RESULTS

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The results of the study were tabulated and statistically analyzed. There were 4 groups of patients each group consisted of 15 candidates.

Group I: Patient with NS as their first presentation before institution of therapy (FPG).

Group II: Patients with NS in remission after 4 weeks of prednisone therapy (RIG).

Group III: Patients with NS in relapse and before reinstitution of therapy (RAG).

Group IV: Healthy children matching the same age and sex as a control group.

I- Analysis of clinical and personal data:

(1) There were no statistical significant difference among the four groups as regard their ***age*** (mean ages (4.8, 4.6, 4.7, 4.3 yr respectively) F= 0-276) (*Table I*)

(2) The ***sex*** distribution among the four groups didn't show any statistical significant difference. (F= 0.902) (*Table I*)

(3) There were no statistical significant difference among the four groups as regard their mean ***heights*** (103, 101, 99 and 105 respectively) (F= 106995) (*Table I*)

(4) The mean ***weight*** of the FPG and RAG were significantly higher than the RIG and control groups (21.7, 18.1, 22.7 and 16.5 kg respectively) (F=15.8156) (*Table I*)

(5) The ***mean systolic blood pressure*** was significantly higher in the FPG and RAG compared to RIG and control groups (101, 93, 103 and

90 mmHg respectively) (F= 3.014) while the ***mean diastolic blood pressure*** was significantly high in the FPG and RAG compared to controls only (68.6, 64.6, 70.6 and 58.6 mmHg respectively) (F= 4.739) (*Table II*)

(6) The ***edema*** was present in 100% of cases of FPG and RAG and were totally absent in RIG and controls. The ***ascites*** and ***pleural effusion*** were present in 46.7% and 33.3% of the FPG cases; and 33.3% and 26.7% of the RAG cases respectively. (*Table II*).

II- Analysis of laboratory findings:

(1) The presence of ***urinary red cells/HPF*** was significantly higher in the FPG and RAG compared to RIG and control groups (4.8, 2.8, 4.8 and 2.7 cells/HPF respectively) (F= 3.138). ***Urinary white blood cells count*** showed that their mean number was statistically significantly higher in the RAG compared to FPG (2.6, 2.4, 5 and 2.8 cells/HPF respectively) (F= 6.068). The ***urinary casts***, were statistically significantly higher in the FPG and RAG compared to the RIG and control groups (20, 0, 33 and 0% of cases) (X^2 = 10.38). The ***Lipoid casts***, were present in 20% and 33.3% of the FPG and RAG respectively. (*Table III*)

(2) The ***24 hr urinary protein excretion*** was significantly higher in the FPG and RAG compared to the RIG and control groups (4.4, 0.13, 4.3 and 0.09 gm respectively) (F=206.5) (*Table III*)

(3) The ***mean total serum protein concentration*** was significantly lowers in the FPG, RIG and RAG groups compared to the controls, while the FPG and RIG groups were significantly higher than the RAG groups (4.3, 5.2, 3.4 and 6.65 gm/dl respectively) (F=77.2) while the ***mean serum albumin concentration*** was significantly lower in all three groups compared to controls, but still lower in the

FPG and RAG compared to the RIG. (1.4, 3.4, 1.4 and 4.5 gm/dl respectively) (F = 282.9) (*Table IV*)

(4) The ***mean blood urea*** showed that the FPG were significantly lower than the controls (18, 19.5, 21.2, and 22.2 mg/dl respectively) (F= 4.016) (*Table IV*).

(5) The ***mean serum cholesterol*** was significantly higher in all three groups compared to controls, while the RAG was significantly higher than the FPG and RIG (435, 328, 549 and 139 mg/dl respectively) (*Table IV*)

(6) The ***mean serum creatinine*** did not show significant differences among the four groups (0.4, 0.35, 0.42 and 0.35 mg/dl respectively) (F= 1.632) (*Table IV*)

(7) The ***mean hemoglobin concentration*** was significantly higher in the FPG and RAG compared to the RIG and control groups (14.3, 10.3, 14.3 and 11.5 gm/dl respectively) (F= 24.394) while the ***total lymphocytic count*** showed that the FPG and RAG were significantly lower than the RIG and control group (3.4, 4.2, 2.9 and 4.5×10^3 cells/mm^3 respectively) (F= 17.102) (*Table V*).

