Summary and conclusion

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The aim of this work was to evaluate bone mineral density (BMD) in premenopausal female patients with SLE and to assess the influence of disease related variables and use of corticosteroids . We analysed only the premenopausal SLE patients to eliminate the confounding effect of menopause on bone loss .

This study was carred out on forty pre-menopausal patients with systemic lupus erythematosus (SLE) attending the out patient clinic or were admitted to the inpatient unit of the Rheumatology Department of Benha University Hospitals .

All Patients fulfilled the revised criteria for classification of SLE of the American College of Rheumatology ***(Tan et al.,1982).*** All Patients were females . Their ages ranged from 18 to 44 years with a mean of 24.6 $\pm$ 4.4 years . Their disease duration ranged from 6 months to 13 years with a mean of 8.8 $\pm$ 3.4 years . Also , 20 healthy control subjects apparently free from any relevant disease were included in the study . All were females and their ages ranged from 19 to 39 years with a mean of 25.8 $\pm$ 5 years .

Exclusion Criteria included patients with impaired renal function (serum creatinine $\geq$1.3mg/dl), pregnancy or hyperthyroidism, transient amenorrhea lasting >2 months , and any medication known to affect bone metabolism, with the excepation of calcium supplements and corticosteroids (i.e., anticoagulants, barbiturates , calcitanin , thiazides , estrogenic hormones) .

All patients were subjected to the following :

- **Full history taking :** Especially age , disease duration , and drug history (cytotoxic and corticosteroid)
- **Through clinical examination :**

  General examination and local examination especially body mass index , locomotor system , skin , chest , heart , and nervous system , assessment of disease activity using the SLE disease activity index (SLEDAI) , and assessment of functional status using Steinbrocker grades.
- **Laboratory investigations :**
  - Complete blood picture with counter counter .
  - Erythrocyte sedimentation rate (Erythrocyte sedimentation rate (ESR) with westergren method .
  - Detection of antinuclear antibodies (ANA) and anti-ds-DNA antibodies using the indirect immunofluorecent antibody test .
  - Determination of C3 and C4 levels .
  - Determination of serum level of calcium, phosphorus and creatinine by the routine methods .
  - Complete urine analysis for urinary casts, hematuria and pyuria.
  - Twenty-four hours urine examination for albumin .
- **Bone mineral density BMD(g/cm2) measurements :**

  Bone densitometry was performed by Dual Energy X-Ray Absorptiometry (DEXA). The machine used in this study was lunar – DPX using pencil beam X-ray source and the data were analyzed with special software for analysing the densities of the examined parts. The data received were automatically compared with age, weight, and sex matched normal reference population . It was also

compared with normal peak bone mass for same sex and race . Bone mass deficit is quantitated as gm/cm^2 or approximate standard deviation above or below age matched normal means (Z-score) . It also correlated to deviation from normal peak bone mass (T-score) .

In this study , the lumbar spine from L2-4 and left hip(femoral neck, , trochanter) were examined and analysed to get the absolute bone density in relation to Z and T scores.

The findings of this study were as follow :

- The mean value of age was 24.6 ± 4.4 years ; disease duration 8.8 ± 3.4 years ; BMI 28.4 ± 8.8 kg/m^2 ; and SLEDAI 16.2 ± 6.5 .
- As regards corticosteroid therapy ; the mean value of the current dose was 10.4 mg/d ; the cumulative dose 24.8 g / and the total steroid duration 76.4 months .
- As regards of disease activity grading (DAG) in SLE patients :
  - 10 Patients (25%) had grade I;
  - 16 Patients (40%) had grade II;
  - 7 Patients (17.5%) had grade III; and
  - 7 Patients (17.5%) had grade IV.
- As regards of functional capacity in SLE patients .
  - 8 Patients (20%) had grade I;
  - 13 Patients (32.5%) had grade II;
  - 14 Patients (35%) had grade III; and
  - 5 Patients (12.5%) had grade IV.
- Our results showed a high frequency of low BMD at the lumbar spine (L2-L4) and left hip (femoral neck , trochanter) as diagnosed by using DEXA in premenopausal female patients with SLE as compared to controls .

- According to the World Health Organization Criteria ***(WHO, 1994)***, 35% of our SLE patients had normal bone mineral density (BMD), 45% had osteopenia and 20% had osteoporosis at the lumbar spine ; at the femoral neck 47.5% had normal BMD, 37.5% had osteopenia, and 15% suffered from osteoporosis ; at the trochanteric area 57.5% had normal BMD, 30% had osteopenia , and 12.5% had osteoporosis .
- When SLE patients were divided into groups according to their disease activity grading there were statistical significant differences between these groups as regard the BMD in all the studied areas .
- By using one – way ANOVA test , significant differences were found between BMD at the lumbar spine and proximal femur (femoral neck and trochanter) and grading of functional capacity in SLE patients
- In our study , no correlation was detected between BMD and disease duration in all the studied areas ($P>0.05$) .
- In our study, BMD correlated negatively with age and correlated positively with BMI .
- on the basis of their daily steroid dose, the patients were categorized as those receiving no steroid theraby, ≤ 7.5 mg/day or >7.5 mg/day prednisolone equivalent dose and by using one-way ANOVA test, significant differences were found between these groups and BMD at the lumbar spine and the proximal femur (femoral neck and trochanter).

In our study, the BMD at both lumbar spine and proximal femur did not correlate with total corticosteroid duration. BMD at lumbar spine and trochanteric area correlated negatively with both cumulative and

current corticosteroid dose but BMD at femoral neck correlated negatively only with current corticosteroid dose.

Many of variables were significantly correlated with BMD in SLE patients so multiple regression analysis was done to determine the best model for predicting osteoporosis in SLE patients . Among the wide range of variables considered in the present study , current and cumulative corticosteroid doses , and BMI respectively were the most predicting osteoporosis at the lumbar spine ; at the femoral neck; age , BMI , and SLEDAI respectively ; at the trochantric area; current and cumulative corticosteroid doses , and grading of functional capacity respectively were the most predicting osteoporosis .

In conclusion : we found that premenopausal SLE patients had significantly lower BMD than controls . Also , a high incidence of osteopenia and osteoporosis was found in premenopausal patients with SLE . Bone diminution in SLE seemed to be attributable to age, BMI, disease activity , functional capacity, and corticosteroid treatment .