1- **Low bone mass in children with malignant lymphoma.**

The aim of this work was to study the effect of disease process on bone mass and calcium homeostasis in children with malignant lymphoma at diagnosis, 3 months after starting chemotherapy, and after 1 year. Evaluation of lumber vertebrae (L2-L4) bone mineral density using dual-energy X-ray absorptiometry and calcium homeostasis parameters and bone turnover biochemical markers (serum osteocalcin and urinary deoxypyridinoline) had been assayed in twenty lymphoma patients at presentation and after treatment. Low bone mass for chronological age was observed in 4 patients (20%) at diagnosis and persisted after 3 months and 1 year. Parathyroid hormone level demonstrated no differences between children with lymphoma at different stages of therapy and controls, while 25(OH) D(3) was significantly lower in lymphoma patients at different stages of therapy as compared to controls (p < .001). Osteocalcin was significantly lower in lymphoma patients at different stages of therapy. Deoxypyridinoline showed only significant higher values after 3 months of therapy compared to controls (p = .01). In conclusion, low bone mass was observed in children with lymphoma and is related to decreased osteoblastic activity and decreased mineralization of bone.

2- **Low turnover bone disease in Egyptian children with acute leukemia.**

The aim of this work was to study bone turnover markers, calcium homeostasis and bone mineral density (BMD) in children with acute leukemia at diagnosis, after induction chemotherapy, and during maintenance therapy to delineate abnormalities present. After evaluation of L2-L4 BMD using dual-energy X-ray absorptiometry in patients with acute myeloid and lymphoid leukemia at presentation and after treatment, the results were compared to 352 healthy age- and sex-matched Egyptian controls. Calcium homeostasis parameters and bone turnover biochemical markers (serum osteocalcin and urinary deoxypyridinoline) were also assayed and the results were compared to 12 healthy age- and sex-matched controls. Osteopenia was observed at diagnosis and during treatment in patients with acute leukemia. At diagnosis osteopenia was observed in 27 patients (62.8%): 10 (23.3%) had non severe osteopenia and 17 (39.5%) had severe osteopenia. This low BMD persisted in those who were followed up. Parathyroid hormone (PTH) (pg/ml) levels demonstrated non significant differences between children with acute leukemia at different stages of therapy and controls, while, 25 (OH) D3 (ng/ml) was significantly lower in acute leukemia patients at different stages of therapy compared to controls (p<0.001). Osteocalcin (ng/ml) is significantly lower in patients at different stages of the disease compared to controls (p<0.001) but there was no significant difference between patients at different stages of therapy. Deoxy-pyridoline cross links showed non-significant difference between the different types of acute leukemia and with controls. Osteopenia is a significant problem in children with acute leukemia at presentation and after chemotherapy. Osteopenia in acute leukemia appears to be of the low turnover type (decreased osteoblastic activity and decreased bone mineralization).

3- **Bone Mineral Density in Egyptian Children with Chronic Renal Failure: Is It Related to Leptin Level or Insulin Resistance?**
Chronic renal failure (CRF) is often associated with altered bone histology. Hyperparathyroidism is the main factor responsible for this disturbance. Elevated leptin levels and insulin resistance (IR) are prevalent in uremia. Leptin may decrease bone remodeling and IR has also been suggested to have a role in the pathogenesis of bone loss mostly through an inhibitory effect on renal 1-alpha hydroxylase.

Objectives:
This study was carried to assess bone mineral density (BMD) in Egyptian children with CRF and to study its relation with leptin, insulin resistance and parathormone (PTH) levels.

METHODS: BMD was measured using Dual Energy X-ray Absorptiometry (DEXA) at lumbar spine in 35 Egyptian children with CRF (20 children in the predialysis phase and 15 children with end stage renal failure on regular haemodialysis). Fasting serum leptin, insulin, blood glucose and PTH levels were assessed. Insulin resistance index (IRI) was calculated. Patients were compared to a control group consisting of 15 healthy children of matched age and sex.