(8) The ***percent of CD4 cells*** was significantly higher in the FPG and RAG compared to the RIG, while all three groups were significantly lower than the controls (22.6, 10.23, 22.1 and 34.5% respectively) (F= 25.1) (*Table VI*) **Fig (1)**.

(9) The ***percent of $CD8^+$ cells*** showed no statistical significant difference among the four groups (15.4, 14.0, 13.4 and 17.4% respectively) (F= 0.282) (*Table VI*) **Fig (2)**.

(10) The ***percent of $CD25^+$ cells*** (IL-2 receptors) was significantly high in the FPG and RAG compared the RIG and control group (1.207, 0.73, 2.0 and 0.34% respectively) (F= 7.913) (*Table VII*) **Fig (3)**

(11) The ***mean serum IL-2*** was significantly lower in all three groups compared to controls but significantly higher in the RIG compared to the FPG and RAG (0.21, 0.46, 0.18 and 0.69 IU/ml respectively) (F= 22.03) (*Table VIII*) **Fig (4)**.

III- Interleukin-2/creatinine (serum) ratio:

There was significant lower IL-2/creatinine (serum) ratio in the FPG and RAG compared to RIG and control values ($\mathbf{X}^2$ = 29.95 (*Table VIII*).

IV- Correlation studies:

The $CD4^+$, $CD8^+$, $CD25^+$ percent from total lymphocytic count as well as serum IL-2 level were correlated to all studied parameters and showed :-

(1) **in the FPG** (*Table IX*)

(a) ***$CD4^+$ %*** did not show any significant correlation

(b) ***$CD8^+$ %*** showed a significant ***positive*** correlation with the total serum protein and total lymphocyte count.

(c) ***$CD25^+$ %*** showed a significant ***negative*** correlation with the blood hemoglobin concentration.

(d) ***The serum IL-2*** showed a significant ***negative*** correlation with the blood hemoglobin concentration.

(2) **In the RIG :** (*Table X*)

(a) ***$CD4^+$ %*** did not show any significant correlation.

(b) ***$CD8^+$ %*** did not show any significant correlation.

(c) ***$CD25^+$ %*** did not show any significant correlation.

(d) ***Serum IL-2*** level did not show any significant correlation.

(3) **In the RAG** (*Table XI*)

(a) ***CD4*$^+$ %** did not show any significant correlation.

(b) ***CD8*$^+$ %** did not show any significant correlation.

(c) ***CD25*$^+$ %** did not show any significant correlation.

(d) ***Serum IL-2*** level did not show any significant correlation.

(4) **In the Control group** (*Table XII*)

(a) ***CD4*$^+$ %** showed a significant ***negative*** correlation with the systolic B.P. and proteinuria.

(b) ***CD8*$^+$ %** did not show any significant correlation.

(c) ***CD25*$^+$ %** did not show any significant correlation.

(d) ***Serum IL-2*** level did not show any significant correlation.

V- Multiple logistic regression model for prediction:

By doing a multiple logistic regression model for prediction, which included all the studied parameters, it was found that only serum IL-2 had the possibility of predicting the FPG (93.3%) from controls (80%) with a total prediction of 86.67%; and predicting relapse (86.2%) from controls (100%) with a total prediction of 93.3% (*Table XII*).

Table (I): Personal characteristics of the studied groups

	Nephrotic groups			Control (n = 15)	F test
	First presentation (n = 15)	Remission " (n = 15)	Relapse (n = 15)		
Age (years)					
- Min – Max	3.5 - 7.0	3.5 - 7.0	3.5 - 6.0	3.0 - 7.0	0.276
- Mean ± SD	4.8±1.24	4.63±1.17	4.67±0.82	4.43±1.19	
Sex					
- Male	10 (66.7%)	10 (66.7%)	11 (73.3%)	10 (66.7%)	
- Female	5 (33.3%)	5 (33.3%)	4 (26.7%)	5 (33.3%)	0.902
Weight (kg)					
- Min – Max	17.0 - 27.0	13.0 - 23.0	18.0 - 27.0	13 - 20	15.8156*
- Mean ± SD	21.67±3.60#^	18.13±2.67^	22.73±2.87#	16.47 ± 2.13	
Height					
- Min – Max	93 – 117	90 – 122	90 – 107	92 – 122	1.6995
- Mean ± SD	103.53±7.615	101.73±8.63	99.07±6.19	105.33 ± 9.03	

" : After 4 weeks of stopping oral prednisone therapy.
* No pair wise significance

Table (II): Clinical characteristics of the studied groups.

