# RESULTS

This study included 30 patients with SLE. They were all females (100%), whose ages ranged between 17-45 years (**mean ±SD** 27.67±8.24 years). Their disease duration ranged between 6 months-12 years **(mean ± SD** 4.2 ± 2.98 years).

Twenty apparently healthy volunteers were carefully chosen as a control group. They were all females (100%), whose ages ranged between 18-45 (**mean ±SD** 29.9 ± 9.54) years.

Patients and controls were matched for age ***(P> 0.05)*** and sex ***(P> 0.05 ).***

## SLE patients:

Thirty patients fulfilling at least four of the updated ACR revised criteria for the classification of systemic lupus erythematosus (SLE) ***(Hochberg, 1997)*** were included in this study.

They were divided into two groups: ***Figure (1)***

**Group I:** Included 6 female SLE patients (20%), who had never shown any major renal manifestation attributable to SLE . Their ages ranged between 19-35 **(mean ± SD** 29.67 ± 8.262) years. Their disease duration ranged between 6 months-4 years (**mean ± SD** 2 ± 1.8 years).

**Group II:** Included 24 female SLE patients with renal disease (80%), based on past or present evidence of major renal manifestation attributable to SLE and/or the results of the renal biopsy. Their ages ranged between 17-45years (**mean ± SD** 28.56± 8.742) years. Their disease duration ranged between 1-12 years (**mean ± SD** 4.75 ± 3.07 years).

**This group was subdivided into 2 groups:**

**Group II A:** included 18 female patients (75%) with active lupus nephritis (rSLEDAI score ≥4). Their ages ranged between 19-45years ( **mean ± SD** 29.89 ± 7.753) years. Their disease duration ranged between 2 -12 years (**mean ± SD** 5.4 ± 3.2 years).

**Group II B:** included 6 female patients (25%) with non active renal disease (rSLEDAI score 0). Their ages ranged between 17-22 years (**mean ± SD** 19 ± 2.366) years. Their disease duration ranged between 1-4 years (**mean ± SD** 2.7 ± 1.5 years).

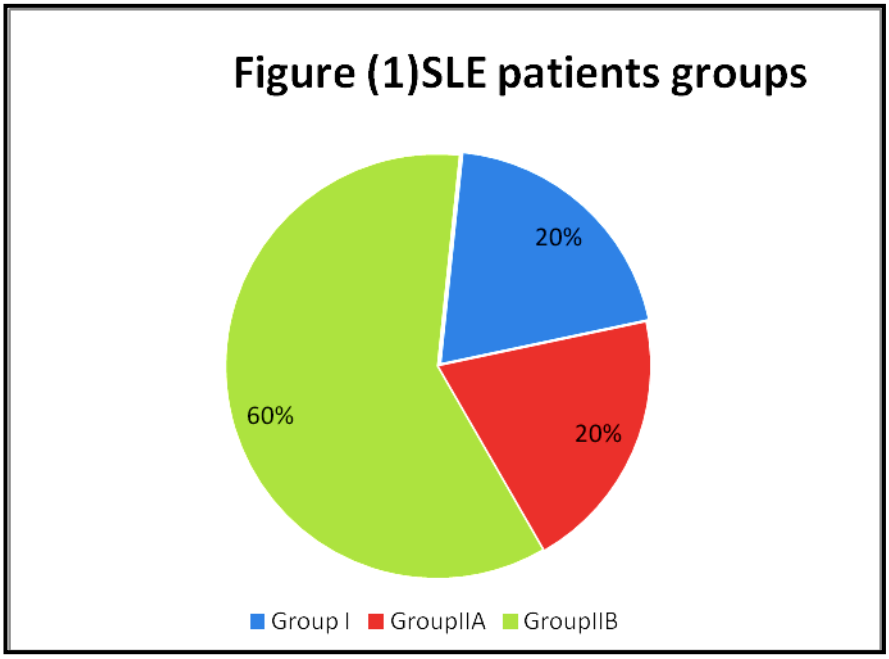


**Table (1)**: Comparison of age between the SLE patients and the control groups.

| Group | SLE patients | | Controls | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| **Age/ years** | 17 | 45 | 18 | 45 |
| **Number** | 30 | | 20 | |
| **Mean** | 27.67 | | 29.9 | |
| **± SD** | 8.24 | | 9.54 | |
| **t** | 0.88 | | | |
| **P** | >0.05 | | | |

**P >0.05 =** Insignificant

There was non statistically significance difference in the mean age and sex between the SLE patients and the control group ***(P > 0.05), Figure ( 2).***

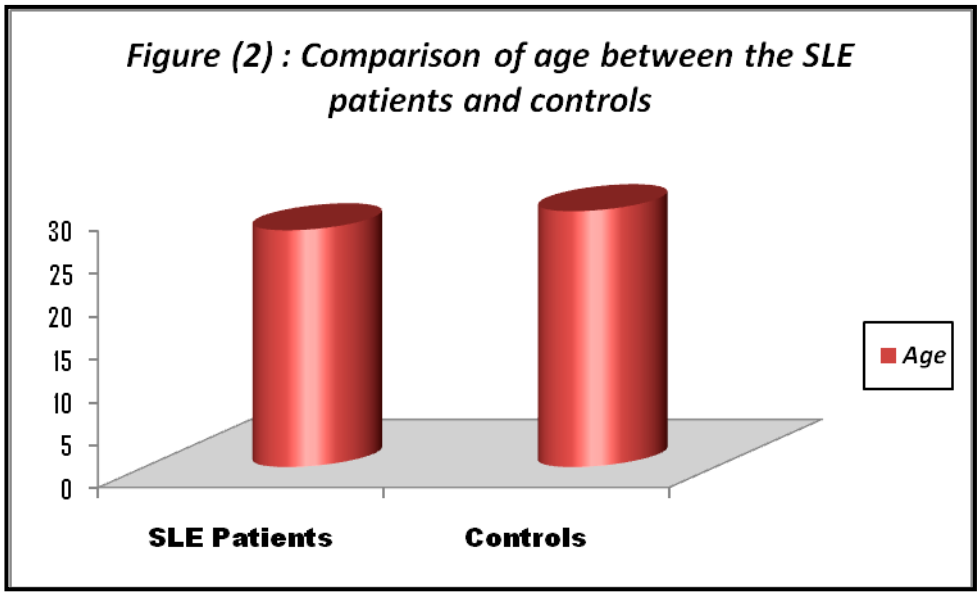
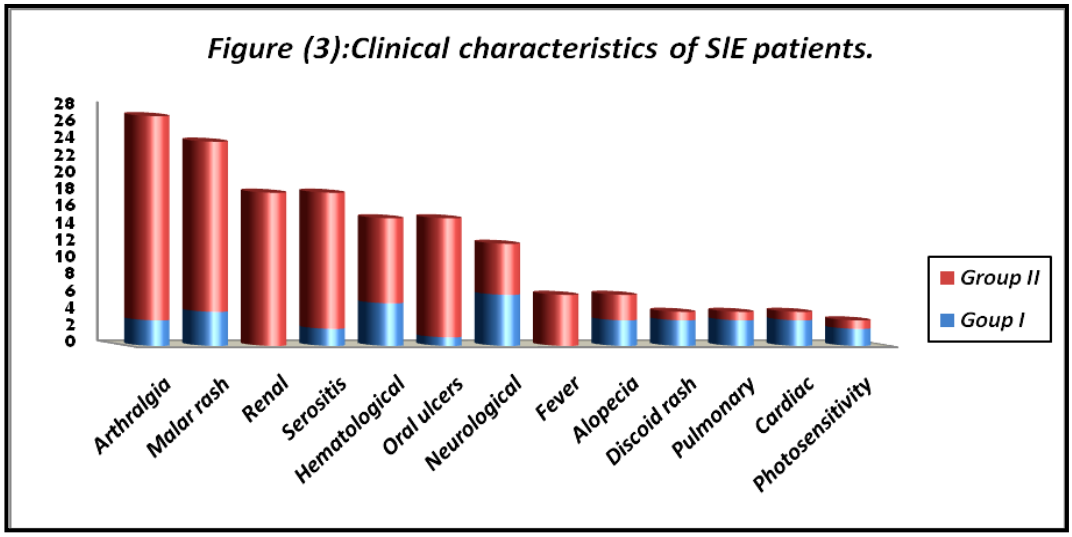


