ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2015; 1(9): 545-549
www.allresearchjournal.com
Received: 03-06-2015
Accepted: 06-07-2015

Sanjay Dhawale
Associate Professor
Department of Medicine
Gajraraja Medical College
Gwalior (M.P.), India.

Satyam Singh jayant
Associate Professor
Department of Medicine
Gajraraja Medical College
Gwalior (M.P.), India.

Rakesh gaharwar
Associate Professor
Department of Medicine
Gajraraja Medical College
Gwalior (M.P.), India.

Correspondence
Sanjay Dhawale
Associate Professor
Department of Medicine
Gajraraja Medical College
Gwalior (M.P.), India.

Original Article - Study of Etiological Profile of Nephrotic Syndrome in Adults

Sanjay Dhawale, Satyam Singh jayant, Rakesh gaharwar

Abstract
Aims and objectives- The aims and objectives of the study were: To study the clinical and biochemical profile of adults presenting with nephrotic range proteinuria. And To determine the pathology responsible for the adult nephrotic syndrome by renal biopsy.
Material and methods- A prospective study was conducted on patients of either sex, age ≥18 yrs who presented to the medicine department of G. R. Medical college and JA Group of hospitals, Gwalior during the period of June 2008 to November 2010 with proteinuria of ≥ 3gm/24hours. Patients with these features were subjected to clinical examination and biochemical investigations. Renal biopsy was done to characterize the lesion responsible for the proteinuria. The following were the inclusion and exclusion criteria used for selection of candidates for renal biopsy.
Results- Out of the total 54 cases studied, males contributed to around 64.8% of the cases. The overall male to female ratio was 1.8:1.Maximum number of cases was in the age group of 18-27 contributing to 51.8% of the total cases. The mean age at presentation was 31.7± 8.5 years (range was 18 – 65 years). At the time of presentation, Edema was seen in 96.3 %. 33. 3% cases had hypertension. The mean MAP was 96.1 ±16.5 mmHg (range 73.3 – 120 mmHg).The mean duration from onset of symptoms to renal biopsy was 6.83 months. Present study revealed that out of 54 cases, 63% cases had hypercholesterolemia, 85.2% cases had hypoalbuminemia, 39% cases had increased levels of serum creatinine and 37% cases had hematuria at the time of presentation. The mean hemoglobin was 11.5±1.8 gm%. (Range 6.7 – 15.9 gm%). The mean serum Creatinine was 1.3±0.8 mg/dl (range 0.4 – 3. 62 mg/dl). The mean 24 hr Urinary Protein were 5.6 ± 1.3 gm/day (range was 3–28.1 gm/day).The mean serum Albumin was 2.4± 0.4 gm/dl (range was 0.9 – 3.6 gm/dl). The mean serum cholesterol was 268.3±173.2 mg/dl (range was 142 – 514 mg/dl). Among the total 54 cases studied, the most common lesion responsible for the nephrotic syndrome in adults was Focal Segmental Glomerulosclerosis (FSGS). FSGS was the lesion responsible in 37% of the cases. The next common lesion was Membranous Glomerulonephritis (MGN) which contributed to around 18.5% of the cases. The third most common lesion in our study was Renal Amyloidosis which constituted 14.8% of the total. Membranoproliferative Glomerulonephritis (MPGN) was found in 13% of the cases. Lupus Nephritis (LN) was identified as the cause of adult nephrotic syndrome in 9.3 % cases. Minimal Change Disease (MCD) was responsible for adult nephrotic syndrome in 5.5% of the cases with adult nephrotic syndrome. Only one among the 54 cases studied came out to be IgA Nephropathy (IgAN) which contributed to 1.8%.
Conclusion- All these facts stress the need for a proper histopathological diagnosis and avoidance of unnecessary delay in making a confirmatory diagnosis wherever needed by a renal biopsy.