	Nephrotic groups			Control (n = 15)	F test (X^2)
	First presentation (n = 15)	Remission" (n = 15)	Relapse (n = 15)		
Systolic BP (mm Hg) Min – Max Mean ± SD	90 – 150 101.67 ± 67.00	80 –100 93.33±7.24	80 – 140 103.33±19.88	80 – 100 90.0±6.55	3.014**
Diastolic BP (mm Hg) Min – Max Mean ± SD	60 – 100 68.67±12.32#	60 – 70 64.67±5.16	50 – 90 70.67±11.63#	50 – 70 58.67±6.40	4.739*
Edema No Yes	- 15 (100.0%)	15 (100.0%) -	- 15 (100.0%)	- -	-
Ascites No Yes	8 (53.3%) 7 (46.7%)	15 (100%)	10 (66.7%) 5 (33.3%)	-	(0.022)
Pleural effusion No Yes	10 (66.7%) 5 (33.3%)	15 (100%)	11 (73.3%) 5 (26.7%)	-	(0.078)

* Significant, $P < 0.05$.
** No pair wise significance.
# Significant from the control group.
@ Significant from the relapse group.
^ Significant from the remission group.
( ) Comparing the nephrotic group categories.
" After 4 weeks of stopping oral Prednisone therapy.

Table (III): Urinary findings of the studied groups.

	Nephrotic groups			Control (n = 15)	F test (X^2)
	First presentation (n = 15)	Remission" (n = 15)	Relapse (n = 15)		
Urinary RBCs / HPF Min – Max Mean ± SD	12 – 15 4.80±3.45	1 – 4 2.80±1.01	1 – 12 4.87±3.62	1 – 5 2.73±1.10	3.138**
Urinary WBCs / HPF Min – Max Mean ± SD	1 – 4 2.60±0.99@	1 – 4 2.40±1.24@	2 – 12 5.07±3.37#	1 – 5 2.87±1.13	6.068*
Lipoid casts / HPF No Yes	12 (80%) 3 (20%)	15 (100%)	10 (66.7%) 5 (33.3%)	-	(0.501) -
Protein (g / 24 hours) Min – Max Mean ± SD	3 – 7 4.47±1.25#^	0.09 – 0.15 0.13±0.02	3.30 – 5 4.35±0.49#^	0.03 – 0.15 0.09+0.04	206.5*

* Significant, $P < 0.05$.
** No pair wise significance.
# Significant from the control group.
@ Significant from the relapse group.
^ Significant from the remission group.
( ) Comparing the nephrotic group categories.
" After 4 weeks of stopping oral Prednisone therapy.

Table (V): Hemoglobin level and total lymphocytic count of the studied groups.

	Nephrotic groups			Control (n = 15)	F test
	First presentation (n = 15)	Remission " (n = 15)	Relapse (n = 15)		
Hemoglobin (g/dl)					
Min – Max	11 – 16	8 – 12	10 – 15	10 – 14	
Mean ± SD	14.33±1.50#^	10.30±1.28@	14.33±2.26#	11.50±1.13	24.394*
Lymphocytes (10^3cells /mm^3)					
Min – Max	2.70 – 5	3.30 – 5	2 – 4.05	3.30 – 6	17.102*
Mean ± SD	3.40±0.68#^	4.27±0.61@	2.90±0.70#	4.52±0.81	

* Significant, P < 0.05.
** No pair wise significance.
# Significant from the control group.
@ Significant from the relapse group.
^ Significant from the remission group.
" After 4 weeks of stopping oral Prednisone therapy.

Table (VI): T helper cells ($CD4^+$) and cytotoxic cells ($CD8^+$) of the studied groups.

	Nephrotic groups			Control (n = 15)	F test
	First presentation (n = 15)	Remission " (n = 15)	Relapse (n = 15)		
$CD4^+\%^<$					
Min – Max	16 – 44	2 – 17	15 – 37	21 – 52	25.10*
Mean ± SD	22.67±8.57#^	10.23±4.85#@	22.13±5.94#	34.93±10.26	
$CD8^+\%^<$					
Min – Max	9.60 – 28	7 – 28	9 – 25	9 – 23	0.282
Mean ± SD	15.44±5.45	14.07±6.04	13.90±4.65	14.75±4.21	

* Significant, $P < 0.05$.
** No pair wise significance.
# Significant from the control group.
@ Significant from the relapse group.
^ Significant from the remission group.
$^<$ Percent of total lymphocytes
" After 4 weeks of stopping oral Prednisone therapy.

