byDiabetic nephropathyare the leadingSecondaryglomerular diseasesin India.[7]
Minimal change disease (MCD), Focal segmental glomerulosclerosis (FSGS), and Membranous nephropathy (MN), generate an enormous individual and societal financial burden, accounting for approximately 12% of prevalent end stage renal disease. However, the clinical classification of these diseases is widely believed to be inadequate by the scientific community. Given the poor understanding of MCD/FSGS and MN biology along with newer pathologies associated with nephrotic syndrome it is not surprising that the available studies therapies are imperfect. The therapies lack a clear biological basis, and as many families have experienced, they are often not beneficial, and in fact may be significantly toxic. Given these observations, it is essential that research be conducted to address these serious obstacles for effective management.
The foregoing shortcomings make a strong case that concerted and innovative analytical studies combining basic science, translational, and clinical methods should be employed to study nephrotic syndrome in adults.Hence in this study, an attempt is made to note the clinical features,biochemical, and histopathological spectrum in the adult nephrotic syndrome and analyse variations in different parameters in follow up.

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I. Objective of the study

1. To study the various aetiologies of nephrotic syndrome.
2. To study various biochemical profiles including heamogram, renal function tests,lipidprofile,totalprotein,albumin, 24 hour urinary protein etc.
3. To study the histological subtypes in these patients.
4. To study variations in different parameters in follow up on treatment on day 10,day 30(1 month) and 90 day (3 month).

After obtaining approval of the Institutional Ethical and Research Committee, present study was conducted in the Department of Nephrology andMedicine, at a tertiary care institute of a metro city .Its a one year observational and prospective study conducted on patients,clinically diagnosed to have adult onset nephrotic syndrome(age >12yr and Patient with "nephrotic range proteinuria" i.e. 24 hour urine protein > 3gm/day),where as those refusing renal biopsy, having UTI,or obstructive uropathy and pregnant pt were excluded.Mixed population of thirty one patients clinically diagnosed to have adult onset nephroticsyndrome were admitted, evaluated and selected for the study after obtaining the informed consent.Data was collected and

recorded on predesigned and pretested proformarelevant history, clinical examination, relevant biochemicalinvestigation and renal biopsy (done under ultra sound guidance),as per standard guidelines and precaution in all selected patients.The results were tabulated and the data was analysed using rates, ratiosand percentages of different clinical manifestations, biochemical parameters andhistopathological diagnosis.

II. Results

DEMOGRAPHIC DATA

Parameters of 31 cases	
Age (yrs)	
Mean	29.13
SD	11.54
Range	13-60 yrs
Sex (%)	
Male	13 (41.9)
Female	18 (58.1)

In this study, the age of the cases was ranging from **13-60yrs** with mean age being **29.13 yrs**. **58.1%** of the cases were female while **41.9%** were male.

Profile of Presenting Complaints

Presenting complaints	**No. of cases(N = 31)**	**Percentage**
Edema	31	100.0
Weight gain	31	100.0
Breathlessness	09	29.0
Hematuria	01	03.2
Fever	07	22.6
Joint pain	06	19.4
Rash	04	12.9
Polyuria/polydipsia/polyphagia	05	16.1

As per this observation, all the cases had Edema or weight gain,as the presenting complaints followed by **29.0%** of the cases with Breathlessness.

Associated symptoms	**Yes (%)**	**No (%)**
Ascites	10 (32.3)	21 (67.7)
Hypertension	16 (51.6)	15 (48.4)
Pulmonary edema	5 (17.2)	26 (82.8)
Pleural Effusion	10 (32.3)	21 (67.7)

As per above table of associated symptoms **17.2**% of the cases had pulmonary oedema,**32.3**% of the cases had Pl.effusion,**32.3**% of the cases had ascites, and **51.6**% of the cases were hypertensive on presentation.

Association Between Renal Biopsy and Hypertension (SBP>140 mmHg)

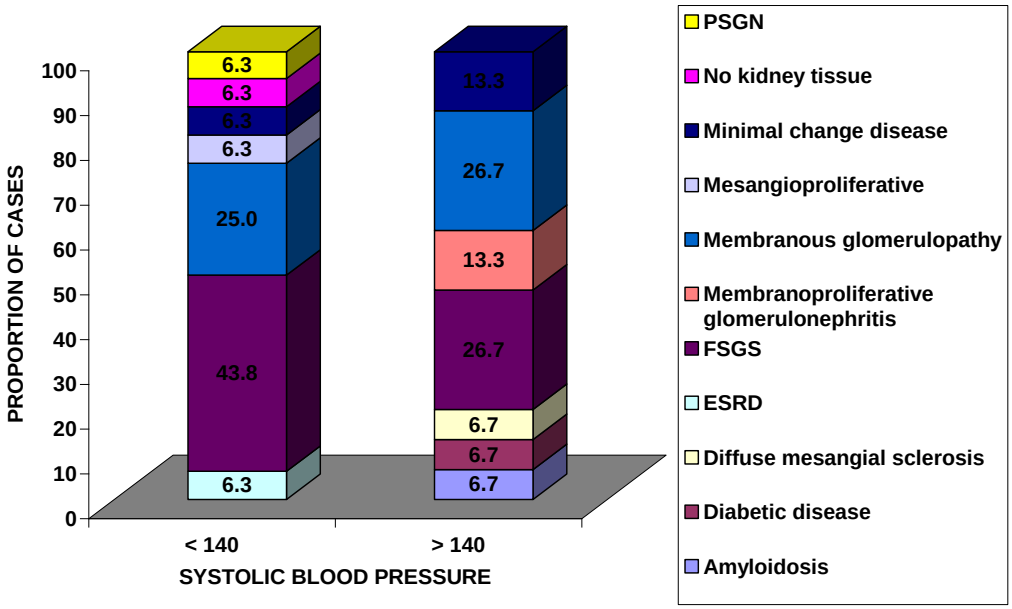
Renal biopsy	**HYPERTENSION(N=16)**		**NON HYPERTENSIVE(N=15)**	
	No.	**%**	**No.**	**%**
Amyloidosis	-		01	06.7
IgA Nephropathy	-		01	06.7
Diffuse mesangial sclerosis	-		01	06.7

ESRD	01	6.3	-	
FSGS	07	43.8	04	26.7
Membranoproliferative GN	-		02	13.3
Membranous glomerulopathy	04	25.0	04	26.7
Mesangioproliferative	01	6.3	-	
Minimal change disease	01	6.3	02	13.3
No kidney tissue	01	6.3	-	
PSGN	01	6.3	-	

By Chi-square test Not Significant

Above analysis states that,**43.8**% of the hypertensive patients had FSGS,followed by membranous glomerulopathy in 25% of patients.**26.7**% of non hypertensive patients had FSGS on renal biopsy,but the difference was not significant.

ASSOCIATION BETWEEN RENAL BIOPSY AND SYSTOLIC BLOOD PRESSURE



Profile of Blood Urea Nitrogen

Range	No. of cases(N = 31)	Percentage
< 20mg/dl	10	32.3
≥ 20mg/dl	21	67.7

Above data states that **67.7**% of the cases had BUN more than 20mg/dl.