RESULTS: Low bone mass was found in 13 CRF patients (37.1 %); 8 dialysis children (53.3%) and 5 predialysis children (25%); respectively. BMD Z-score was not significantly different between predialysis and dialysis patients (P = 0.09). In comparison to controls; patients had significantly elevated serum leptin level [Median (IQR) = 0.9 (0.6-1.0) Vs 1.00 (0.8-2.2) ng/ml respectively; (P = 0.002)]; significantly elevated IRI [Median (IQR) = 0.78 (0.34-1.9) Vs 2.84 (1.9-3.5) respectively; (P <0.001)] and significantly elevated serum PTH level [Median (IQR) = 24.3 (22-33.5) Vs 97 (17-250) pg/ml respectively; (P <0.001)]. BMD Z score correlated negatively with PTH (r= - 0.79; P <0.001). There was no significant correlation between BMD Z score and leptin (r = 0.17; P = 0.31) or IRI (r = 0.07; P=0.66).

CONCLUSIONS: Low bone mineral density in children with CRF is mostly due to secondary hyperparathyroidism. Elevated leptin levels and IRI do not seem to have a role in the pathogenesis of bone disease in these patients.

Bone Mineral Density and Insulin Resistance in Patients with Trunerâ€™s Syndrome

The aim of this work was to study bone mineral density (BMD), gonadotropins and insulin resistance in girls with turnerâ€™s syndrome and its correlation with some growth parameters. This work comprise 14 patients with turnerâ€™s syndrome (mean age ±SD: 11.93±3.79 years) and 14 healthy age matched Egyptian females as a control group. Thorough anthropometric measurements were done for patients and controls and is expressed as standard deviation score utilizing Egyptian growth table for height and international tables for ideal weight for height. Lumber2 -lumber4( L2- L4 ), BMD was done using dual energy X-ray absorptiometry (DEXA) (using lunar DPXIQ, USA),in Patients and controls and compared to 352 healthy age and sex matched Egyptian controls. Morning blood sample after over night fast was used for estimation of FSH, LH, insulin (Elisa) and blood glucose. Insulin resistance index (IRI) and relative insulin resistance (RIR) were calculated from fasting blood glucose and fasting insulin. The results shows: significant decrease in height with significant increase in weight %to ideal weight for height in turner patients compared to controls with significant higher FSH, LH and increased IRI, RIR while BMD of L2-L4 showed significant osteopenia. Correlation
studies shows significant positive correlation between height SD score and L2-L4 BMD and significant negative correlation between it and wt % to ideal weight for height and measures of insulin resistance. FSH and LH demonstrated negative correlation with L2-L4 BMD and height SD score. Insulin resistance indices demonstrated a positive correlation with wt% to ideal weight for height and negative correlation with BMD.

Conclusion: Turner’s syndrome is associated with significant short stature and overweight with significant osteopenia and insulin resistance. Height SD score is positively correlated with BMD and negatively correlated with wt% to ideal wt for height, FSH, LH, IRI and RIR. FSH and LH showed significant negative correlation with BMD.

5-

Hormonal, Sonographic, and Body Composition Changes in Egyptian Adolescent Girls with Hyperandrogenic Manifestations