**Table (2):** Clinical characteristics of the SLE patients. Figure(3)

| Feature | SLE patients *N* = 30 (100%) | *Group I* N= 6 (100%) | *Group II* *N*= 24 (100%) | *Z* | *P value* |
|---|---|---|---|---|---|
| **Arthralgia** | 27 (90 %) | 3(50%) | 24(100%) | 3.6 | <0.001** |
| **Malar rash** | 24 (80%) | 4(33.3%) | 20(83.3) | 0.9 | >0.05 |
| **Renal** | 18(60%) | 0(0%) | 18(75%) | 5.5 | <0.001** |
| **Serositis** | 18(60%) | 2(33.3%) | 16(66.7%) | 1.5 | >0.05 |
| **Hematological** | 15(50%) | 5(83.3%) | 10(41.2%) | 1.2 | >0.05 |
| **Oral ulcers** | 15(50%) | 1(16.7%) | 14(58.3%) | 1.8 | <0.05* |
| **Neurological** | 12(40%) | 6(100%) | 6(25%) | 3.4 | <0.001** |
| **Fever** | 6(20%) | 0(0%) | 6(25%) | 1.4 | >0.05 |
| **Alopecia** | 6(20%0 | 3(50%) | 3(12.5%) | 1.1 | >0.05 |
| **Discoid rash** | 4(15%) | 3(50%) | 1(4.16%) | 1.4 | >0.05 |
| **Pulmonary** | 4(13%) | 3(50%) | 1(4.16%) | 0.9 | >0.05 |
| **Cardiac** | 3(10%) | 1(16.7%) | 2(8.33%) | 0.6 | >0.05 |
| **Photosensitivity** | 3(10%) | 2(33.3%) | 1(4.16%) | 1.1 | >0.05 |

**P>0.05=** Insignificant

**P<0.05 *=**Significant




**P<0.001 **=** High significant.

**Table (3):** Laboratory characteristics of the SLE patients.

| Group / Variable | SLE Patients (n=30) Mean ± SD |
|---|---|
| **ESR mm / 1st hour** | 61.8±20.1 |
| **HB % g/dl** | 10.95 ± 1.3 |
| **WBCs $10^9$/L** | 5.340 ± 2.2679 |
| **Platelet $10^9$/L** | 257.3 ± 72.1 |
| **Creatinine clearance ml/min** | 73.3±21.4 |
| **S. creatinine mg/dl** | 1.2±0.5 |
| **S. urea mg/dl** | 19.9±8.3 |
| **24h proteinuria mg /24h** | 1079.3±1082.5 |
| **C3 mg/dl** | 9.9±20.02 |
| **C4 mg/dl** | 20.1±9.9 |
| **ANA U/ml** | 11.9±55.5 |
| **Anti -ds DNA U/ml** | 84.8± 43.2 |
| **SerumMCP1 pg/ml** | 192.7±54.5 |
| **Urinary MCP 1 pg/ml** | 1790.5±874.2 |

**Table (4):** Comparison between the mean SLE disease activity indices' scores in the studied SLE patients' groups.

| Group / Variable | Group I (n=6) Mean ± SD | Group IIA (n=18) Mean ± SD | Group IIB (n=6) Mean ± SD | F | P |
|---|---|---|---|---|---|
| **SLEDAI Score** | 6±1.79 | 22±13.7 | 9±0.89 | 6.4 | <0.05* |

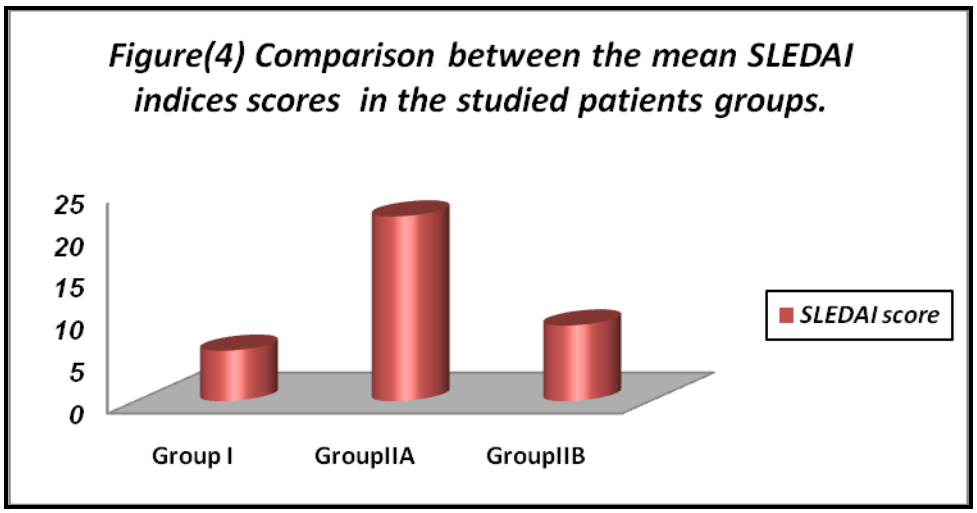
**P<0.05*** = Significant.

Multigroup comparison between the mean SLEDAI scores in the studied groups yielded an overall significant difference ***(P < 0.05). Figure( 4).***

- **Post-hoc testing**, revealed statistically significant difference in the mean of SLEDAI scores between group IIA and group IIB being higher in group IIA ***(P < 0.05).***

**S**tatistically significant difference in the mean of SLEDAI scores between group IIA and group I being higher in group IIA ***(P < 0.05).***

Non- statistically significant difference in the mean of SLEDAI scores between group IIB and group I ***(P >0.05).***




*Figure(4) Comparison between the mean SLEDAI indices scores in the studied patients groups.*

**Table(5):** Frequency of renal manifestations in the SLE patients,

| Variable | Status | Frequency |
|---|---|---|
| **Proteinuria ( > 0.5 gm/24hrs)** | -ve | 12 (40%) |
| | +ve | 18 (60%) |
| **Urinary casts** | -ve | 22(73%) |
| | +ve | 8(27%) |
| **Hematuria** | -ve | 20(67%) |
| | +ve | 10(33%) |
| **Pyuria** | -ve | 24(80%) |
| | +ve | 6(20%) |

*Figure (5):Frequency of renal manifestations in SLE patients*

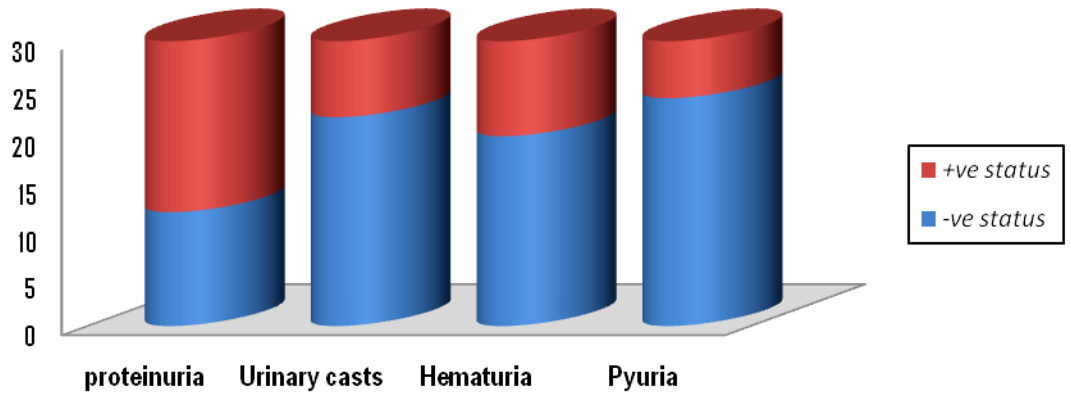


**Table (6):** Histopathological grading in renal biopsies of LN patients:

| Grade / Frequency | II | III | IV |
|---|---|---|---|
| **Total No. 24 (100%)** | 10(42%) | 8(33%) | 6(25%) |

A renal biopsy from each patient had been obtained on the same day of blood sampling. World Health Organization (WHO) classification system was used for grading lupus nephritis ***(Churg et al., 1995).***

Twenty four patients (80%) had evidence of LN ***Figure(6).*** Ten patients(42%) had LN grade II ***Figure(7)*** , 8 patients(33%) had LN grade III ***Figure(8)*** , 6 patients (25%) had LN grade IV ***Figure (9)*** ,non of the patients had LN grade V.