Keywords: *Nephrotic Syndrome, Renal Biopsy, Pathophysiology of Nephrotic Syndrome.*

Introduction
The term, *nephrotic syndrome* implies not a single disease entity but a constellation of clinical findings dominated by heavy proteinuria. These conditions have in common the presence of glomerular damage and thus increased permeability to proteins. These are associated with complications such as increased susceptibility to infections, thromboembolism, altered lipid and carbohydrate metabolism and losses in the binding proteins in urine. In the modern era of ready availability of percutaneous biopsy, coupled with sophisticated electron microscopy and immunofluorescence studies the great variability of the underlying lesions and etiological agents that evoke nephrotic syndrome can be detected quickly. The purpose of the current study was to study the etiological profile of nephrotic syndrome in adult patients who presented to G. R. Medical College and JA group of Hospitals, Gwalior, and M.P during a two year period through renal biopsy studies and to

establish the trend of etiologies in recent times and to study the histological findings and the laboratory parameters obtained.

Aims and Objectives- The aims and objectives of the study were: To study the clinical and biochemical profile of adults presenting with nephrotic range proteinuria. And To determine the pathology responsible for the adult nephrotic syndrome by renal biopsy.

Materials & Methods- A prospective study was conducted on patients of either sex, age ≥18 yrs who presented to the medicine department of G. R. Medical college and JA Group of hospitals, Gwalior during the period of June 2008 to November 2010 with proteinuria of ≥ 3gm/24hours. Patients with these features were subjected to clinical examination and biochemical investigations. Renal biopsy was done to characterize the lesion responsible for the proteinuria. The following were the inclusion and exclusion criteria used for selection of candidates for renal biopsy.

Inclusion Criteria: Age > 18 yrs, Patients presenting with Proteinuria > 3 gm/day

Exclusion Criteria: Age < 18 yrs, Presence of coagulopathies, Contracted kidneys, Presence of unilateral solitary kidney, Acute pyelonephritis, H/o vesicoureteric reflux, GFR < 15mL/min (MDRD) at presentation and Patients who gave negative consent for biopsy, All long standing patients of Diabetes Mellitus with clinical and biochemical picture of Diabetic nephropathy. The duration of illness, clinical features like edema, hypertension, and anemia were recorded. The routine blood investigations like Hemoglobin (Hb), Total Leukocyte count(TLC), Differential Leukocyte count(DLC), Random Blood Sugar (RBS), serum urea, serum creatinine, lipid profile and serum proteins were done and recorded. Urine routine & microscopy was done for all patients to record presence of degree of proteinuria, presence of RBCs, casts etc., And patients were subjected to 24 hour urine analysis for protein. And patients who had nephrotic range proteinuria (≥ 3 gm/24 hrs) with sonographically normal sized kidneys were subjected to renal biopsy. Special investigations like Anti-Nuclear Antibody (ANA), Anti-double stranded DNA (Anti dsDNA), Rheumatoid factor (RA factor), serum Complement (C3, C4) levels were done if the Renal biopsy picture suggested the need to rule out Collagen Vascular Diseases. Before biopsy coagulation parameters were performed like Prothrombin time (PT), Activated Partial Thromboplastin Time (APTT), and Platelet count to rule out any coagulation abnormalities. These patients were admitted and renal biopsies were performed. The biopsies were done with proper written consent about the procedure, its importance, likely complications. The biopsies were done using Bard FNAC Renal Biopsy gun No: 18 with real time USG guidance in the presence of professional guidance and care. Two samples were taken for Light Microscopic studies in 10% buffered formalin and 1 for immunofluorescent study in Michel's Media. They were monitored for any post biopsy complications mainly in the first 24 hours. Out of 72 patients who presented with nephrotic range proteinuria, renal biopsy was done for 54 patients with proper informed written consent. 6 patients had advanced renal disease with GFR < 15 ml/min (MDRD), 5 patients were hemodynamically unstable and 7 patients gave negative consent for biopsy and hence they were excluded from the study. No patients experienced any major post biopsy complications in our study group. Cases with HBs antigenemia and patients who tested positive for HCV were not categorized separately, but were classified according to their histological pattern on biopsy.