Background: This study was conducted to assess the prevalence of hyperandrogenic disorders especially PCOS in a random sample of adolescent girls in our locality, as well as to identify the clinical, hormonal, ultrasonic, and body composition characteristics associated with such disorders. Subjects and Methods: In this cross-sectional study, 200 school girls (15-18 years old) were selected by multi-stage random sampling from different secondary schools in Mansoura city, Egypt, and screened for hyperandrogenic disorders by a validated questionnaire. Eight apparently healthy girls of matched age were included as controls. Adolescent students presenting with menstrual dysfunction and/or clinical hyperandrogenism as well as controls, were subjected to thorough history taking, physical and gynecologic examination, anthropometric measurements, complete hormonal assay by Eliza technique [including FSH, LH, total and free testosterone, DHEAS, 17 OH progesterone, glucose insulin ratio(GIR), insulin resistance index (IRI), relative insulin resistance (RIR)], pelvi-abdominal pulse inversion harmonic imaging (PIHI), and body composition assessment by bioelectrical impedance (BIA). All these investigations were done from the 4th to the 7th day of the menstrual cycle after overnight fast. Results: Out of 200 randomly chosen school girls, twenty-five of them were thoroughly evaluated. Eighteen adolescents of the examined students (72%) were finally diagnosed as PCOS, 5 (20%) as idiopathic hyperandrogenism and 2 (8%) as non-classic congenital adrenal hyperplasia (CAH). Clinical PCOS was present in (14/200 (7%), and confirmed (according to Rotterdam criteria) in 18/200 (9 %) of the whole random sample. Weight, waist circumference, total, free testosterone, DHEAS, glucose insulin ratio, serum insulin and relative insulin resistance were significantly higher in PCOS patients compared to controls (P= 0.008, 0.006, 0.001, 0.003, <0.001, 0.019, 0.003 and 0.008) respectively. Pelvi-abdominal PIHI detected characteristic sonographic appearance consistent with PCOS, in 13 out of the 18 PCOS cases (72.2%). Despite normal weight percentiles, and body mass index (BMI) for age and sex in 83.3% and 88.9% of students with PCOS respectively, fat mass, trunk fat percentage, trunk fat mass, and trunk free fat were significantly higher in PCOS patients compared to controls (p= 0.008, p=0.034, p= 0.023, p=0.034) respectively. BMI was significantly and positively correlated with fat mass, fat mass percentage, trunk fat mass, and trunk fat percentage (p<0.001, p<0.001, p=0.001, and p<0.001 respectively) while waist circumference was significantly and positively correlated with fat mass, fat mass percentage, fat free mass, trunk fat mass, trunk fat percentage, and trunk free fat (p =0.003, p <0.001, p=0.015,
p=0.004, p=0.004, and p=0.019 respectively). Significant positive correlations between both GIR, and RIR and BMI, BMI centiles, and fat mass percentage were found. There was a significant positive correlation between IRI and trunk fat mass. Conclusions: PCOS is the most common hyperandrogenic disorder in adolescents of our locality. Both menstrual dysfunction and clinical hyperandrogenism were able to detect cases of adolescent PCOS with adequate sensitivity and very high specificity. PIHI had adequate sensitivity as a preferred diagnostic tool of PCOS in virgin adolescents who may have increased central adiposity. Body composition assessment by BIA in PCOS is a valuable tool in detecting central adiposity which can be correlated to parameters of insulin resistance, especially in the presence of normal BMI.

Key words: Hyperandrogenism, Egyptian, adolescent girls, Body composition.

6-

**Serum Leptin, Insulin Resistance and Soft Tissue Composition By Dual Energy X-Ray Absorptiometry In Obese Children**

Aim: This work aimed to study serum leptin and insulin resistance in obese children and their relation to body composition by DEXA and various measurements of obesity.

Subjects: 33 obese subjects body mass index (BMI) > 95th centile, were enrolled in this study (12 males and 21 females), age ranged from 4 years to 15 years (mean 9.4±2.93) plus 16 healthy age and sex matched Egyptian children.

Method: Obese children and control group were subjected to thorough anthropometric measurements, estimation of BMI and Weight% to ideal weight for height, DEXA study for body composition (using lunar DPX IQ, USA), serum leptin by ELISA and serum insulin (ELISA) and blood glucose fasting and post prandial to assess insulin resistance. Insulin resistance index.

Results: The study showed that obese children had significant higher BMI and Weight% to ideal weight for height compared to control. Percent total body fat by DEXA was significant higher in obese children compared to control group (49.47 ± 6.12 vs 19.85 ± 5.06) (P<0.0001) and arm fat percent in obese children was 52.92 ± 8.46 vs 16.84 ± 4.6 in controls (P<0.0001) and also significant higher trunk fat/lower limb fat by DEXA (1.21 ± 0.2 vs 0.81 ± 0.07 (P<0.0001).