Association Between Renal Biopsy And BUN

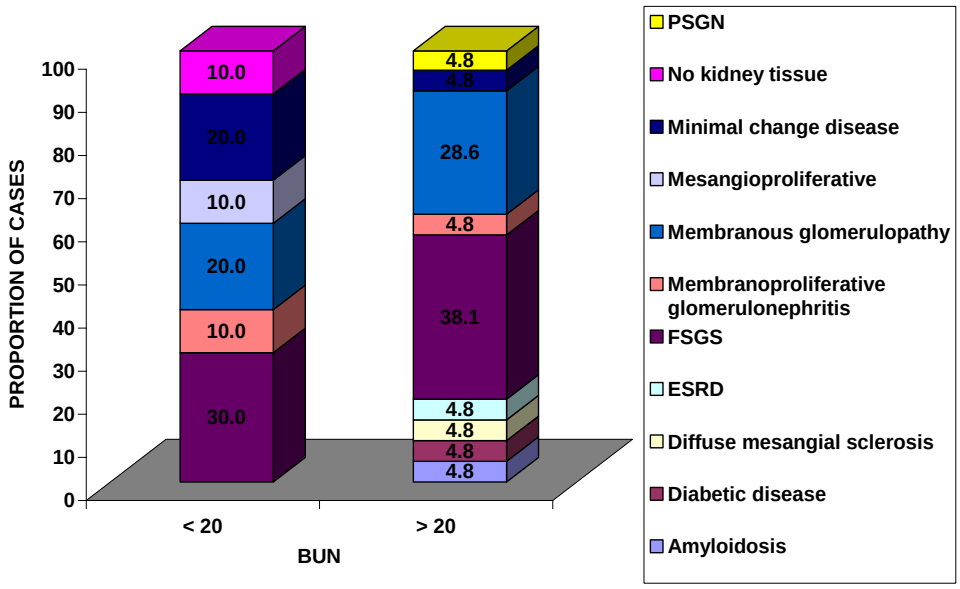
Renal biopsy	Blood urea nitrogen < 20mg/dl(N=10)		Blood ure nitrogen > 20mg/dl(N=21)	
	No.	%	No.	%
Amyloidosis	-		01	04.8
IgA nephropathy	-		01	04.8
Diffuse mesangial sclerosis	-		01	04.8
ESRD	-		01	04.8
FSGS	03	30.0	08	38.1
Membranoproliferative GN	01	10.0	01	04.8
Membranous glomerulopathy	02	20.0	06	28.6
Mesangioproliferative	01	10.0	-	
Minimal change disease	02	20.0	01	04.8

No kidney tissue	01	10.0	-	
PSGN	-		01	04.8

By Chi-square test Not Significant

Above analysis states that,**30.0**% of the cases had FSGS who had Blood urea nitrogen less than 20mg/dl which was less as compared to **38.1**% of the cases who had Blood urea nitrogen more than 20mg/dl but the difference was not significant.

ASSOCIATION BETWEEN RENAL BIOPSY AND BUN

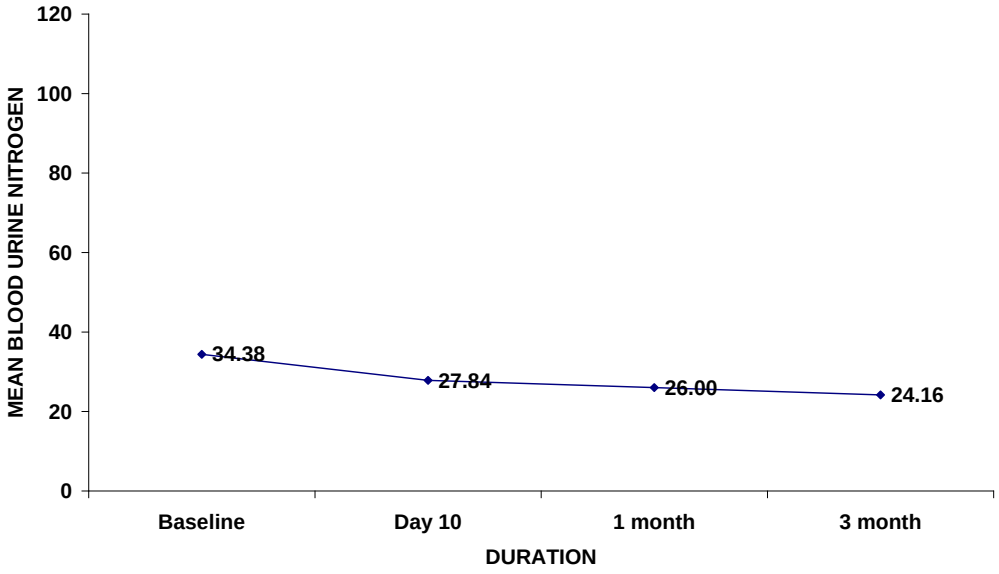


Change In Mean Blood Urea Nitrogen After Treatment

Duration	**Mean blood urea nitrogen (mg/dL)($\overline{X}$ ± SD)(N=31)**	**P value**
Baseline	34.38 ± 26.17	
Day 10	27.84 ± 16.62	
1 month	26.00 ± 16.49	
3 month	24.16 ± 17.60	
Diff (Baseline – day 10)	-6.54 ± 16.27	*(0.0327)
Diff (Baseline – 1 month)	-8.38 ± 15.69	*(0.0057)
Diff (Baseline – 3 month)	-10.22 ± 18.32	*(0.0041)

By Student't' Test *Significant

- In above data, mean Blood urea nitrogen at baseline was **34.38.**
- At day 10, mean Blood urea nitrogen showed a significant fall of **19.0%** from baseline.
- Same trend was observed till the end of 3 month.