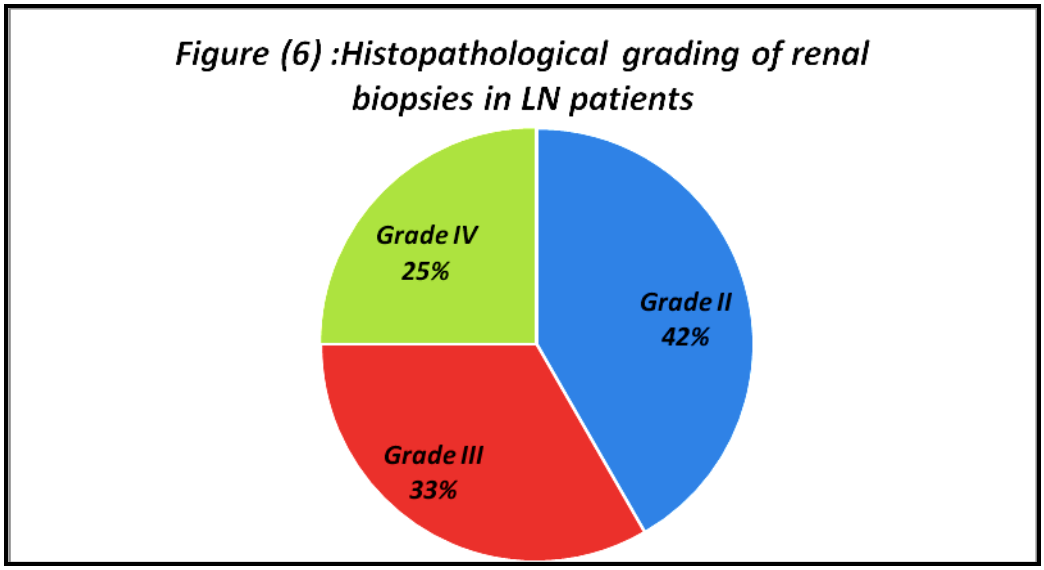


***Figure (7):Lupus nephritis with mesangial proliferation classII. (H&E, X400)***

***Figure (8): Focal proliferative GN class III with* segmental glomerular sclerosis (H&E, X400.**

*Figure(9):Diffuse proliferative glomerulonephritis class IV (H&E x400).*

**Table (7):** Pathological activity and chronicity indices' scores in the LN groups:

| Variable \ Group | Group II | Group IIA | Group IIB |
|---|---|---|---|
| **Activity index score** | | | |
| **Range (Max=24)** | 1-20 | 8-20 | 1-7 |
| **mean±SD** | 11.08 ± 5.961 | 13.55 ± 4.362 | 3.66 ± 3.055 |
| **Chronicity index score** | | | |
| **Range( Max=12)** | 1-7 | 1-7 | 3-5 |
| **mean±SD** | 3.67± 1.922 | 3.67 ± 2.179 | 3.67 ± 3.334 |

Activity ***Figure (10 & 11)*** and chronicity ***Figure (12 & 13)*** indices (AIS and CIS) respectively were used for biopsy assessment according to the standards of the National Institute of Health (NIH) for lupus nephritis ***(Austin et al., 1984) Figure (14).***

**Figure (10 ):** ***Frequent lesion indicating activity and therefore permitting classify lesions as class III or IV is extracapillary proliferation (crescents)*** **.There is an** ***a circumferential epithelial crescent (H&E, X400).***

***Figure (11):Glomerulonephritis class (III) with Fibrinoid necrosis .The necrotizing lesions are associated with a clinical course of severe renal involvement and with greater probability of chronic glomerular changes. (H&E, X400).***

*Figure (12 ) : Chronic proliferative glomerulonephritis with end arthritis obliterans (H&E, X400).*

*Figure (13 ):Chronic proliferative glomerulonephritis with atrophic tubule showing hyaline casts* **(H&E, X400**).

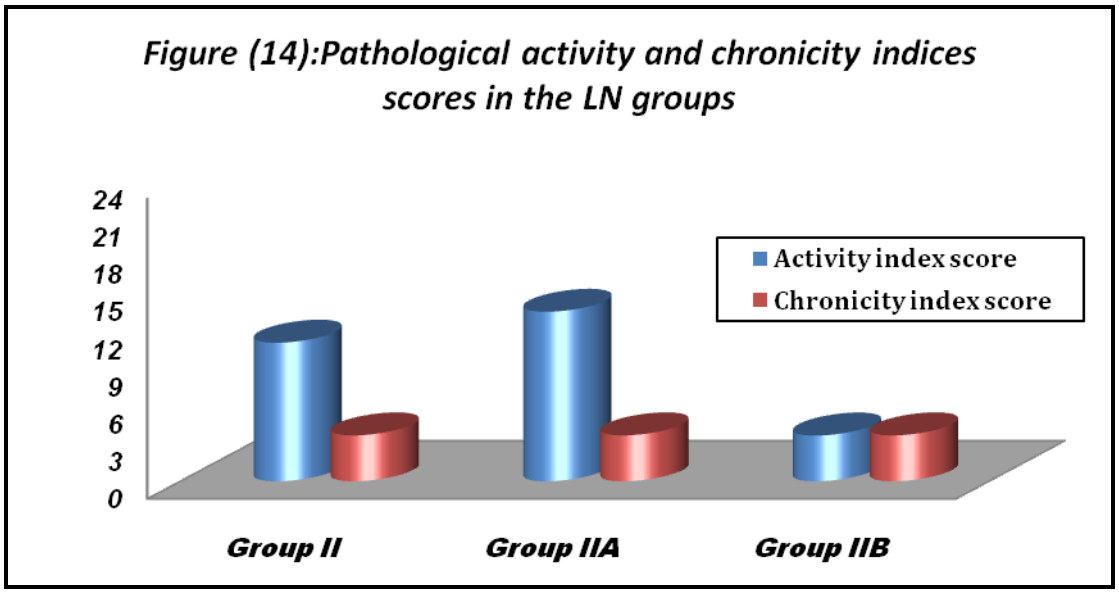



**Table (8):** Comparison between laboratory parameters in the studied SLE patients' groups

| Group / Variable | Group I (n=6) Mean ± SD | Group IIA (n=18) Mean ± SD | Group IIB (n=6) Mean ± SD | F | P |
|---|---|---|---|---|---|
| **ESR mm / 1st hour** | 42.3±6.8 | 71.9±18.01 | 50±15.5 | 9.2 | <0.05* |
| **Creatinine clearance ml/min** | 110±8.9 | 60.4±10.01 | 75±4.5 | 10.53 | <0.05* |
| **S. creatinine mg/dl** | 0.97±0.19 | 1.4±0.5 | 0.8±0.2 | 4.9 | <0.05* |
| **S. urea mg/dl** | 11.7±6.8 | 23.9±7.3 | 16.3±3.7 | 8.5 | >0.05 |
| **24h proteinurea mg/24h** | 133.7±86.4 | 1634.8±1081.7 | 358.3±56.3 | 9.5 | <0.05* |
| **C3 mg/dl** | 130.7±15.002 | 87.8±7.9 | 100.7±15.002 | 33.7 | <0.05* |
| **C4 mg/dl** | 31±9.1 | 14.8±4.7 | 25±11.8 | 12.4 | >0.05 |
| **ANA U/ml** | 104.7 ±29.2 | 120 ±86.5 | 94.7 ±19.1 | 1.02 | >0.05 |
| **Anti -ds DNA U/ml** | 22.7±8.5 | 109± 25.5 | 97.4±35.02 | 11.03 | <0.05* |

**P>0.05** =Insignificant

**P < 0.05*** = Significant

There was statistically significant difference ***(P<0.05)*** in the mean value of ESR among the studied groups being highest in group IIA.

There was statistically significant difference ***(P<0.05)*** in the mean value of creatinine clearance being highest in group I.

There was statistically significant difference ***(P<0.05)*** in the mean value of serum creatinine being highest in group IIA.

There was statistically significant difference ***(P<0.05)*** in the mean value of 24h. protein in urine being highest in group IIA.

There was statistically significant difference ***(P<0.05)*** in the mean value of C3 level being lowest in group IIA.

There was statistically significant difference ***(P<0.05)*** in the mean value of anti-ds DNA antibody level being higher in group IIA.

There was no statistically significant difference ***(P>0.05)*** in the mean value of serum urea , C4 , of ANA levels among the studied groups.

-Post-hoc testing, revealed a statistically significant differences between group IIA and group IIB as regards the mean value of ESR ***(P<0.05)*** being higher in group IIA ,the creatinine clearance level ***(P<0.05)*** being lower in group IIA, the 24h protein in urine ***(P<0.05)*** being higher in group IIA and the C3 level ***(P<0.05)*** being lower in group IIA.

No statistically significant differences were observed between group IIA and group IIB as regarding the mean value of serum creatinine level ***(P>0.05),*** serum urea level ***(P>0.05),*** C4 level ***(P>0.05),*** ANA level ***(P>0.05),*** the mean value of anti-ds DNA antibody level ***(P>0.05).***

**Table (9):** Comparison between the mean *serum and urinary* MCP-1 levels in the SLE patients and the control groups:

| Groups / Variables | SLE Patients Mean ± SD | Controls Mean ± SD | t | P value |
|---|---|---|---|---|
| ***Serum* MCP 1Pg/ml** | 192.7±54.5 | 150.8±68.2 | 2.4 | <0.05* |
| ***Urinary* MCP1 Pg/ml** | 1790.5±874.2 | 399.3±85.6 | 8.7 | <0.001** |

**P <0.05=** Significant.

**P<0.001 **=** Highly significant.

In the SLE patients' group the mean value of the ***serum*** MCP-1 was 192.7±54.5 pg/ml , in the control group the mean value of the ***serum*** MCP-1 was 150.8±68.2 pg/ml.

There was statistically significant difference of the mean value of the ***serum*** MCP-1 between both groups ***(P <0.05).***

In the SLE patients' group the mean value of the ***urinary*** MCP-1 was 1790.5 ±874.2 pg/ml , in the control group the mean value of the ***urinary*** MCP-1 was 399.3±85.6 pg/ml.