Table (VIII): Ratios of IL-2/creatinine and IL-2 receptor ($CD25^+$ %)/creatinine of the studied groups.

	Nephrotic groups			Control (n = 15)	• X^2
	First presentation (n = 15)	Remission (n = 15)	Relapse (n = 15)		
$CD25^+$ / creatinine ratio					
Min – Max	0.83 – 30.00	1.00-5.00	1.17-10.00	0.00-2.50	19.33*
Mean ± SD	4.04±7.26	2.24+1.16	4.90+2.89	1.22+0.80	
IL-2 / creatinine ratio					
Min – Max	0.00-4.50	0.60-4.00	0.00-1.50	0.83-5.00	29.95*
Mean ± SD	0.74+1.15	1.50+0.90	0.50+0.45	2.28+1.14	

* Significant, $P < 0.05$.

• Kruskal Wallis 1-Way Anova

Table (IX): Correlation between $CD4^+$, $CD8^+$, $CD25^+$% of total lymphocytes and serum IL- 2 level and other studied parameters in the first presentation group.

	$CD4^+$	$CD8^+$	$CD25^+$	IL-2
Systolic blood pressure	-.0805	0.2028	-.2788	-.1417
Diastolic blood pressure	-.1907	0.3382	-.2831	-.2542
Protein in urine	0.0357	0.4726	0.3088	0.2428
Total serum protein	-.3384	0.5328*	0.3382	0.4617
Albumin	-.0619	-.0423	0.3192	0.4144
Blood urea	-.0387	-.4288	0.3460	0.3010
Serum creatinine	-.1011	0.2460	-.3169	-.6538*
Cholesterol	0.3514	-.2337	-.0617	0.1689
Hemoglobin	0.0929	-.1411	-.5267*	-.5374*
Lymphocytes	-.1273	0.5965*	-.1280	-.2655

* Significant, $P< 0.05$.

Table (X): Correlation between $CD4^+$, $CD8^+$, $CD25^+$ % of total lymphocytes and serum IL-2 level and other studied parameters in the Remission group.

	$CD4^+$	$CD8^+$	$CD25^+$	IL-2
Systolic blood pressure	0.1288	0.0926	-.3525	-.3670
Diastolic blood pressure	0.0076	-.1710	0.0454	0.0588
Protein in urine	-.2215	-.4233	-.1717	0.1969
Total serum protein	-.3644	-.4173	-.4472	0.2034
Albumin	0.0581	-.1458	-.4029	0.1008
Blood urea	-.0956	0.0411	-.5030	0.3199
Serum creatinine	0.3091	-.0944	0.2368	-.0788
Cholesterol	0.0120	-.1816	0.0075	0.2087
Haemoglobin	0.2256	0.0111	-.5046	-.0059
Lymphocytes	0.0691	-.1059	-.1921	0.1741

Table (XI): Correlation between $CD4^+$, $CD8^+$, $CD25^+$ % of total lymphocytes and serum IL-2 level and other studied parameters in the relapse nephrotic group.

	$CD4^+$	$CD8^+$	$CD25^+$	IL-2
Systolic blood pressure	0.1896	0.1044	0.2747	0.3784
Diastolic blood pressure	0.2055	-.0251	0.2284	0.1811
Protein in urine	0.0146	0.3442	-.1596	0.4581
Total serum protein	-.1642	-.3656	-.1483	-.3386
Albumin	0.0268	0.2878	-.0332	0.4358
Blood urea	-.0163	-.2756	0.0427	0.2188
Serum creatinine	0.1330	-.1596	0.3860	-.2051
Cholesterol	-.1155	-.3133	-.1600	0.2054
Haemoglobin	0.1030	0.1294	0.3267	0.2222
Lymphocytes	-.1481	-.0109	0.1655	-.3463

Table (XII): Correlation between $CD4^+$, $CD8^+$, $CD25^+$ % of total lymphocytes and serum IL-2 level and other studied parameters in the Control group.