Profile of Sr Creatinine

Range	No. of cases(N = 31)	Percentage
< 1.4mg/dl	11	35.5
≥ 1.4mg/dl	20	64.5

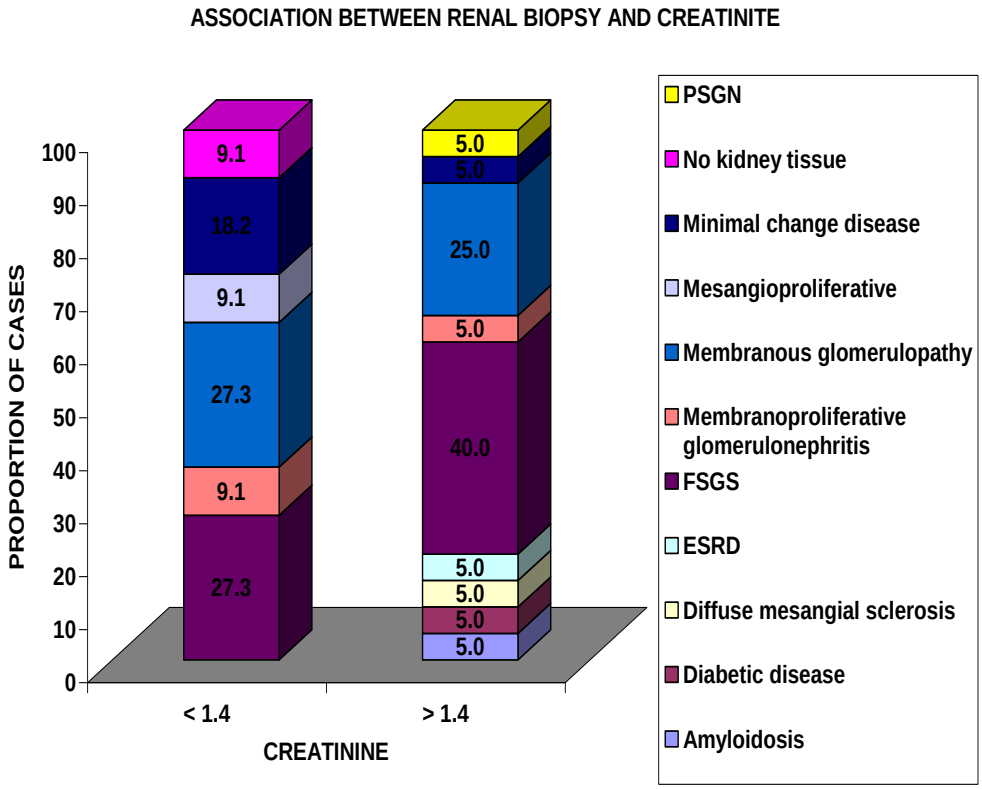
In this table, **65.5**% of the cases had creatinine ranging more than 1.4mg/dl.

Association between Renal Biopsy and Creatinine

Renal biopsy	Creatinine < 1.4mg/dl(N=11)		Creatinine >1.4mg/dl(N=20)	
	No.	%	No.	%
Amyloidosis	-		01	05.0
IgA nephropathy	-		01	05.0
Diffuse mesangial sclerosis	-		01	05.0
ESRD	-		01	05.0
FSGS	03	27.3	08	40.0
Membranoproliferative GN	01	09.1	01	05.0
Membranous glomerulopathy	03	27.3	05	25.0
Mesangioproliferative	01	09.1	-	
Minimal change disease	02	18.2	01	05.0
No kidney tissue	01	09.1	-	
PSGN	-		01	05.0

By Chi-square test Not Significant

Above analysis states that,**27.3**% of the cases had FSGS who had creatinine level less than 1.4mg/dl which was less as compared to **40.0**% of the cases who had creatinine level more than 1.4mg/dl but the difference was not significant.



Changes In Mean Serum Creatinine After Treatment

Duration	Mean creatinine (mg/dL) ($\bar{X}$ ±SD)(N=31)	P value
Baseline	2.93 ± 2.90	
Day 10	2.47 ± 2.99	
1 month	2.05 ± 2.63	
3 month	1.81 ± 2.23	
Diff (Baseline – day 10)	-0.46 ± 3.45	0.4638NS
Diff (Baseline – 1 month)	-0.88 ± 3.33	0.1517NS
Diff (Baseline – 3 month)	-1.12 ± 3.02	*(0.0476)

By Student 't' Test *Significant

- In this analysis, mean creatinine at baseline was **2.93**.
- At day 10, mean creatinine showed a fall of **15.7%** from baseline but the difference was not significant.
- Same trend was observed at 1 month.
- At 3 months, mean creatinine showed a significantfall of **38.2%** from baseline.

Profile of Total Protein

Range	No. of cases(N = 31)	Percentage
< 4gm/dl	06	19.4
> 4gm/dl	25	80.6

Above data reveals that **80.6**% of the cases had T. protein more than 4gm/dl.

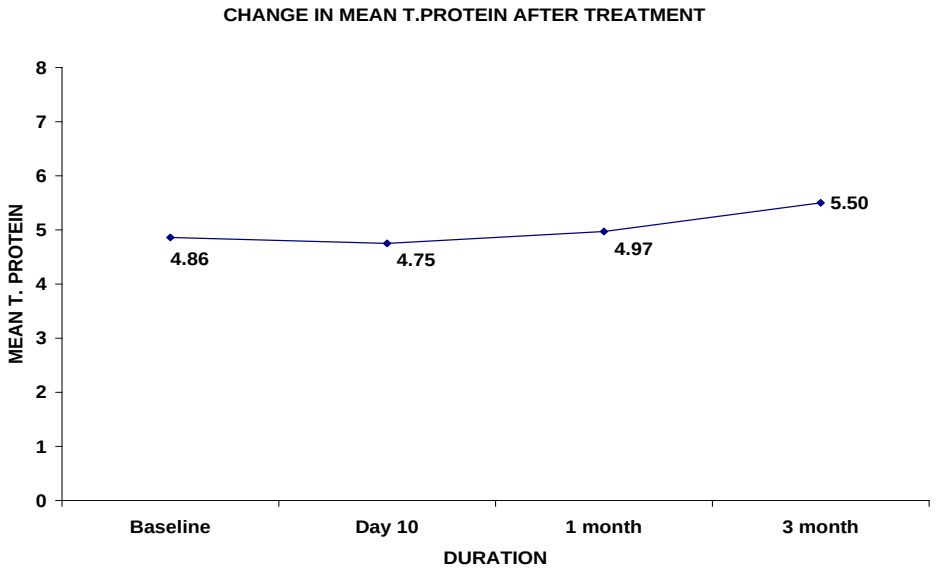
Changes In Mean Sr Total Protein after Treatment

Duration	Mean T. protein (gm/dL) ($\bar{X}$ ±SD)(N=31)	P value
Baseline	4.86 ± 0.83	
Day 10	4.75 ± 0.95	

1 month	4.97 ± 0.94	
3 month	5.50 ± 0.55	
Diff (Baseline – day 10)	-0.11 ± 0.89	0.4580NS
Diff (Baseline – 1 month)	-0.11 ± 0.94	0.5193NS
Diff (Baseline – 3 month)	0.64 ± 0.74	*(0.0000)

By Student 't' Test *Significant
NS = Not Significant

- In this analysis, mean T. protein at baseline was **4.86gm/dl**.
- At day 10, mean T. protein showed a fall of **2.3%** from baseline but the difference was not significant.
- Same trend was observed at 1 month.
- At 3 month, mean T. protein showed a significant rise of 1**3.2%** from baseline.