There was high statistically significant difference of the mean value of the ***urinary*** MCP-1 between both groups **(P <0.001),** ***Figure (15).***

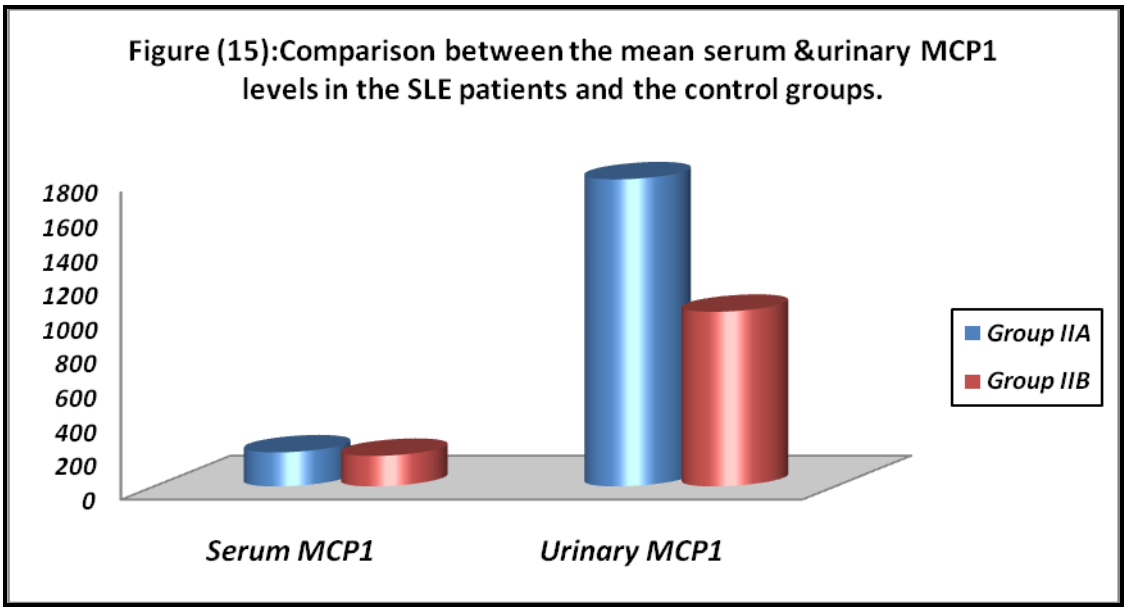



**Table (10):** Comparison between the mean *serum &urinary* MCP-1 levels in the studied groups.

| Group / Variable | Group I (n=6) Mean ± SD | Group II (n=24) Mean ± SD | Control (n=20) Mean ± SD | F | P |
|---|---|---|---|---|---|
| ***Serum* MCP 1 Pg/ml** | 187.7±33.2 | 194±59.1 | 150.8±68.2 | 2.3 | *<0.05 |
| ***Urinary* MCP1 Pg/ml** | 700±89.4 | 2063.2±757.6 | 399.3±85.6 | 56.5 | **<0.001 |

**P > 0.05=** insignificant

**P < 0.001 ****=high significant

In group II the mean value of the ***serum*** MCP-1 was 194±59.1pg/ml , in group I the mean value of the ***serum*** MCP-1 was 187.7±33.2 pg/ml and in the control group the mean value of the ***serum*** MCP-1 was 150.8±68.2 pg/ml.

There was statistically significant difference of the mean value of the ***serum*** MCP-1 in the studied groups ***(P >0.05).***

- Post-hoc testing revealed that there was statistically significant

difference of the mean value of the ***serum*** MCP-1 between group II and the control group ***(P<0.05)*** but there was no statistically significance difference between group I and group II nor between group I and the control group ***(P >0.05).***

The mean value of the ***urinary*** MCP-1 in group II was 2063.2±757.6 pg/ml, the mean value of the ***urinary*** MCP-1 in group I was 700±89.4 pg/ml, while the mean value of the ***urinary*** MCP-1 in the control group was 399.3 ± 85.6 pg/ml.

There was statistically high significant difference of the mean value of the ***urinary*** MCP-1 in the studied groups ***(P <0.001).***

- Post-hoc testing revealed that the mean value of the ***urinary*** MCP-1 was statistically highly significantly higher in group II than group I and also highly significantly higher in group II than the control group ***(P <0.001).***

There was no statistically significant difference of the mean value of ***urinary*** MCP-1 between group I and the control group ***(P >0.05)***

**Table (11):** Comparison between the mean *serum & urinary* MCP-1 levels in group IIA & group IIB

| Group / Variable | Group IIA (n=18) Mean ± SD | Group IIB (n=6) Mean ± SD | t | P |
|---|---|---|---|---|
| ***Serum* MCP1pg/ml** | 199.2±64.6 | 178.5±38.7 | 0.73 | >0.05 |
| ***Urinary* MCP1Pg/ml** | 2409.8±516.3 | 1023.3±60.9 | 11.2 | *<0.001 |

**P>0.05=** insignificant

**P<0.001 **=**High significant

The mean value of the ***serum*** MCP-1 in group IIA was 199.2±64.6 pg/ml while the mean value of the ***serum*** MCP-1 in group IIB was 178.5±38.7 pg/ml.There was no statistically significant difference of the mean value of the ***serum*** MCP-1 between both groups. (**P** >0.05).

The mean value of the ***urinary*** MCP-1 in group IA (2409.8±516.3 pg/ml) was statistically significantly highly higher than the mean value of the ***urinary*** MCP-1 in group IIA (1023.3±60.9 pg/ml) (**P** <0.001)., ***Figure (16).***

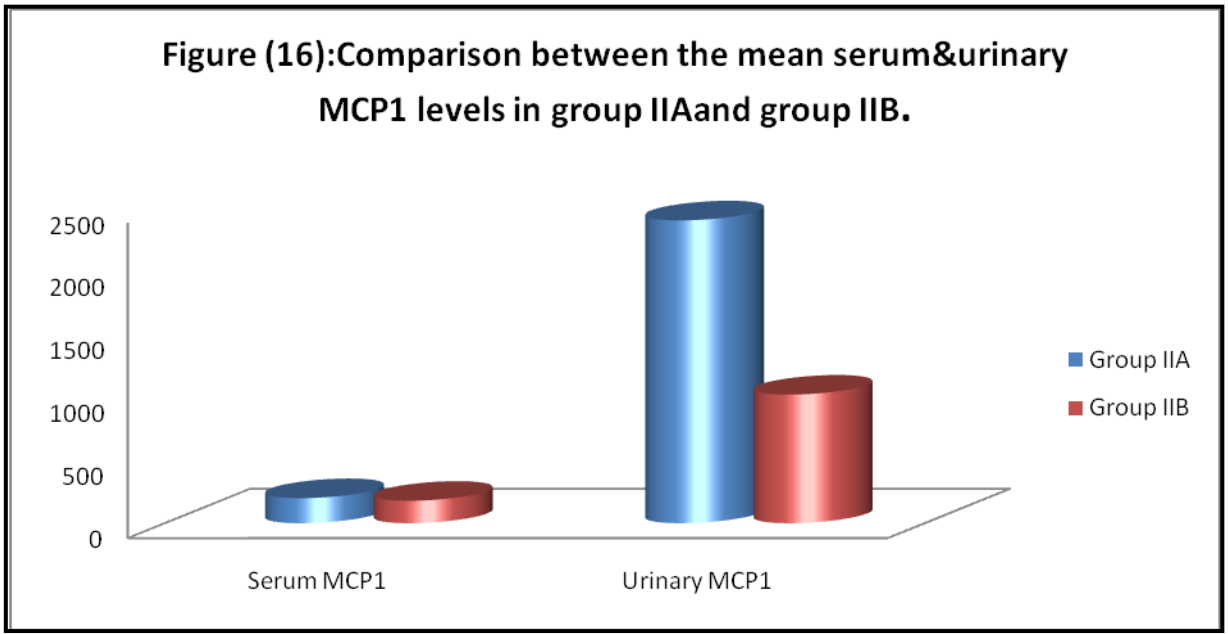


**Table (12):** Comparison between the mean titre of *serum* MCP- 1 according to clinical manifestations in SLE.

| Feature | N | Mean ± SD | t | P |
|---|---|---|---|---|
| **Fever** | 6 | (+) 399.91 ± 66.6 | 1.39 | > 0.05 |
| | 24 | (-) 289.89 ± 73.8 | | |
| **Malar rash** | 24 | (+)157.00±22.66 | 1.951 | > 0.05 |
| | 6 | (-)274.oo± 45.87 | | |
| **Discoid rash** | 4 | (+) 240.2 ± 70.6 | 1.2 | > 0.05 |
| | 26 | (-) 145.8 ± 73.9 | | |
| **Alopecia** | 6 | (+) 181 ± 63.8 | 0.8 | > 0.05 |
| | 24 | (-) 378.2 ± 73.2 | | |
| **Photosensitivity** | 3 | (+)273 .3 ± 87.2 | 1.4 | > 0.05 |
| | 27 | (-) 190.2 ± 93.8 | | |
| **Oral ulcers** | 16 | (+) 385.80± 68.9 | 1.1 | > 0.05 |
| | 14 | (-) 435.2 ± 76.3 | | |
| **Arthralgia/arthritis** | 27 | (+) 198.3 ± 89.3 | 4.36 | < 0.05* |
| | 3 | (-) 301.1 ± 73.9 | | |
| **Serositis** | 18 | (+) 222.6 ± 56.2 | 0.8 | > 0.05 |
| | 12 | (-) 297.2 ± 77.1 | | |
| **Renal** | 24 | (+) 273.9 ± 75.2 | 7.5 | > 0.05 |
| | 6 | (-) 211.3 ± 81.9 | | |
| **Neurological** | 12 | (+) 351.2 ± 84.3 | 0.5 | > 0.05 |
| | 18 | (-) 274.9 ± 87.2 | | |
| **Hematological** | 15 | (+) 250.3 ± 77.9 | 2.3 | > 0.05 |
| | 15 | (-) 235.1 ± 69.3 | | |
| **Cardiac** | 3 | (+) 250.9 ± 86.4 | | |

| | | | | |
|---|---|---|---|---|
| | 27 | (-) 170.8 ± 87.4 | 1.6 | > 0.05 |
| **Pulmonary** | 4 | (+) 233.4 ± 68.3 | 0.7 | > 0.05 |
| | 26 | (-) 241.7 ± 73.9 | | |