	$CD4^+$	$CD8^+$	$CD25^+$	IL-2
Systolic blood pressure	-.5212*	-.5909*	-.3995	-.2390
Diastolic blood pressure	-.0450	-.2252	-.0136	-.2021
Protein in urine	-0.6682*	-0.1165	-0.10	-0.0106
Total serum protein	-.0519	-.0766	0.2079	0.3089
Albumin	-.1774	-.1165	-.2912	-.2817
Blood urea	0.3343	0.0708	-.0144	-.1018
Serum creatinine	0.0073	-.1636	-.4893	0.0993
Cholesterol	0.1285	0.2539	0.1552	0.1048
Haemoglobin	0.8045	0.2342	0.2306	-.1518
Lymphocytes	0.1799	0.0944	-.0332	-.0762

* Significant, $P < 0.05$.

Table XIII: Multiple logistic regression models for prediction.

	B	Sig.	R	Exp (B)
First attack				
IL-2	-8.44	0.006	-.371	0.0002
Constant	3.50	0.006		
Relapse				
IL-2	-109.956	0.909	0.000	0.000
Constant	43.577	0.909		

IL-2 could predict.

First presentation

Prediction of control 80.00%
Prediction of first presentation 93.30%
Total prediction 86.67%

Prediction of Relapse

Prediction of control 100.0%
Prediction of relapse 86.70%
Total prediction 93.30%