Clinical Parameters: Clinical and laboratory reports were collected for each patient at the time of presentation. Anemia was defined according to WHO definition for anemia as <13gm% in males and <12gm% in females [19]. Hypertension was defined as a blood pressure either systolic BP≥ 140mmHg and/or diastolic BP≥ 90mmHg [20]. Nephrotic range proteinuria was defined ≥ 3 gm/24 hrs [21, 22]; hypoalbuminemia < 3.5 gm/dL [23]. Hematuria as >5 RBCs/hpf [24]. Renal failure has been defined as GFR (MDRD) < 60 mL/min [25]. Normal levels of serum urea was defined as 15 – 45 mg/dl [23] and serum creatinine was considered to be in the abnormal range when > 1.4 mg/dl [3] and serum cholesterol was defined (NCEP-ATP III Classification) as being in the higher range when > 200 mg/dl [23].

Histological Parameters: The proportion of glomeruli with segmental scars and/or global scars was found out. In addition, specific histopathological features such as mesangial hypercellularity, interstitial fibrosis, tubular atrophy and vascular involvement were noted. The immunofluorescence study included the following antisera conjugated with fluorescein isothiocyanate i.e., IgG, IgM, IgA, C3, C1q, C4.

Observations

Table 1: Demographic Profile At Diagnosis: (n =54)

Variable	Number Of Cases (%)	Mean± S.D	Median (Range)
Males	35 (64.8%)		
Hypertension	18 (33.3%)		
Edema	52 (96.3%)		
Hematuria	20 (37%)		
Age (Years)		31.7±8.5	27.5 (18-65)
Map(Mmhg)		96.1±16.5	96.6 (73.3-120)
Hemoglobin (Gm %)		11.5 ± 1.8	11.4 (6.7 -15.9)
Serum Creatinine(Mg/Dl)		1.3±0.8	1.2 (0.4 -3.62)
24 Hr Urine Protein(Gm/Day)		5.6±1.3	4.3 (3-28.1)
Serum Albumin(Gm/Dl)		2.4±0.4	2.48 (0.9 -3.6)
Serum Cholesterol(Mg/D)		268.3±173.2	238.5 (142-514)

Table 1 summarizes the demographic profile of 54 patients at the time of diagnosis.

Table 2: Gender Wise Distribution of Cases (n=54)

Gender	No. of Cases	Percentage
Male	35	64.8%
Female	19	35.2%
Total	54	100%

Above table shows that out of the total number of patients, 64.8 % were males and 35.2 % were females.

Table 3: Age Wise Distribution of Cases

Age (Years)	Male (N=35)	Female (N=19)	Total (N=54)
18 -27	18 (51.4%)	10 (52.6%)	28(51.8%)
28-37	5 (14.2%)	5 (26.3%)	10(18.5%)
38-47	3 (8.6%)	4 (21%)	7(13%)
48-57	7 (20%)	0	7(13%)
58-67	2 (5.7%)	0	2(3.7%)

From the above table we infer that the maximum number of cases were in the age group of 18-27 i.e.28 out of 54 cases contributing to 51.8% of the total cases.

Table 4: Etiology Wise Distribution of Nephrotic Syndrome in Adults

S. No.	Lesion	Number (N=54)	Percentage (%)
1.	Focal Segmental Glomerulosclerosis (Fsgs)	20	37%
2.	Membranous Glomerulonephritis (Mgn)	10	18.5%
3.	Renal Amyloidosis	08	14.8%
4.	Membranoproliferative glomerulonephritis (Mpgn)	07	13%
5.	Lupus Nephritis (Ln)	05	9.3%
6.	Minimal Change Disease (Mcd)	03	5.5%
7.	Iga NEPHROPATHY (Igan)	01	1.8%

Above table shows the types of glomerulonephritis in the adult patients who presented with nephrotic syndrome.
The commonest lesion was FSGS (Focal Segmental Glomerulosclerosis).