**P>0.05=** insignificant

**P<0.05 *=**significant

The mean ***serum*** MCP-1 level showed , non statistically significant differences regarding the presence fever ***(P> 0.05),*** malar rash ***(P> 0.05),*** discoid rash ***(P> 0.05),*** alopecia ***(P> 0.05),*** photosensitivity ***(P> 0.05),*** oral ulcers ***(P> 0.05),*** renal manifestations ***(P> 0.05)*** , neurological manifestations ***(P> 0.05),*** hematological manifestations ***(P> 0.05),*** cardic manifestations ***(P > 0.05)*** and pulmonary manifestations ***(P>0.05).***The mean ***serum*** MCP-1 level showed, statistically significant differences regarding the presence arthritis / arthralgia ***(P<0.05).***

**Table (13):** Comparison between the mean titre of the *urinary* MCP-1 according to clinical manifestations in SLE.

| Feature | N | Mean ± SD | t | P |
|---|---|---|---|---|
| **Fever** | 6<br>24 | (+) 799.91 ± 66.6<br>(-) 689.89 ± 73.8 | 1.84 | > 0.05 |
| **Malar rash** | 24<br>6 | (+)737.00±33.86<br>(-)674.oo± 95.87 | 0.699 | > 0.05 |
| **Discoid rash** | 4<br>26 | (+) 440.2 ± 90.2<br>(-) 545.8 ± 75.4 | 0.322 | > 0.05 |
| **Alopecia** | 6<br>24 | (+) 481 ± 33.00<br>(-) 378.2 ± 79.76 | 0.2 | > 0.05 |

| | | | | |
|---|---|---|---|---|
| **Photosensitivity** | 3<br>27 | (+)590 .3 ± 77.2<br>(-) 490.2 ± 63.8 | 1.95 | > 0.05 |
| **Oral ulcers** | 16<br>14 | (+) 685.80± 69.9<br>(-) 625.2 ± 56.3 | 2.13 | > 0.05 |
| **Arthralgia/arthritis** | 27<br>3 | (+) 898.3 ± 84.3<br>(-) 791.1 ± 77.9 | 1.76 | >0.05 |
| **Serositis** | 18<br>12 | (+) 822.6 ± 96.2<br>(-) 697.2 ± 67.1 | 2.5 | > 0.05 |
| **Renal** | 24<br>6 | (+) 973.9 ± 95.2<br>(-) 211.3 ± 51.9 | 5.3 | < 0.001** |
| **Neurological** | 12<br>18 | (+) 451.2 ± 34.3<br>(-) 574.6 ± 87.2 | 1.6 | > 0.05 |
| **Hematological** | 15<br>15 | (+) 750.3 ± 37.9<br>(-) 535.1 ± 63.3 | 3.45 | > 0.05 |
| **Cardiac** | 3<br>27 | (+) 349.9 ± 26.4<br>(-) 470.8 ± 67.4 | 2.9 | > 0.05 |
| **Pulmonary** | 4<br>26 | (+) 233.4 ± 69.5<br>(-) 841.7 ± 53.9 | 0.56 | > 0.05 |

**p>0.05=** insignificant

**p<0.05 *=**significant

**p<0.001 **=**high significant

Regarding the mean ***urinary*** MCP-1 level , it was significantly higher only in patients with renal affection ***(P<0.001)*** .

**Table (14)**: Comparison between the mean C3 ,C4, ANA titre , Anti-ds DNA , serum & urinary MCP-1 levels according to the classes of the renal biopsies.

| Class / Variable | Class II n = 10 Mean ± SD | Class III n =8 Mean ± SD | Class IV n =6 Mean ± SD | F | P |
|---|---|---|---|---|---|
| **C3 mg/dl** | 89.2 ± 1.9235 | 95± 16.64 | 88.333 ± 16.072 | 3.05 | >0.05 |
| **C4 mg/dl** | 17.8 ± 9.1705 | 21± 9.695 | 11.66 ± 1.5275 | 1.86 | >0.05 |
| **ANA U/ml** | 101.8± 18.226 | 78.25± 29.84 | 181 ± 97.34 | 2.41 | >0.05 |
| **Anti -ds DNA U/ml** | 85.8± 21.0404 | 126.75± 20.998 | 89.33 ± 50.242 | 3.58 | >0.05 |

| | | | | | |
|---|---|---|---|---|---|
| **Serum MCP1 pg/ml** | 179.3±48.1 | 189.5±51.1 | 224.5±81.8 | 1.1 | > 0.05 |
| **Urinary MCP1 Pg/ml** | 1517.6±417.3 | 2042.5±679.01 | 3000±178.9 | 17.5 | < 0.05** |

**P>0.05**= Insinificant

**P<0.05***= Significant.

There was no statistically significant difference ***(P>0.05)*** between the mean $C_3$ ,$C_4$ ,ANA , Anti-ds DNA and the ***serum*** MCP-1 levels according to the WHO morphological classification of lupus nephritis.

Regarding the ***urinary*** MCP-1 level, there was a statistically significant difference (P<0.05) between groups, being higher in patients with class IV-and lower in patients with class II ,***Figure(17).***

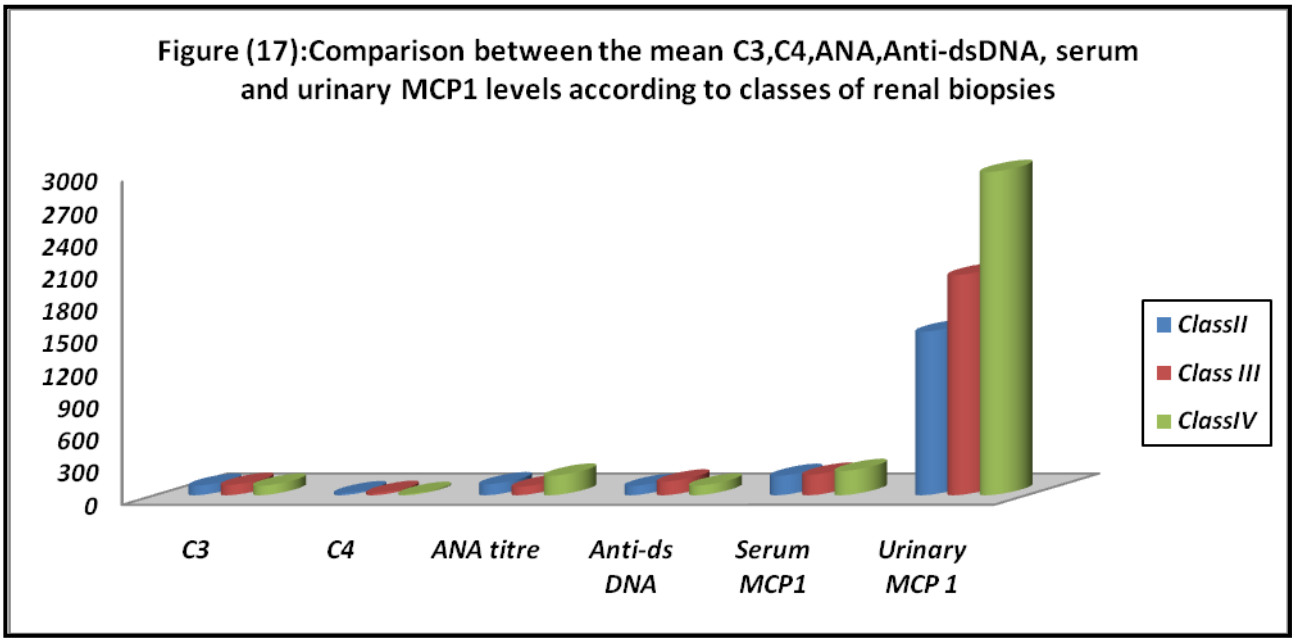



**Table (15):** Correlation coefficients of *serum* and *urinary* MCP-1 levels with laboratory and disease activity markers in SLE patients.