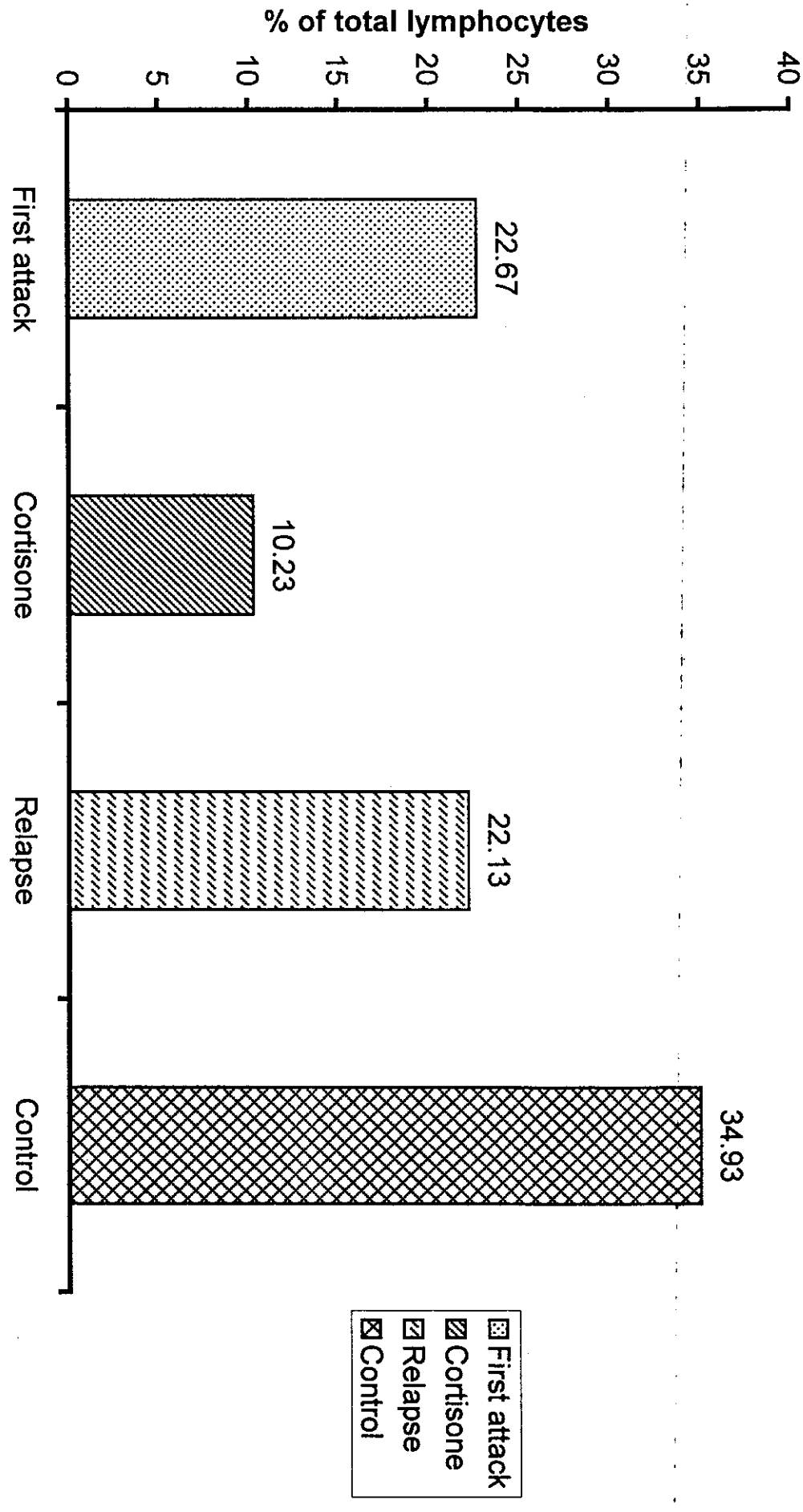


Fig (1): T-helper cells (CD4+%) of nephrotic and control groups