Table 5: Gender Wise Distribution of Various Lesions in Adult Nephrotic Syndrome. (n=54)

Fsgs (N=20)	14	6
Mgn (N=10)	8	2
Renal Amyloidosis (N=8)	6	2
Mpgn (N=7)	4	3
Lupus Nephritis (N=5)	1	4
Mcd (N=3)	2	1
Igan (N=1)	-	1

This table shows that males outnumbered females in every lesion, except in lupus nephritis (LN) where there was female predominance.

Overall male to female ratio was 1.8:1

Table 6: Showing the Distribution of Cases According To Clinical Presentation (N=54)

Finding	Number of Cases	Percentage
Edema	52	96.3%
Hypertension	18	33.3%

This table shows that 52(96.3%) cases had Edema and 18 cases (33.3%) had Hypertension at the time of presentation.

Table 7: Showing the Distribution of Cases According To Laboratory Parameters (n=54)

Laboratory Parameter	No. of Cases	Percentage
Anemia (<13gm% In Males &<12 Gm% In Females)	38	70.3%
Hypercholesterolemia (>200mg/Dl)	34	63%
Hypoalbuminemia (<3.5gm/Dl)	46	85.2%
Increased Levels Of Creatinine (>1.4mg/Dl)	15	27.8%
URINE Rbcs (>5/Hpf)	20	37%

This table shows that 38(70.3%) cases had anemia, 34(63%) cases had hypercholesterolemia, 46(85.2%) cases had hypoalbuminemia, 15(27.8%) cases had increased levels of serum creatinine and 20 (37%) cases had hematuria at the time of presentation.

Discussion- The present study was conducted in patients admitted in the medical wards of Department of Medicine, G. R. Medical College and JA Group of hospitals, Gwalior (M.P) who were of ≥ 18 years of age. The Demographic profile of the adult patients who presented with nephrotic range proteinuria was studied which revealed that, 64.8% of the patients were males and the mean age at presentation was 31.7± 8.5 years (range was 18–65).At the time of presentation, Edema was seen in 96.3 % cases while 33. 3% had hypertension and 37% had microscopic hematuria. The mean duration from onset of symptoms to renal biopsy was 6.83 months. The mean MAP was 96.1 ±16.5 mmHg (range 73.3 – 120 mmHg).The mean hemoglobin was 11.5±1.8 gm%. (Range 6.7 – 15.9 gm %). The mean serum Creatinine was 1.3±0.8 mg/dl (range 0.4 –3.62 mg/dl). The mean 24 hr Urinary Protein were 5.6 ± 1.3 gm/day (range was 3 – 28.1gm/day).The mean serum Albumin was 2.4± 0.4 gm/dl (range was 0.9 – 3.6 gm/dl). The mean serum cholesterol was 268.3±173.2 mg/dl 238.5 (range was 142 – 514 mg/dl).In the present study, 64.8% were males. The male: female ratio being 1.8:1.In a study by Haraldsson *et al.* [1] also showed that there is male predominance in the occurrence of nephrotic syndrome in adults. In a study by Javed Iqbal Kazi *et al.* [2], a total of 316 adult patients were studied. Of these, 201 (63.6%) were male and 115 (36.4%) were female. The present study included subjects ≥ 18years of age. Majority of the patients were in the age group of 18 – 27 years 51.8%.The age range was from 18–65 years with the mean age being 31.7 ± 8.5 years. In a study by Kazi IK *et al.* [2], a total of 316 adult patients were studied and the mean age at presentation was 28.4 ± 10.51 years with a range of 16–78 years. Naini EA *et al.* [3] analyzing the biopsy results among adult glomerulonephritides in Tehran from 1998-2001, found mean age of presentation being 33.6± 15.7 years. In our present study, Out of the 3 patients of minimal change disease (MCD), 2 were males and 1 female respectively and all belonged to the age group of 18-27 yrs. A study by Hopper *et al.* [4] has found MCD to have a fairly high incidence in adult cases also. In Joon Choi *et al.* [5] also

found that the most common primary GN among adults being MCD (26.6%) in their biopsy studies in Korea. Also in India, a study conducted to identify the spectrum of renal diseases in Indian adults (Agarwal SK, Dash) [6] revealed that among the nephrotic syndrome cases primary glomerulonephritides was seen in 58.5% cases and of which minimal change disease (MCD) was the commonest cause in 38% of cases