| | **Serum MCP1** | | **Urinary MCP1** | |
|---|---|---|---|---|
| | ***r*** | **P** | ***r*** | **P** |
| **Urinary MCP1 pg/ml** | 0.26 | >0.05 | ---- | ----- |

| | | | | |
|---|---|---|---|---|
| **ESR mm / 1st hour** | 0.28 | >0.05 | 0.89 | < 0.05* |
| **HB g/dl** | -0.11 | >0.05 | - 0.68 | < 0.05* |
| **WBCs/HPF** | 0.01 | >0.05 | - 0.13 | > 0.05 |
| **Platelet/ HPF** | 0.01 | >0.05 | 0.01 | > 0.05 |
| **Creatinine clearance ml/min** | -0.09 | >0.05 | -0.89 | < 0.05* |
| **S. creatinine mg/dl** | 0.22 | >0.05 | 0.79 | >0.05 |
| **S. urea mg/dl** | 0.22 | >0.05 | 0.83 | >0.05 |
| **24h proteinurea g/dl** | 0.15 | >0.05 | 0.89 | < 0.001** |
| **C3 mg/dl** | -0.30 | >0.05 | -0.81 | < 0.05* |
| **C4 mg/dl** | -0.03 | >0.05 | -0.68 | > 0.05 |
| **ANA u/ml** | 0.21 | >0.05 | 0.3 | > 0.05 |
| **Anti-ds DNA u/ml** | 0.07 | >0.05 | 0.44 | < 0.05* |
| **SLEDAI score** | 0.06 | >0.05 | 0.91 | > 0.05 |
| **rSLEDAI score** | 0.14 | >0.05 | 0.95 | < 0.001** |

**P>0.05=** insignificant

**P<0.05 *=**significant

**P<0.001 **=**high significant

There were statistically insignificant correlations ***((P > 0.05)*** between ***serum*** MCP-1 levels and ESR ***(r = 0.28),*** HB% ***(r = - 0.11***), WBSc ***(r = 0.01),*** platelet count ***(r = 0.01)*** , creatinine clearance (***r = - 0.09)***, seum creatinine ***(r = 0.22 )***, serum urea ***(r = 0.22),*** 24h. protein in urine ***(r = 0.15),*** C3 ***(r= -0.33)*** ,C4 ***( r = - 0.03),*** ANA titre ***(r = 0.21)*** , anti-ds DNA titre ***( r = 0.07)*** , SLEDAI score ***(r = 0.06)*** or rSLEDAI

score ***(r = 0.14).***

There were statistically high significant positive correlations between the ***urinary*** MCP-1 levels and 24h. protein in urine ***(r = 0.89, P < 0.001) Figure (18)*** and rSLEDAI score ***(r= 0.95, P < 0.01). Figure (19).***

There were statistically significant positive correlations ***(P < 0.05)*** between the ***urinary*** MCP-1 levels and ESR***(r = 0.89),*** anti-ds DNA titre **(r= 0.44)** and SLEDAI score ***(r = 0.91).***

Also, there was statistically negative significant correlation ***(P <0.05)*** between the ***urinary*** MCP-1 levels and HB % ***(r = -0.68),*** creatinine clearance ***(r = - 0.89) Figure (20)*** and C3 titre ***(r = - 0.28) Figure (21)***