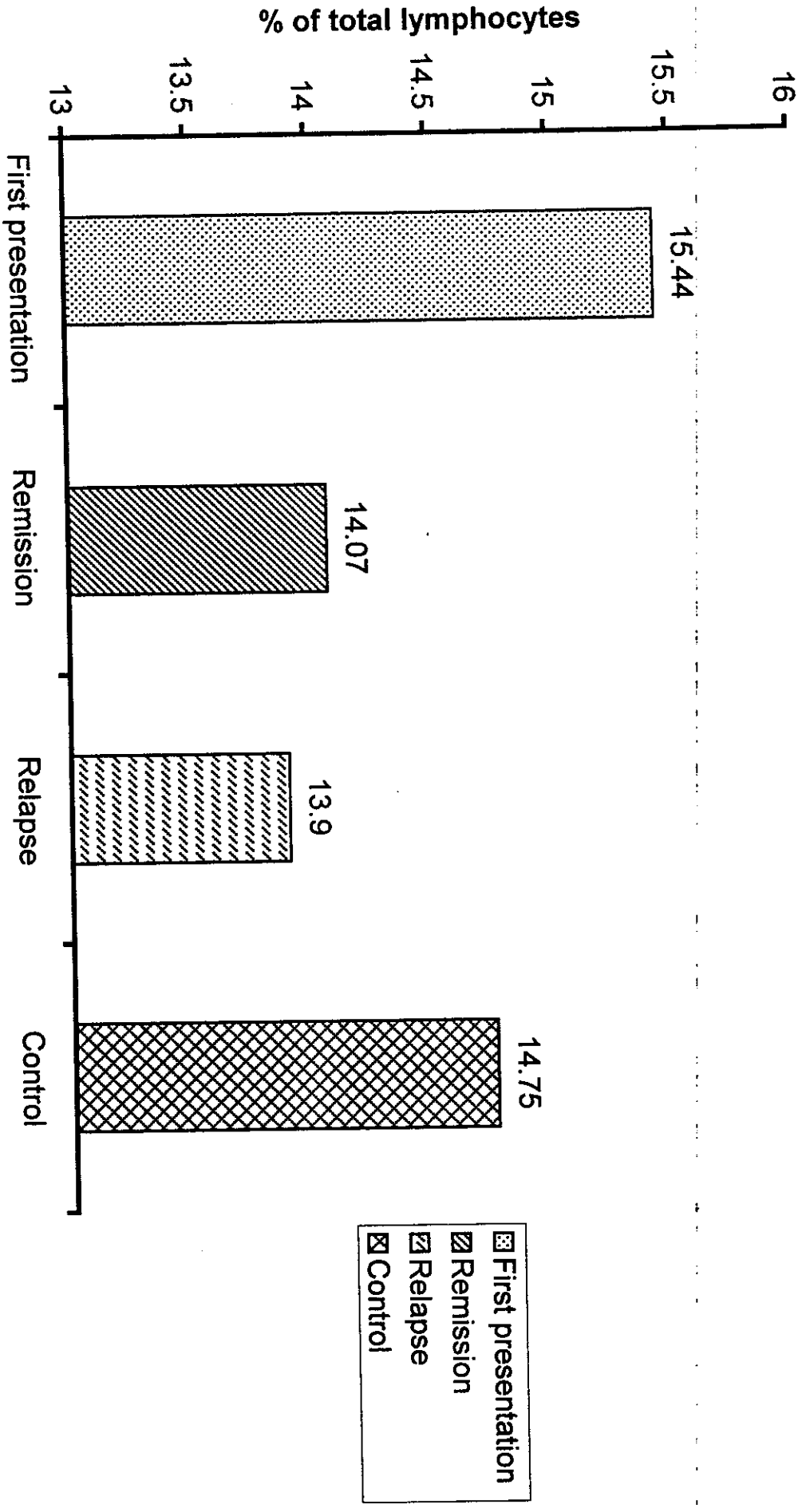
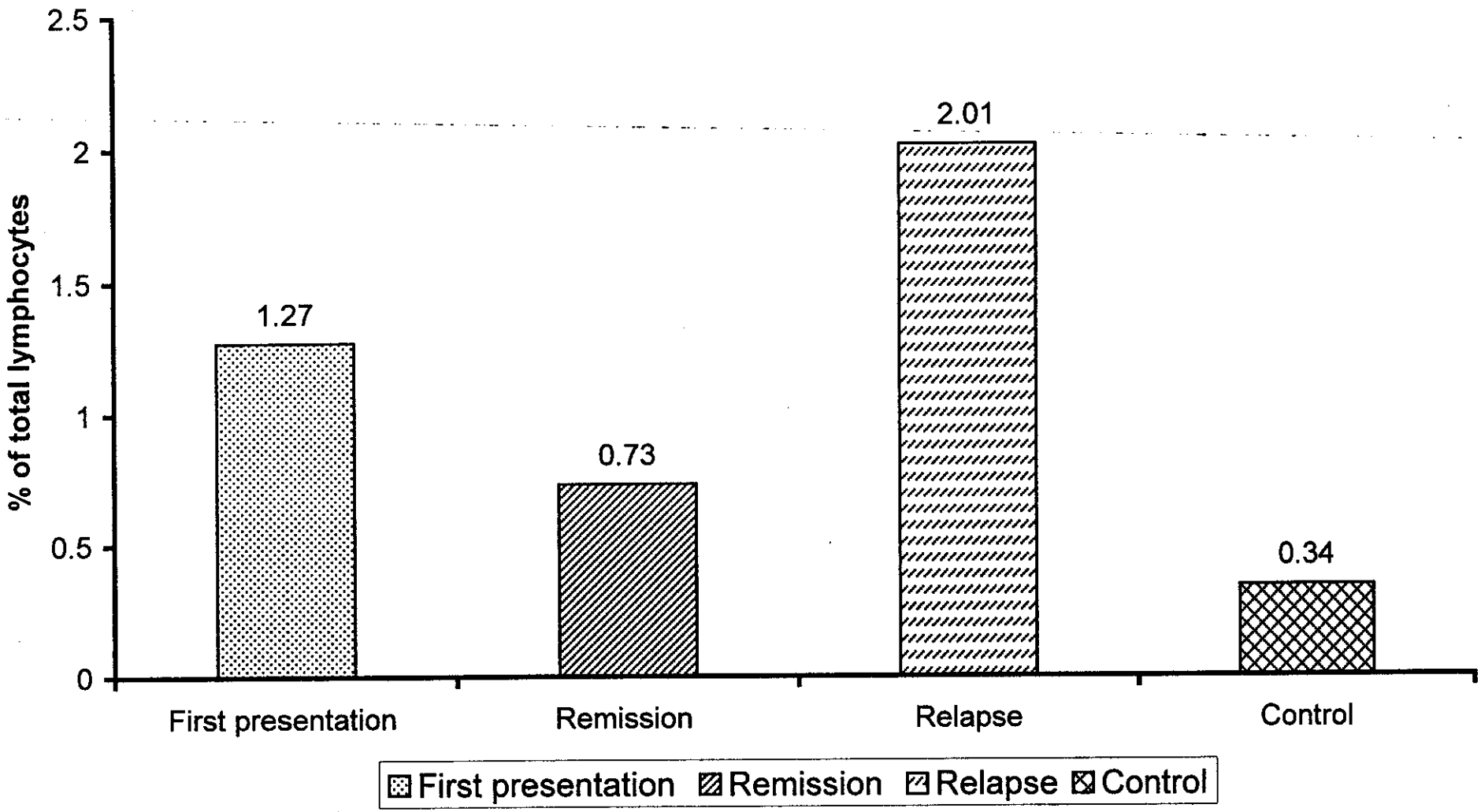