Among 20 patients of focal segmental glomerulosclerosis (FSGS), 13 were males and 7 were females. Maximum numbers of patients were in the 18-27 year age group. Studies by Dragovic *et al*. [7] and Braden GL *et al.* [8] found that FSGS was increasing in incidence in both white as well as black patients. In the current study, out of 20 cases of FSGS, 14 were males (70%). Male to female ratio among adult nephrotics with FSGS was 2.3: 10 patients of membranous glomerulonephritis (MGN) were present, and among them 8 were males and 2 were females. Majority of patients were in 18-27 year age group. In the current study, MGN was diagnosed among 10 cases out of total 54 contributing to 18.5%. Male to female ratio was 4:1 with males contributing to 80% of cases. In the current study, the mean age group among the MGN patients was 36.5 $\pm$ 1.4 years (range of 25 – 54 years). Naini EA. *et al.* [3] analyzing the biopsy results among adult glomerulonephritides in Tehran from 1998-2001 and Jalalah SM [9] in his study of primary glomerular diseases in adults of Saudi Arabia, found that MGN was the most common GN contributing to 23.6% and 25.7% cases respectively. Studies by Riabov *et al.* [10] (1986), Medawar *et al.* [11] (1990), Anuradha *et al.* [12] (1997) showed the incidence of MGN among adult cases being 25%, 28% and 30% respectively. In the current study, only 10 out of 54 had MGN i.e., contributing to about only 18.5% of the total cases. This is in contrast to the above studies. This has been supported by the study by Braden *et al.* [13] where there was a decrease in relative frequency of MN 38.3% during 1975 to 1979 to 14.5 % during 1990 to 1994.A Total of 7 patients of Membranoproliferative glomerulonephritis (MPGN) were found, and 4 among them were males and 3 were females. Majority of patients were in 18-27 year age group. In the current study, MPGN was diagnosed among 7 cases out of total 54 with the incidence being 13%. Among the 7 cases, 4 were males contributing to 57% of total MPGN cases with the Male to female ratio being 4:3. The mean age at presentation was 24.1 $\pm$ 13.4 years (range was 18-37 years).MPGN accounts for approximately 10% of cases with adult nephrotic syndrome. Riabov *et al*. (1986) [10] found out in his study that MPGN contributed about 31 % of cases of adult nephrotic syndrome. The incidence of MPGN has been on the declining trend. It has been shown from the studies of Medawar *et al.* (1990) [11] and Anuradha *et al.* (1997) [12] where MPGN found around 17% and 10% respectively. Mitwalli *et al.* [14], reported that the incidence of MPGN among primary glomerular diseases in Saudi Arabia was 1.4%. Similarly Korbet *et al*. [15], in their study reported that the incidence was 2%.Out of 5 patients of lupus nephritis, 1 was male and 4 were females. Majority of patients were in 18-27 year age group. Naini *et al*. [3] have found that Lupus nephritis contributed around 10.6% of cases of adult glomerulonephritides. Studies in Saudi Arabia by Mitwalli *et al.* [14, 16] have shown that amongst the secondary glomerular diseases, Lupus nephritis was the most prevalent. In the present study, 5 cases were diagnosed as Lupus nephritis on renal biopsy contributing to about 9.2%. Among 5 cases, only one was a male contributing to 20% of the total and the male to female ratio was 1:4 with the most common age group being 18 – 27 years at the time of presentation. The mean age at the time of presentation was 27 $\pm$ 17 years (range 18-42). Renal Amyloidosis was the outcome in 8 out of 54 cases, and out of those 8 cases, 5 were males and 3 were females. Majority of patients were in 18-27 year age group. The kidneys are the most organ to be involved in AL amyloid and most patients with AL amyloid eventually have amyloid in their kidneys as shown on autopsy [17]. The incidence of AL amyloid is about 8 per million annually.. Males are affected twice as often as women [18]. In the present study, 8 out of 54 cases were diagnosed to be having renal Amyloidosis contributing to about 14.8% of the adult cases of nephrotic syndrome biopsied. Males contributed to 75% (6 out of 8) with male to female ratio being 3:1. In the current study, we had four patients > 40 and four patients <40 years respectively. The mean age was 40.2 $\pm$ 31.8 years (range was 20-65 years.) One patient had evidence of pulmonary tuberculosis. Out of 54 patients, only one had IgA nephropathy and the patient was a female of the age group 28-37 years. In the present study, out of 54 cases 1 case was diagnosed as Ig a nephropathy on renal biopsy contributing to about 1.8%. So, the findings could not be compared with other relevant studies this correlates well with the gender wise incidence among adult nephrotic where incidence among males is high except in Lupus nephritis where female predominance is seen. Our present study also showed similar male: female ratio except in Lupus nephritis where female patients outnumbered males. In the present study, 96.3% of patients had pedal edema which was the commonest mode of presentation. Hypertension was found in 33% of cases. Present study revealed that, 70% patients had anemia, 63% cases had hypercholesterolemia, 85.2% cases had hypoalbuminemia, 27.8% cases had increased levels of serum creatinine and 37% cases had microscopic hematuria at the time of presentation.