**Figure (18): Positive Correlation between the *urinary* MCP1 levels and the 24h protein in urine.**

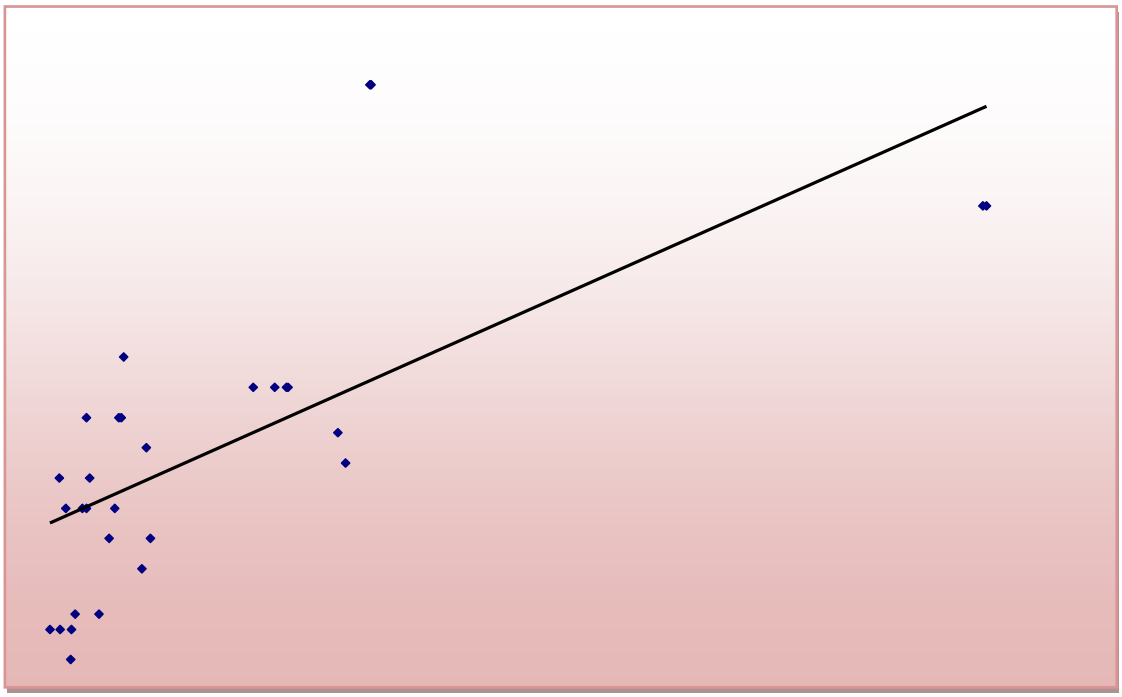


***Figure (19): Positive Correlation between the urinary MCP1 levels and the rSLEDAI scores.***

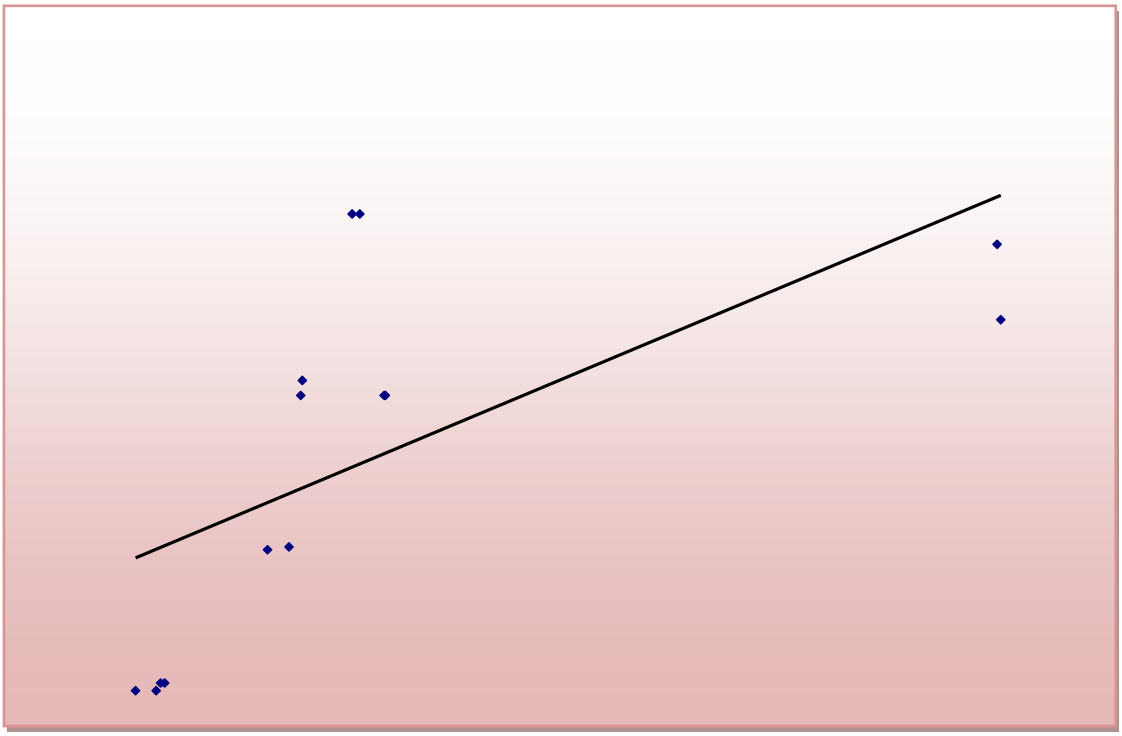


***Figure (20): Negative Correlation between the urinary MCP1 levels and the Creatinine clearance levels.***

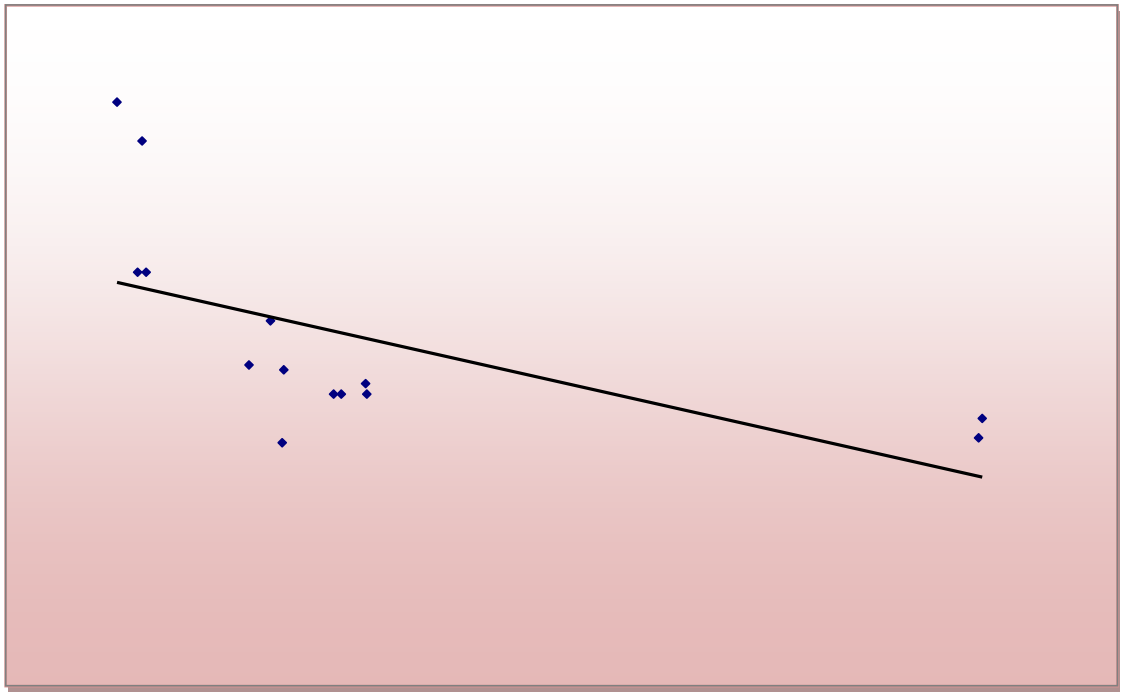


***Figure (21): Negative Correlation between the urinary MCP1 levels and the C3 levels.***

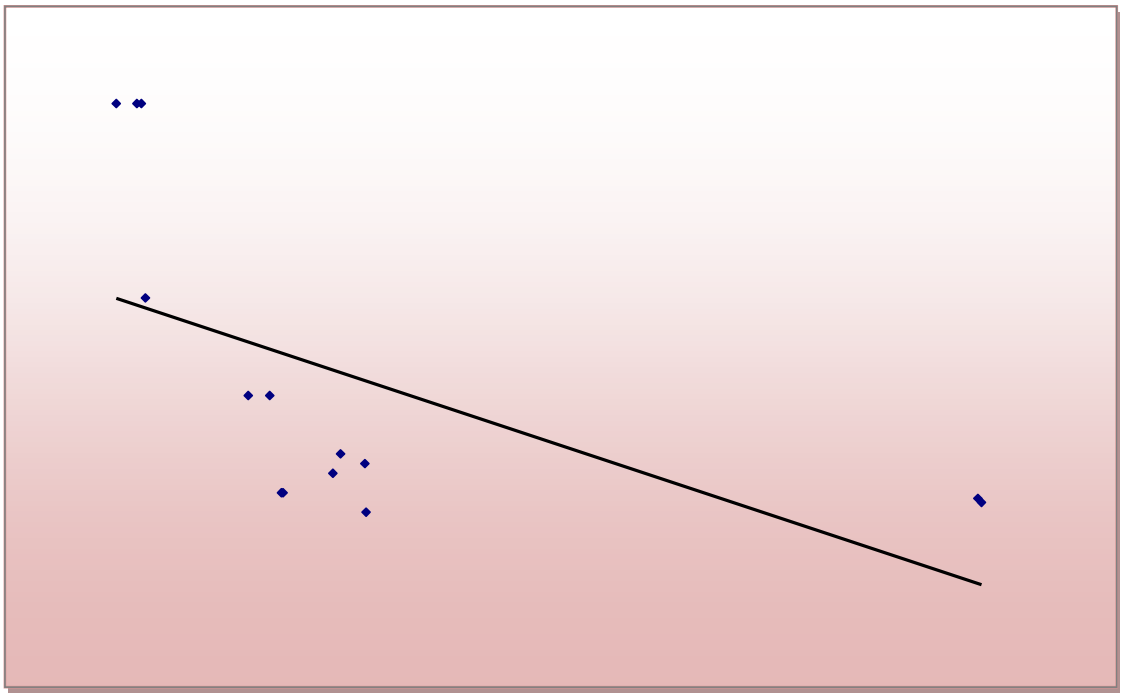


**Table (16):** Correlation between the C3 , C4 , ANA , Anti-ds DNA, *serum* and *urinary* MCP-1 levels with activity and chronicity scores of renal biopsy in SLE patients.

| | Activity index scores | | Chronicity index scores | |
|---|---|---|---|---|
| | **r** | **P** | **r** | **P** |
| **C3 mg/dl** | 0.15 | > 0.05 | 2.98 | > 0.05 |
| **C4 mg/dl** | 2.87 | > 0.05 | 1.43 | > 0.05 |
| **ANA u/ml** | 0.24 | > 0.05 | 1.84 | > 0.05 |
| **Anti-ds DNA u/ml** | 1.78 | > 0.05 | 0.56 | > 0.05 |
| **Serum MCP1 pg/ml** | 0.14 | > 0.05 | 0.18 | > 0.05 |
| **Urinary MCP1 Pg/ml** | 0.38 | < 0.05* | 0.02 | > 0.05 |

**P >0.05=** Insignificant

**P <0.05 *=**significant

There was statistically significant positive correlation (P <0.05) between the ***urinary*** MCP-1 levels and the activity scores (r = 0.38) of the examined renal biopsies. ***Figure (22).***

***Figure (22): Positive Correlation between the urinary MCP1 levels and the activity scores of the examined renal biopsies.***

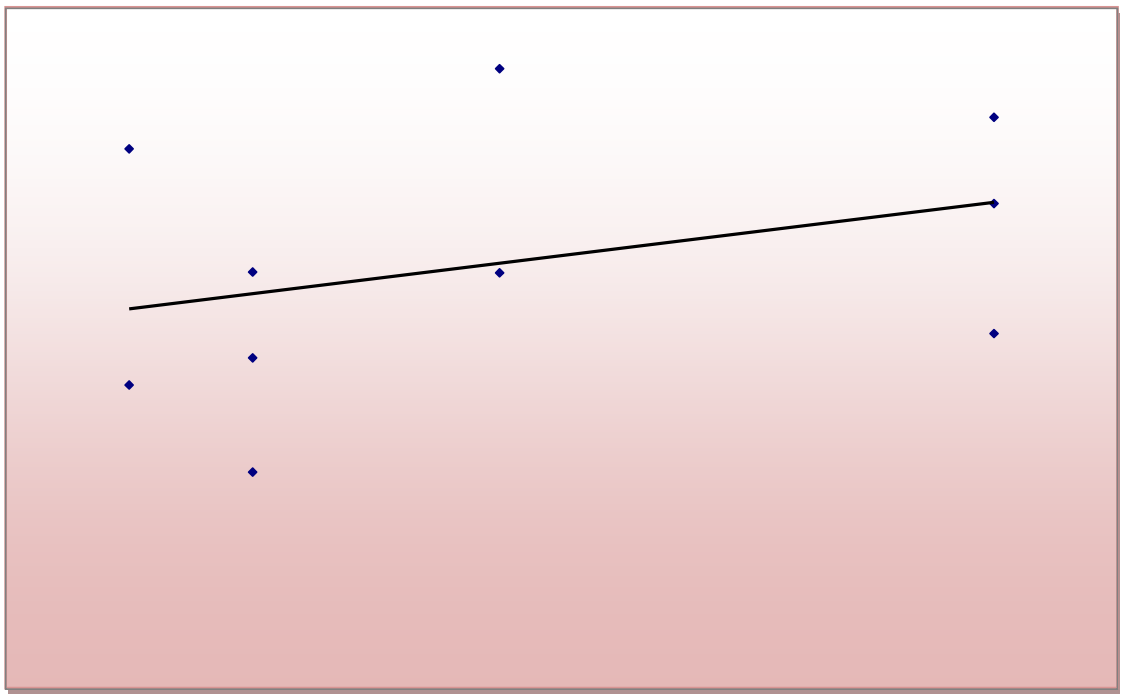


**Table (17):** Comparison of the mean *serum* and *urinary* MCP-1 levels according to presence of proteinuria.

| proteinuria / Variable | Present (n=24) Mean ± SD | Absent (n=6) Mean ± SD | t | P |
|---|---|---|---|---|
| ***Serum* MCP1 pg/ml** | 200.2±64.6 | 187.1±36.7 | 0.9 | >0.05 |
| ***Urinary* MCP1 Pg/ml** | 2181.8±516.3 | 857.7±167.9 | 11.7 | <0.001** |

**P>0.05=** Insignificant

**P<0.05 *=**Significant

**P<0.001**=** High significant**.**

There was no statistically significant difference ***(P > 0.05)*** between the mean ***serum*** MPC-1 levels in the presence or absence proteinuria.