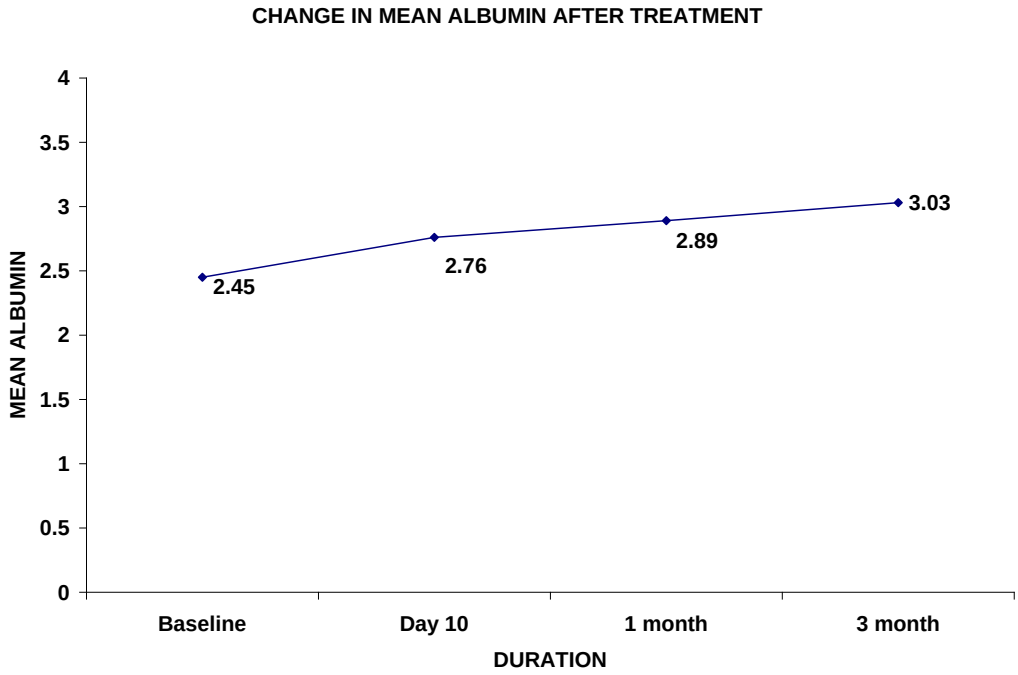


Changes In Mean Serum Albumin After Treatment

Duration	Mean albumin (gm/dL) ($\bar{X}$ ±SD)(N=31)	P value
Baseline	2.45 ± 0.41	
Day 10	2.76 ± 0.40	
1 month	2.89 ± 0.45	
3 month	3.03 ± 0.23	
Diff (Baseline – day 10)	0.31 ± 0.45	*(0.0005)
Diff (Baseline – 1 month)	0.44 ± 0.50	*(0.0000)
Diff (Baseline – 3 month)	0.58 ± 0.42	*(0.0000)

By Student't' Test *Significant

- In above data, mean albumin at baseline was **2.45gm/dl.**
- At day 10, mean albumin showed a significant rise of **12.7%** from baseline.
- Same trend was observed till the end of 3 month.



Profile of Triglyceride

Range	No. of cases(N = 31)	Percentage
100-200mg/dl	02	06.5
201-300mg/dl	17	54.8
> 300mg/dl	12	38.7

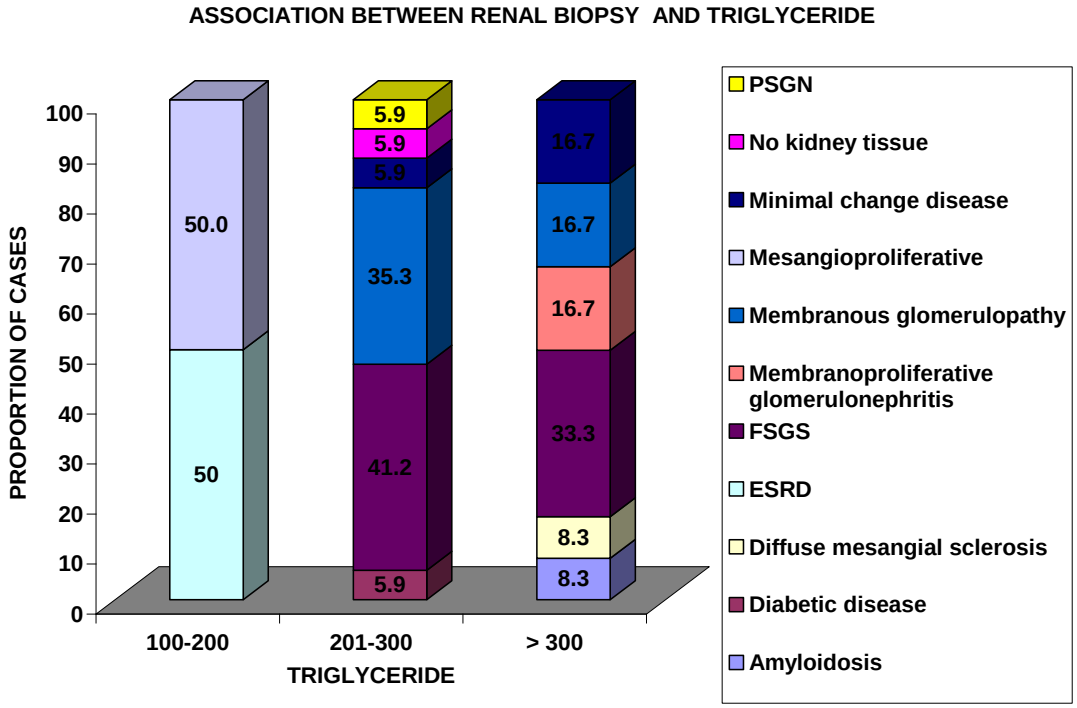
Above data states that **54.8**% of the cases belong to range 201-300mg/dl followed by **38.7**% and **6.5**% belong to range more than 300mg/dl and 100-200mg/dl respectively.

Association Between Renal Biopsy and Triglyceride

Renal biopsy	**Triglyceride100-200**mg/dl**(N=02)**		**Triglyceride 201-300**mg/dl **(N=17)**		**Triglyceride> 300**mg/dl **(N=12)**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Amyloidosis	-		-		01	8.3
IgA nephropathy	-		01	05.9	-	
Diffuse mesangial sclerosis	-		-		01	8.3
ESRD	01	50.0	-		-	
FSGS	-		07	41.2	04	33.3
Membranoproliferative GN	-		-		02	16.7
Membranous glomerulopathy	-		06	35.3	02	16.7
Mesangioproliferative	01	50.0	-		-	
Minimal change disease	-		01	05.9	02	16.7
No kidney tissue	-		01	05.9	-	
PSGN	-		01	05.9	-	

By Chi-square test Not Significant

Above analysis states that,**41.2**% of the cases had FSGS and 35.3% of the cases had membranous glomerulopathy, who had triglyceride belong to range 201-300mg/dl