Conclusion

The clinical and biochemical profile of the total 54 patients were studied and the lesion responsible for the nephrotic range proteinuria was found out. The findings and conclusion obtained from the study is as follows:

Among the total 54 cases studied, the most common lesion (37%) responsible for the nephrotic syndrome in adults was Focal Segmental Glomerulosclerosis (FSGS) 2ND common lesion was Membranous Glomerulonephritis (MGN) 18.5%,3rd most common lesion in our study was Renal Amyloidosis which constituted 14.8% of the total. Membranoproliferative Glomerulonephritis (MPGN) was found in 13% of the cases. Lupus Nephritis (LN) in 9.3 % cases. Minimal Change Disease (MCD) in 5.5% of the cases with adult nephrotic syndrome. Only one among the 54 cases studied came out to be IgA Nephropathy (IgAN) which contributed to 1.8%.There are some limitations in this study. Because this is a renal - biopsy based study and not all patients with glomerulonephritis undergo renal biopsy, our results potentially could underestimate the true number of patients with glomerular diseases in the population. Also, the sample size being small, the results cannot be generalized to the whole population. Despite these limitations, our study confirms that the incidence of FSGS is growing overall and stresses the need of renal biopsy in the diagnosis of glomerulonephritides.

References

1. Cohen Eric P. Nephrotic Syndrome'; <http:// emedicine. medscape.com /article/244631-overview>
2. 160. Javed Iqbal Kazi, Muhammed Mubarak, Ejaz Ahmed *et al*.' Spectrum of glomerulonephritides in adults with nephrotic syndrome in Pakistan'. Clinical and Experimental Nephrology, 13(1), 38-43.
3. Naini AE, Harandi AA, Ossareh S *et al*. 'Prevalence and Clinical Findings of Biopsy-Proven Glomerulonephritidis in Iran'. Saudi journal of kidney diseases and transplantation. 2007; 4(18):556-564.
4. JS Cameron, R Turner, CS OGG *et al*. 'Adults with "minimal change" glomerular lesions'. Quarterly J of Medicine New series. 1974; 171:461-88.
5. Choi IJ, Jeong HJ, Han DS *et al*. 'An analysis of 4,514 cases of renal biopsy in Korea'. Yonsei Med J. 2001; 42:247-254.
6. Agarwal SK, Dash SC. 'Spectrum of renal diseases in Indian adults'. J Assoc Physicians India. 2000; 48:594-600.
7. Dragovic D, Rosenstock JL, Wahl SJ *et al*. 'Increasing incidence of focal segmental glome¬rulosclerosis and an examination of demo-graphic patterns'. Clin Nephrol 2005; 63:1-7
8. Braden GL, Mulhern JG, O'Shea MH *et al*. 'Changing incidence of glomerular diseases in adults'. Am J Kidney Dis. 2000; 35:878-883
9. Jalalah SM. 'Patterns of primary glomerular diseases among adults in the western region of Saudi Arabia'. Saudi J Kidney Dis Transpl. 2009; 20:295-9.