There was statistically high significant difference ***(P < 0.001)*** between the mean ***urinary*** MPC-1 levels in presence or absence of proteinuria, ***Figure(23).***

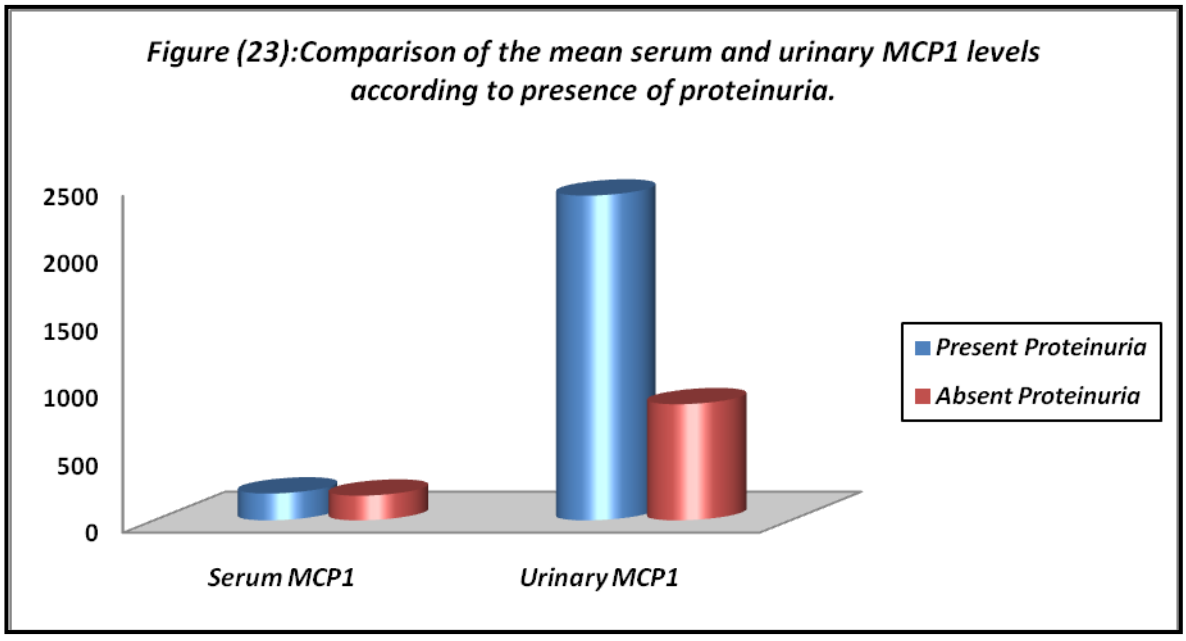


**Table (18):** Comparison of the *serum* and *urinary* MCP-1 level according to the presence of urinary casts.

| Urinary casts / Variable | Present (n=8) Mean ± SD | Absent (n=22) Mean ± SD | t | P |
|---|---|---|---|---|
| **SerumMCP1 pg/ml** | 198.1±84.6 | 190.8±41.2 | 0.3 | > 0.05 |
| **Urinary MCP1 Pg/ml** | 2088±400 | 1423.5±687.4 | 21.7 | < 0.05* |

**P>0.05= nonsignificant**

**P<0.05 *=significant**

There was non statistically significant difference ***(P > 0.05)*** between the mean ***serum*** MCP-1 levels regarding the presence of urinary casts.

There was statistically significant difference ***(P < 0.05)*** between the mean ***urinary*** MCP-1 levels regarding the presence of urinary casts being higher in those patients had urinary casts.

**Table (19):** Comparison of the *serum* and *urinary* MCP-1 levels according to presence of hematuria.

| Hematuria / Variable | Present (n=18) Mean ± SD | Absent (n=12) Mean ± SD | t | P |
|---|---|---|---|---|
| **Serum MCP1 pg/ml** | 199.2±64.6 | 183.1±34.7 | 0.8 | >0.05 |
| **Urinary MCP1 Pg/ml** | 2019.8±516.3 | 1161.7±183.9 | 11.7 | <0.05* |

**P>0.05=** insignificant

**P<0.05 *=**significant

There was no statistically significant difference ***(P > 0.05)*** between the mean ***serum*** MCP-1 levels according to the presence or absence hematuria. While, there was a statistically significant difference **(*P* < 0.05)** between the mean ***urinary*** MCP-1 levels according to the presence hematuria.

**Table (20):** Comparison of the *serum* and *urinary* MCP-1 level according to the presence of pyuria.

| Pyuria / Variable | Present (n=6) Mean ± SD | Absent (n=24) Mean ± SD | t | P |
|---|---|---|---|---|
| **Serum MCP1 Pg/ml** | 220.8±67.1 | 185.7±50.1 | 1.4 | >0.05 |
| **Urinary MCP1 Pg/ml** | 1933.3±273.4 | 1254.8±802.2 | 5.3 | <0.05* |

**P>0.05=** nonsignificant

**P<0.05 *=**significant

There was no statistically significant difference ***(P > 0.05)*** between the mean ***serum*** MPC-1 levels in the presence or absence pyuria.

There was statistically high significant difference ***(P < 0.05)*** between the mean ***urinary*** MPC-1 levels in presence or absence of pyuria.

In our study we considered positive cut-off values of the ***serum*** and ***urinary*** MCP1 levels based on the values equal to or higher than the mean + 2SD of the control group. Samples were considered positive if the value is ≥253.98 pg/dl, ≥878.9 pg/dl for the ***serum*** and ***urinary*** MCP1 levels respectively.

Positive cut-off value of the Anti-ds DNA antibody levels was based on the value equal to or higher than the mean + 2SD of the in group IIB. Samples were considered positive if ≥39.6 u/ml .

**Table (21):** Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of the *serum* and *urinary* MCP-1 in the SLE patients.

| | **Sensitivity** | **Specificity** | **PPV** | **NPV** |
|---|---|---|---|---|
| **Serum MCP1** | 40% | 60% | 60% | 40% |
| **Urinary MCP1** | 66.6% | 90% | 90% | 90.9% |

Twelve of SLE patients (40%) and 8 of the controls (27%) were found positive for the ***serum*** MCP-1 that yielded a diagnostic sensitivity of 40%, specificity of 60%, PPV of 60% and NPV of 40% for serum MCP-1 in SLE or lupus nephritis.

Twenty SLE patients (66%) and 2 of the controls (6% or 10%) were found positive for ***urinary*** MCP-1. This yielded a diagnostic sensitivity of 66.6%, specificity of 90%, PPV of 90% and NPV of 90.9% for the ***urinary*** MCP -1in SLE.

The urinary MCP-1 showed a higher diagnostic sensitivity (66.6%) and specificity (90%) than the serum MCP-1that showed sensitivity of 40% and specificity 60% for SLE .

**Table (22):** Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPP) of Anti-ds DNA antibody, serum and urinary MCP-1 in active lupus nephritis .

| | Sensitivity | Specificity | PPV | NPV |
|---|---|---|---|---|
| **Anti–ds DNA antibody** | 88.8% | 83.3% | 76.1% | 33.3% |
| **Serum MCP1.** | 33.3% | 33.3% | 60% | 8.3% |
| **Urinary MCP1** | 94.4% | 83.3% | 89.4% | 80% |
| **Urinary MCP1& Anti -ds DNA** | 88.8% | 100% | 88.8% | 25% |

Six patients in group IIA with active lupus nephritis (%) and 4 patients (%) in group IIB with inactive lupus nephritis were found positive for ***serum*** MCP-1. This yielded a diagnostic sensitivity of 33.3% , specificity of 33.3%, PPV of 60% and NPV of 8.3% for the ***serum*** MCP-1 in lupus nephritis.

Seventeen patients in group IIA (%) and one patient in group IIB (%) were found positive for the ***urinary*** MCP-1, that yielded a diagnostic sensitivity of 94.4%, specificity of 83.3%, PPV of 89.4% and NPV of 80% for the ***urinary*** MCP-1 in lupus nephritis.

Sixteen patients in group IIA (%) and five patients in group IIB (%) were positive for anti-ds DNA. This yielded a diagnostic sensitivity of 88.8%, specificity of 83.3%, PPV of 76.1% and NPV of 33.3% for the anti-ds DNA antibody in lupus nephritis.

Sixteen patients in group IIA (%) were found positive for both the anti-ds DNA antibody and the ***urinary*** MCP-1, while none of the patients in group IIB were found positive for both anti-ds DNA and the ***urinary*** MCP-1. This yielded a diagnostic sensitivity of 88.8%, specificity of 100%, PPV of 88.8% and NPV of 25% for both the anti-ds DNA antibody and the ***urinary*** MCP-1 in lupus nephritis.

The ***urinary*** MCP -1 showed a higher diagnostic sensitivity of 94.4% and equal specificity of 83.3% to the Anti-ds DNA antibody alone. The diagnostic sensitivity and specificity were greatest when both tests were found positive in combination being 88.8% for the diagnostic sensitivity and 100% for the diagnostic specificity, ***Figure(24).***