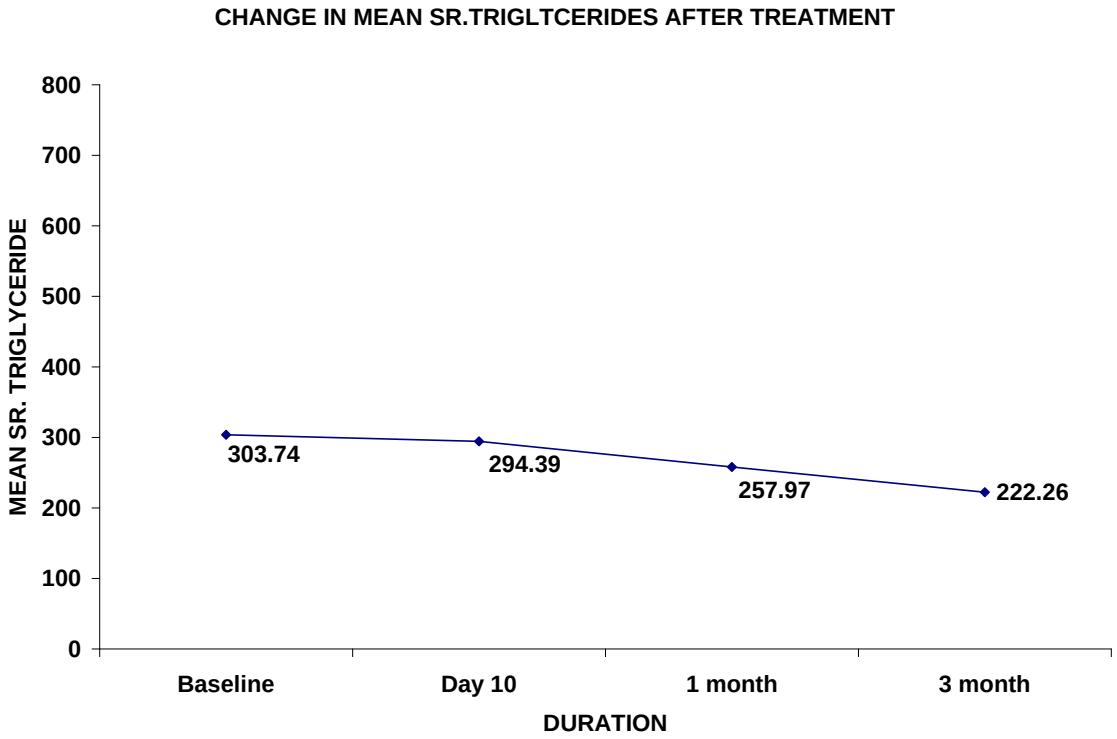


Changes In Mean Sr.Triglycerides After Treatment

Duration	Mean Sr. triglycerides (mg/dL) ($\overline{X}$ ±SD)(N=31)	P value
Baseline	303.74 ± 117.26	
Day 10	294.39 ± 111.60	
1 month	257.97 ± 66.19	
3 month	222.26 ± 46.69	
Diff (Baseline – day 10)	-9.35 ± 38.92	0.1909NS
Diff (Baseline – 1 month)	-45.77 ± 73.14	*(0.0015)
Diff (Baseline – 3 month)	81.48 ± 94.10	*(0.0000)

By Student 't' Test *Significant

- In this analysis, mean Sr. triglyceride at baseline was **303.74**mg/dl.
- At day 10, mean Sr. triglyceride showed a fall of **3.1%** from baseline but the difference was not significant.
- At 1 month, mean Sr. triglyceride showed a significant fall of **15.1%** from baseline.
- Same trend was observed till the end of 3 month.



Profile of Total Cholesterol

Range	No. of cases(N = 31)	Percentage
100-200mg/dl	03	09.7
201-300mg/dl	22	71.0
> 300mg/dl	06	19.4

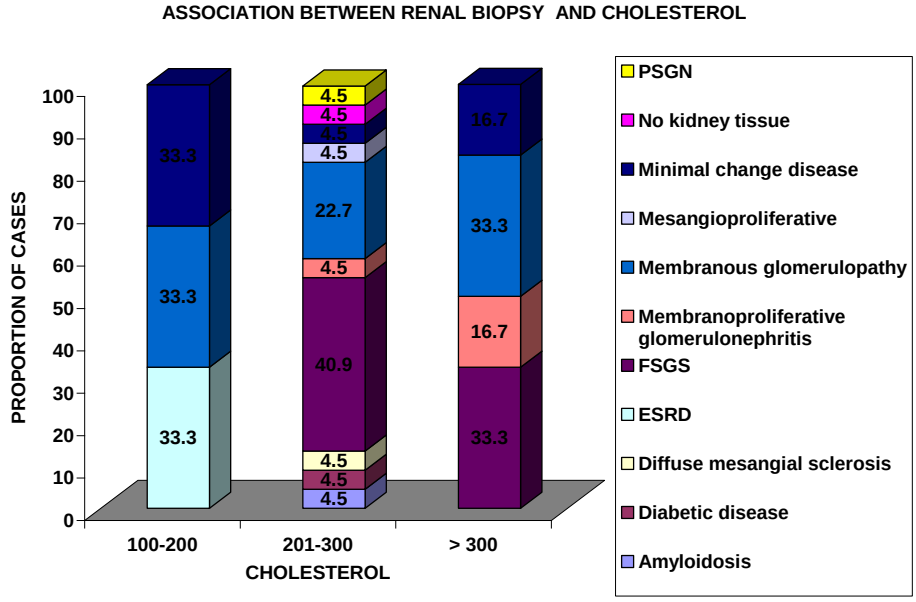
Above data states that **71.0**% of the cases belong to range 201-300mg/dl, followed by **19.4**% and **9.7**% belong to range more than 300mg/dl and 100-200mg/dl respectively

Association Between Renal Biopsy and Cholesterol

Renal biopsy	Cholesterol100-200 (N=03)		Cholesterol201-300 (N=22)		Cholesterol> 300 (N=06)	
Histopathology	**No.**	**%**	**No.**	**%**	**No.**	**%**
Amyloidosis	-		01	04.5	-	
IgA nephropathy	-		01	04.5	-	
Diffusemesangial sclerosis	-		01	04.5	-	
ESRD	01	33.3	-		-	
FSGS	-		09	40.9	02	33.3
Membranoproliferative GN	-		01	04.5	01	16.7
Membranousglomerulopathy	01	33.3	05	22.7	02	33.3
Mesangioproliferative	-		01		-	04.5
Minimal change disease	01	33.3	01	04.5	01	16.7
No kidney tissue	-		01	04.5	-	
PSGN	-		01	04.5	-	

By Chi-square test Not Significant

Above analysis states that,40.9% of cases had FSGS and 22.7% of the cases had Membranous glomerulopathy who had cholesterol belong to range 201-300mg/dl and equal no of pt(33.3%) had FSGS and membranous glomerulopathy who had srcholesterol more than 300mg/dl.