10. Riabov SI, Plotkin Via, Klemina IK. 'Nephrotic syndrome in primary glomerulonephritis'. Ter – Arkh 1986; 58:65-71.
11. Medawar W, Green A, Campbell E, Carmody M *et al*. 'Clinical and histopathologic findings in adults with nephrotic syndrome'. Ir J med Sci. 1990; 159(5):137-40.
12. Anuradha S, Rizvi SNA, Malhotra V. 'Ultrastructural study of glomerular lesions in the adult nephritic syndrome'. Ind J Nephrol. 1997; 7:1-5.
13. Braden GL, Mulhern JG, O'Shea MH *et al*. 'Changing incidence of glomerular diseases in adults'. Am J Kidney Dis. 2000; 35:878-883.
14. Mitwalli AH, Al-Wakeel JS, Al Mohaya SS *et al*. 'Pattern of glomerular disease in Saudi Arabia'. Am J Kidney Dis. 1996; 27:797-802.
15. Korbet SM, Genchi RM, Borok RZ *et al*. 'The racial prevalence of glomerular lesions in nephrotic adults.' Am J Kidney Dis. 1996; 27:647-51
16. Mitwalli AH, Al Wakeel J, Abu-Aisha H *et al*. 'Prevalence of Glomerular Diseases: King Khalid University Hospital, Saudi Arabia'. Saudi J Kidney Dis Transpl. 2000; 11:442-8.
17. Kyle RA, Gertz MA. 'Primary systemic Amyloidosis: Clinical and laboratory features in474 cases'. Semin Hematol 1995; 32:45-59.
18. Schwimmer JA, Joseph RE, Appel GB. 'Amyloid, Fibrillary and the glomerular deposition diseases. In Brady HR, Wilcox CS (eds):Therapy in Nephrology and Hypertension: A companion to Brenner and Rector's' The Kidney, 2nd ed. Philadelphia, WB Saunders, 2003, 253-261
19. Fauci, Braunwald, Kasper, Hauser, Longo, Jameson, Loscalzo. 'Cardinal manifestation and presentation of diseases In: Harrison's principles of internal medicine; 17th edition section 10-Hematologic alterations'; Chapter 58, I(2), 355-363
20. Fauci, Braunwald, Kasper, Hauser, Longo, Jameson, Loscalzo. 'Disorders of the cardiovascular system; section 5 :vascular disease; Chapter 241 :Hypertensive vascular disease' In: Harrison's principle of Internal Medicine;17th edition; Table 241-1 Blood pressure classification, 2(9), 1549-1562
21. Akhtar SZ, Akbar Ali. 'Histologacal pattern of nephrotic syndrome in elderly patients'; J Ayub Med Coll Abbottabad, 2008, 20(4).
22. Khanna UB, Nerurkar SV, Almeida AF, *et al*. 'Study of hyperlipidemia in adults with nephrotic syndrome'. 1985; 31(3):140-5.
23. Tester Ashavaid F. Index of normal values' In: API textbook of medicine 8th edition Miscellaneous; chapter11, 2(27), 1603-1611.
24. Melanie Kim S, Howard L. 'Urinanalysis' In: Corwin Diseases of the kidney and urinary tract; Lippincott Williams & Wilkins ;Robert W.Schrier,MD;7th edition; section II-Clinical Evaluation : chapter 10, I, 317-331
25. Acharya VN. 'Nephrology' In: API textbook of medicine 8th edition chapter12, 1, 717-781