Fig (2): T-cytotoxic cells (CD8%) of nephrotic and control groups

Fig (3): IL-2 receptor (CD25%) of nephrotic and control groups



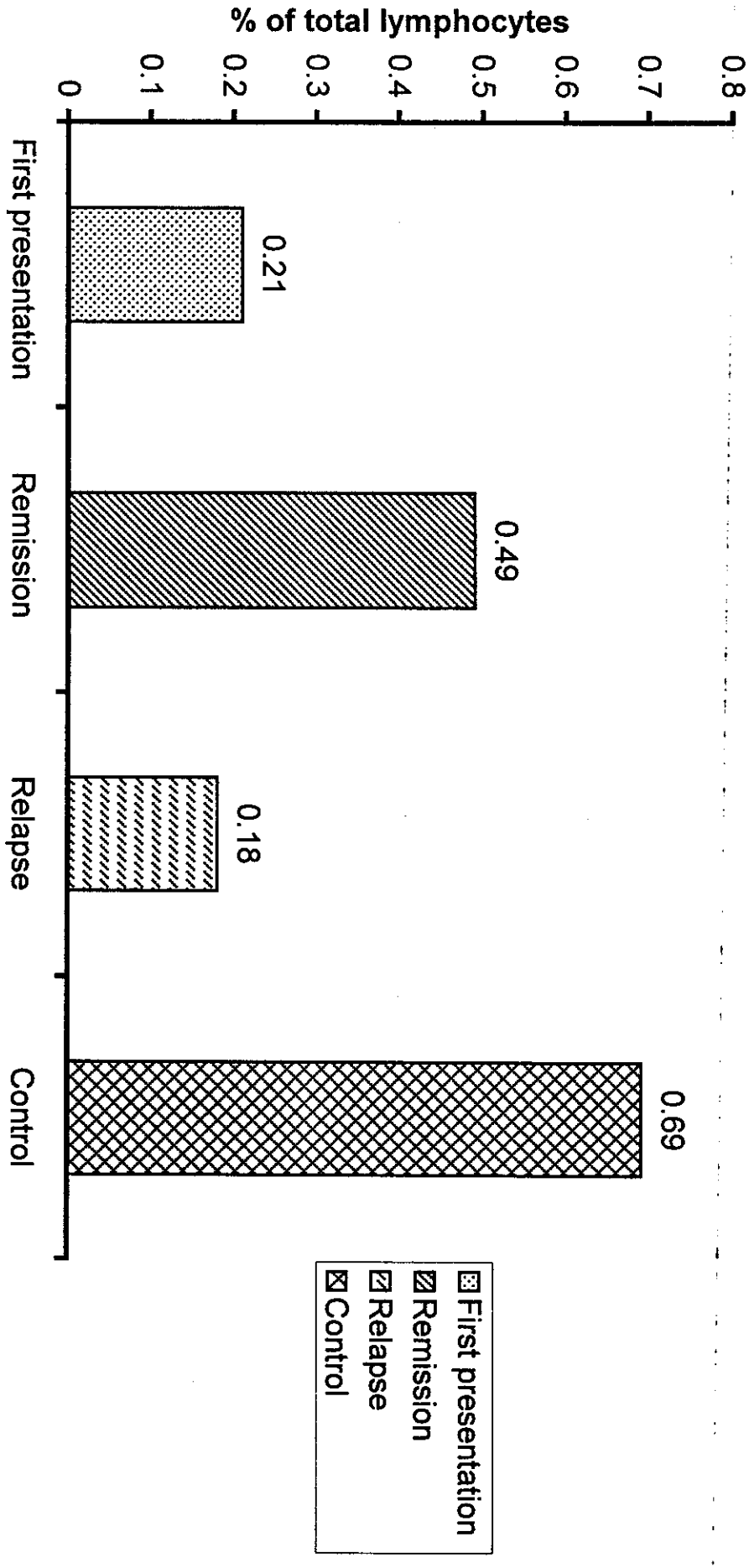


Fig (4): IL-2 level of nephrotic and control groups