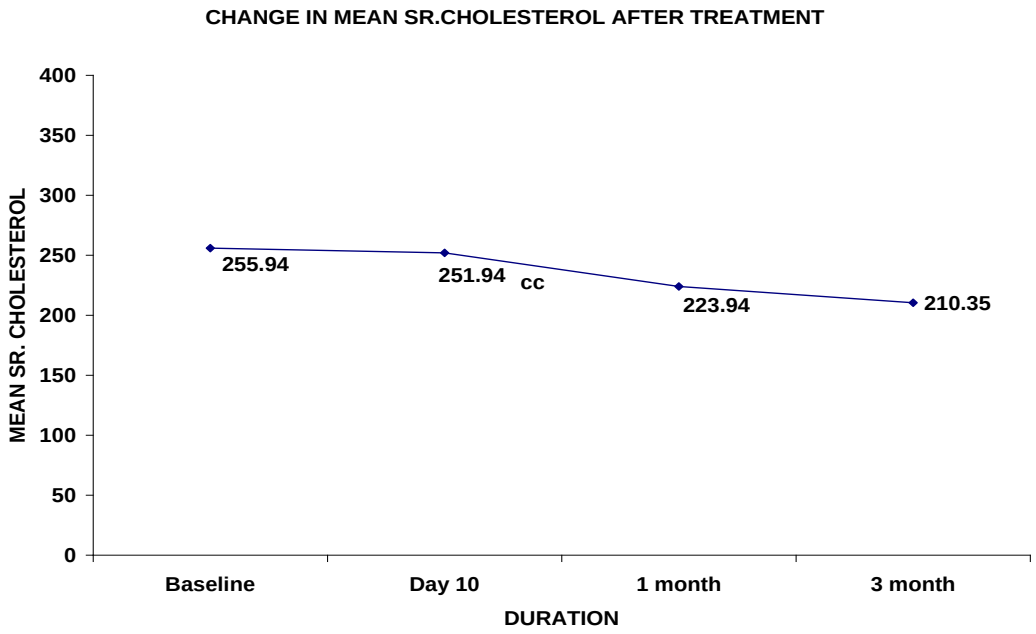
Changes In Mean Sr.Cholesterol After Treatment

Duration	Mean Sr. cholesterol (mg/dL) ($\bar{X}$ ±SD)(N=31)	P value
Baseline	255.94 ± 57.29	
Day 10	251.94 ± 60.96	
1 month	223.94 ± 37.76	
3 month	210.35 ± 33.95	
Diff (Baseline – day 10)	-4.00 ± 21.93	0.3177NS
Diff (Baseline – 1 month)	-32.00 ± 33.31	*(0.0000)
Diff (Baseline – 3 month)	-45.59 ± 37.34	*(0.0000)

By Student 't' Test *Significant

NS = Not Significant

- In this analysis, mean Sr. cholesterol at baseline was **255.94**mg/dl.
- At day10, mean Sr. cholesterol showed a fall of **1.6%** from baseline but the difference was not significant.
- At 1 month, mean Sr. triglyceride showed a significant fall of **12.5%** from baseline.
- Same trend was observed till the end of 3 month



Profile of 24 Hours Urine Protein

Range	No. of cases(N = 31)	Percentage
3.1-4gm/day	10	32.3
4.1-5gm/day	05	16.1
5.1-6gm/day	07	22.6
> 6gm/day	09	29.0

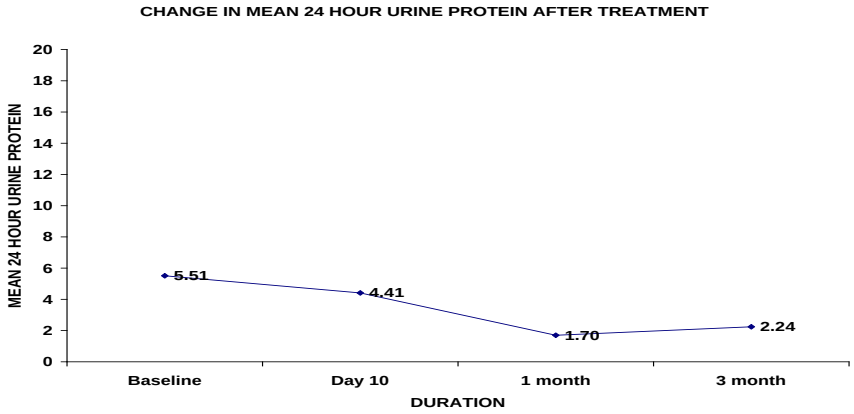
Above analysis reveals that **32.3**% of the cases belong to range 3.1-4 gm/dayfollowed by **16.1**%, **22.6**% and **29.0**% belong to range 4.1-5gm/day, 5.1-6 and > 6gm/day respectively.

Changes In Means 24 Hours Urine Protein After Treatment

Duration	Mean 24 hour urine protein (gm/day) ($\bar{X}$±SD)(N=31)	P value
Baseline	5.51 ± 2.29	
Day 10	4.41 ± 2.88	
1 month	1.70 ± 0.88	
3 month	2.24 ± 1.92	
Diff (Baseline – day 10)	-1.10 ± 1.54	*(0.0004)
Diff (Baseline – 1 month)	-3.81 ± 2.05	*(0.0000)
Diff (Baseline – 3 month)	-3.27 ± 2.58	*(0.0000)

By Student 't' Test *Significant

- In above data, mean 24 hour urine protein at baseline was **5.51**gm/day.
- At day 10, mean 24 hour urine protein showed a significant fall of **20.0%** from baseline.
- Same decreasing trend was observed till the end of 3 month



Profile of Renal Biopsy

Conditions	No. of cases(N = 31)	Percentage
Amyloidosis	01	03.2
IgA nephropathy	01	03.2
Diffuse mesangial sclerosis	01	03.2
ESRD	01	03.2
FSGS	11	35.5
Membranoproliferative GN	02	06.5
Membranous glomerulopathy	08	25.8
Mesangioproliferative	01	03.2
Minimal change disease	03	09.7
No kidney tissue	01	03.2
PSGN	01	03.2

Above table states that **35.5**% of the cases had FSGS followed by **25.8**% and **9.7**% of the cases with Membranous glomerulopathy and Minimal change disease respectively.

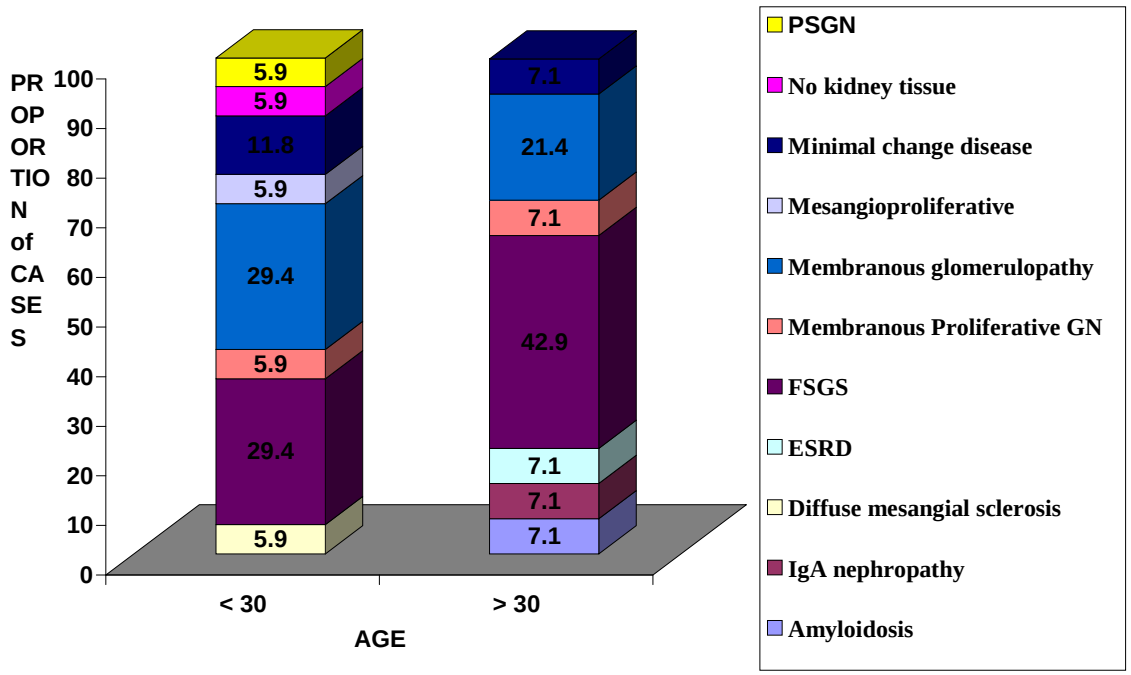
Association Between Renal Biopsy and Age

Renal biopsy	Age < 30years(N=17)		Age > 30years(N=14)	
	No.	%	No	%
Amyloidosis	-		01	07.1
IgA nephropathy	-		01	07.1
Diffuse mesangial sclerosis	01	05.9	-	
ESRD	-		01	07.1
FSGS	05	29.4	06	42.9
Membranoproliferative GN	01	05.9	01	07.1
Membranous glomerulopathy	05	29.4	03	21.4
Mesangioproliferative	01	05.9	-	
Minimal change disease	02	11.8	01	07.1
No kidney tissue	01	05.9	-	
PSGN	01	05.9	-	

By Chi-square test Not Significant

Above analysis states that,**29.4**% of the caseswith age less than 30 years had FSGS and equal no of patients had membranous glomerulopathy.

Association between renal biopsy and age



Systemic Diseases Associated With Nephrotic Syndrome

Conditions	No. of cases(N = 06)	Percentage
Hashimoto'sthyroiditis(hypothyroidism)	01	16.7
Hepatitis C	01	16.7
SLE	01	16.7
HIV	02	33.3
Hypothyroidism(idiopathic)	01	16.7

In this analysis, **33.3**% of the cases had HIV followed by **16.7**% of the cases hadHashimoto's thyroiditis, Hepatitis C, SLE and hypothyroidism(idiopathic).

III. Discussion

The specific primary causes of nephrotic syndrome include kidney diseases such as minimal change nephropathy, focal glomerulosclerosis, andmembranous nephropathy. Nephrotic syndrome can also result from systemic diseases involving other organs in addition to the kidneys, such as Diabetes, HIV, Hypothyroidism,Amyloidosis, and lupuserythematosus.Various national andinternational studies have been done regarding prevalence of different histopathologies.Thus the present study helps to evaluate differenthistopathologiesand different parameters associated with them. It also studied changes in these parameters in follow up.

In our study, cases taken belonging to age group13-60 yrs with mean age being 29.13 yrs.This mean age is comparable with studies done by Sharma BK et al[11],Kazi JI et al[12]and Malafronate et al[13] where mean age was 33.4 years, 29 years and 34 years respectively.Current study represents limited population and had a smaller samplesize.58.1% of the cases were female while 41.9% were male. Sample size being smaller, the difference is not significant.

All the patients were having facial puffiness as one of their presenting complaint, comparable with the studies done by Sharma[11]and Vivekananda[14]. Breathlessness was the second most common complaint,withpulmonary oedema present in 17.4% of patients, being an important responsible factor. Other common complaints were fever, joint pain and rash.32.3% of patients were having pleural effusion and ascites, detectable clinically.

48.4% of all patients were hypertensive on presentation, majority of whom having FSGS(26.7%) or MGN (26.7%) as the histopathological finding. On the other hand the study conducted by Maneknejadet al[15] showed prevalence of hypertension as 11.2% and K Sud et al[16] found prevalence as 32.4%. Higher incidence of hypertension in this study is probably due to higher incidence of FSGS and membranous glomerulopathy.

The mean blood urea nitrogen and creatinine were 34.38 mg/dl and 2.93 mg/dl. 11 of the study subjects had deranged renal functions. The probable reasonfor more patients having deranged BUN and creatinine is that majority of study subjects had FSGS and IMN.Higher incidence of deranged renal functions are reported in these two varieties as evident by study conducted by Golay et al[14] at PGIMER, Kolkata, in which FSGS was associated with AKI in 26.67% of patients, membranous glomerulopathy in 15% of patients while MCN in only 5.22% of all the patients with AKI. In this study,of all the patients presenting with AKI, 38.1% of patients had FSGS on biopsy, followed by 28.6% patients having membranous nephropathy.However the number of subjects in each these groups is small,hence it is difficult to put forward a significant co-relation.

Decline is observed in levels of BUN and creatinine in follow up which was significant at 3 months after treatment, with mean BUN and creatinine being 24.16mg/dl and 1.81mg/dl respectively.

All the patients had hypoproteinemia on admission with mean value of total protein being 4.86 gm/dl, which was comparable to mean value found by Vivekananda M.(4.7gm/dl)[14]. Similarly, serum albumin was low in all the patients, mean being 2.45mg/dl which was comparatively higher as compared to that found in study conducted by Vivekananda M(1.7 gm/dl).Patients responded dramatically to treatment modality as is evident from follow up, with rise in mean value for total protein being 5.50mg/dl at 3 month and serum albumin being 3.03 mg/dl, which was significant statistically.

Hyperlipidemia is a common finding in nephrotic syndrome, as is also found in our study with most of the patients(93.5%), having serum triglyceride level more than 200mg/dl,of which 38.7% of patients had levels more than 300mg/dl. Mean being 303.94 mg/dl. Treatment led to decrease in the mean triglyceride level to 294.39mg/dl on day 10 after treatment, 257.97mg/dl at 1st month and 222.26mg/dl at 3rd month, decrease being statistically significant.

Similar trend was observed in serum cholesterol, with 91.7% of patients having serum cholesterol more than 200mg/dl, with 17% of all the patients having serum cholesterol more than 300mg%.These results are comparable to those found by BiswajeetSahaet al[17].Mean value ofserum cholesterol on admission being 255.94mg/dl, which decreased to 251.94mg/dl on day 10 after treatment, and 210.35mg/dl 3months after treatment which was statistically significant.

Though hyperlipidemia was highly prevalent in study subjects,patients with FSGS and membranous glomerulopathy,were found to have higher levels of Sr Triglyceride andSr cholesterol as compared to others. The result was comparable to study done by Vivekananda M.[14], who found that 75% of patients having FSGS and 66% of patients having membranous glomerulopathy had Sr cholesterol > 200 mg/dl and Sr triglyceride more than 150mg/dl.

Quantitative analysis of proteinuria was done by 24 hour urine protein which washighly variable amongst study patients, maximum value being 15 gm/day, whose biopsy later revealed amyloidosis,while minimum value being 3.3 gm/day.29% of all the patients had 24 hour urine protein more than 6gm/day. Majority of patients(71%) had 24 hour urine protein in the range of 3gm to 6 gm/day,which was similar to that found by Biswajeetet al[17].Significant improvement is observed after starting treatment with mean value decreasing to 4.41gm/day, 10 days after starting treatment and mean value of 1.70gm after 1 month of treatment.However mean value increased to 2.20 gm/day after 3month, indicating tendency towards relapse in some cases, which occurred in 35.48% of patients as evident from increase in 24 hour protein excretion.

In this study, primary glomerular disease was the predominant cause ofnephrotic syndrome and accounted for 80.5% of all biopsies. This is similar tostudies done by Narasimhan et al (71%),[7] Panichvi V et al (70%)[18] and Kazi JI etal (80%).[12] Among primary glomerular disease FSGS was themost common histological lesion, accounted for 35.5% of all biopsies and 44% ofprimary glomerular disease, followed by membranous glomerulopathy accounted for 25.8% of all biopsiesand 32% of primary glomerular disease. Minimal change disease was present in 9.7% of patients.Similar results were found by Haas et al(FSGS-35%,membranousglomerulopathy – 33%) and by Rivera et al[19].Other entities found on biopsy were diffuse mesangial sclerosis,IgA nephropathy, MPGN, amyloidosis, ESRD and biopsy of one of the patientdid not reveal any kidney tissue. The findings were however in contrast to the studies doneby Reshi AR et al (MCN- 44% and FSGS- 17%)[8],Sud K et al [16](MCN-36% andFSGS-25%) and Agarval SK et al[20], (MCN-38%).The difference is probably the result of the changing etiology of nephrotic syndrome with older studies finding MCN as the major pathology, while most of the recent studies concluding to have higher incidence of FSGS and membranous glomerulopathy than MCN. FSGS and membranous glomerulopathywere more prevalent in younger age group (age < 30 yr), as both had equal distribution(29.4%) in this age group. While FSGS is more frequently found than other lesion in older age group(41.9%).

In this study secondary glomerular disease accounted for19.5% of total patients whichis comparable to study done byPanichvi V et al(25.6%)[18]. Secondary glomerular disease withnephrotic syndrome occurredin patients having HIV, Hepatitis C, hypothyroidism and SLE as their primary lesion.

The prevalence of secondary glomerular disease varies within India and world,diabetes mellitus being the most prevalent,secondary glomerular disease causing nephrotic syndrome was also observed in studies based

in NewDelhi,[21]while lupus nephritis , HIV , hypothyroidism were the other prevalent causes. Diabetes mellitus was not found in our patient as most of our patient were from younger age group and lesser frequency of diabetic patient getting subjected to renal biopsy while getting directly started on treatment for nephrotic syndrome .

Hypothyroidism also results in increased glomerular capillary permeability to proteins. The consequent proteinuria often precedes the reduction in GFR in hypothyroidism[22].33.4% of pts having secondarynephrotic syndrome had hypothyroidism,whose treatment led to improvement in urinary protein loss without receiving steroids or any other treatment for urinary protein excretion. Follow up revealed increase in proteinuria at 3 months,however associated derangement of thyroid levels were noted both of which responded to further increase in thyroid supplement.

Worldwide estimates suggest that approximately 10% of patients with HIV-infection develop HIV-associated nephropathy (HIVAN). It has also been predicted that by the end of the decade, HIVAN is likely to become a major cause of end-stage renal disease (ESRD)[23].Prevalence of HIV as a cause of nephrotic syndrome is increasing secondary to increase in the no. of patient being getting diagnosed with HIV and availability of HAART leading to increased life span[24]. In this analysis, 33.3% of secondary nephrotic syndrome,had HIV. Proteinuria initially responded to antiretroviral therapy, but later increased which led to addition of steroid to the treatment regimen and decreased urinary protein excretion.One of the study patient with HIV had MPGN which is commonly reported in presence of HCV infection, the study pt however was negative for HCV. Similar case has been reported by Chidambaram et al[25]. This finding suggests that MPGN may represent a reaction of the kidney to HIV independent of the effects of HCV co-infection. Clinical suspicion must be maintained for MPGN in all HIV infected patients presenting with significant proteinuria regardless of HCV infection status. 24 hr urine protein excretion shown fluctuation with initial decrease followed by increase at 3 month, but same treatment continued led to decrease in further follow up.

IV. Conclusions

Nephrotic syndrome refers to a classic tetrad of proteinuria,hypoproteinemia, edema and hyperlipidemia.The objectives of the present study were to study the clinical features, biochemical and histopathological spectrum in the adult onset nephrotic syndrome, to correlate the clinical and biochemical parameters with histopathological diagnosis and to analyse trends in these parameters in follow up.

- The commonest presentation wasfacial puffiness(edema), pedal edema and breathlessness.
- Hypertension was more prevalent among the FSGS and membranous glomerulopathy type of histological variants.
- Hypoproteinemia and hypoalbuminemia is characteristic of nephrotic syndrome and was present in all the cases. Both the variables show significant improvement in follow up.
- Eleven of the study subjects had deranged renal functions. The probable reasonfor more patients having deranged BUN and creatinine is that majority of study subjects had FSGS and membranous glomerulopathy as the histopathological finding.Decline is observed in levels of BUN and creatinine in follow up after starting treatment.
- Hyperlipidemia is a common finding in nephrotic syndrome, as is also found in our study with most of the patients having high Sr triglyceride and cholesterol levels. Significant decrease is observed in follow up.
- 24 hour urine protein which was highly variable amongst study patients, with values ranging from 3.3gm/day to 15 gm/day. Though decrease is observed in follow up in all the patients initially, few cases had increase in 24 hour protein excretion, in later visits,signifyingtendency towards relapse.
- In view of common clinical presentation and similar biochemicalabnormalities, it is difficult to predict the underlying histopathology in majorityof the patients. Histopathological variety is paramount important for treatmentand prediction of prognosis. Hence kidney biopsy in adult nephritic syndrome is must.
- In this study, primary glomerular disease was the predominant cause of nephrotic syndrome and accounted for 80.5% of all the causes.
- Among primary glomerular disease Focal segmental glomerulosclerosis was the most common histological lesion, accounting for 35.5% of patients followed by membranous glomerulopathy accounting for 25.8% of all biopsies.
- Secondary glomerular disease with nephrotic was found to be associated with HIV,Hypothyroidism,SLE and Hepatitis C.

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