IRI in obese children was 68.5 + 26.8 vs 19.74 + 4.8 in control group (P<0.0001) and serum leptin was higher in obese compared to non obese (40.71 + 22.73 vs 10.38 + 16.08) (P<0.001).

Serum leptin and IRI had significant correlation with BMI, weight% to ideal weight for height, % total body fat by DEXA, % arm fat. Moreover, a significant correlation exist between IRI and serum leptin (P<0.001).

Conclusion: Obesity is associated with insulin resistance and high serum leptin level which denote serum leptin resistance and both are correlated with BMI, weight% to ideal weight for height, % total body fat by DEXA and % arm fat by DEXA.

7-

**Lipid Metabolism and Atherogenic Index in Turnerâ€™s Syndrome**

Turnerâ€™s syndrome (TS) is the most common sex chromosome abnormality in females. Women with Turnerâ€™s syndrome have short stature, hypergonadotrophic hypogonadism and have an increased incidence of coronary heart disease. So, the aim of this work is to study growth parameters, FSH, LH, serum lipids and atherogenic index in
gals with Turnerâ€™s syndrome and highlight the correlation between different studied parameters. This work comprise 14 patients with Turnerâ€™s syndrome (mean age ±SD: 11.933.79 ±1. years) and 14 healthy age matched Egyptian females as a control group. Thorough anthropometric measurements were done for patients and control and is expressed as standard deviation score utilizing Egyptian growth table for height and international tables for ideal weight for height. Morning blood sample after overnight fast was used for estimation of FSH, LH, serum lipids and atherogenic index. The results shows: significant decrease in height with significant increase in weight % to ideal weight for height in turner patients compared to controls with significant higher FSH, LH, cholesterol, LDL, TG and atherogenic index. Correlation studies shows that height SD score shows significant negative correlation with weight % to ideal weight for height, LH, FSH and lipid profile. Meanwhile measures of weight % to ideal weight for height show positive correlation with FSH, lipogram with no signifcant correlation with HDL and atherogenic index. Conclusion: Turnerâ€™s syndrome is associated with hyperlipidemia and significant increased atherogenic index which explain the liability for coronary heart disease and the degree of lipid disorder is negatively correlated and height SD score.

8-

**Oxidative Stress and Antioxidant Vitamins in Obese Children**

Objective: This study was carried out to assess the oxidant antioxidant status in obese children and whether systemic oxidative stress is already increased or not in this group of patient.

Design: Cross-section study in which, thirty five obese children (25 male and 10 female) mean age (9 4.4 ±3. year) with BMI > 2SD of the mean for age and sex (BMI = 31.56.6 ±1 ). A group of 30 healthy, age and sex matched children were used as a control group.

Measurements: Blood samples were collected from every subject and control after an overnight fast of which 2ml blood collected on heparin for plasma ascorbic acid (vitamin C) and 4ml blood collected into plain tube for serum tocopherol and malondialdehyde (MDA).

Results: MDA was significantly higher in obese children compared to control (P=0.0001). This was associated with significantly lower plasma vitamin E and vitamin C in obese children compared to control (P= 0.0001). BMI was positively correlated with age and MDA and showed negative correlation with vitamin E and C.

Conclusions: Severely obese children present a highly altered oxidant antioxidant status, which is alarming for the increased risk of complication so early intervention has been recommended by giving antioxidant, diet-control and exercise.

9-

**Bone Mineral Density in Egyptian Children with Chronic Renal Failure: Is It Related to Leptin Level or Insulin Resistance?**

INTRODUCTION: Chronic renal failure (CRF) is often associated with altered bone histology. Hyperparathyroidism is the main factor responsible for this disturbance. Elevated leptin levels and insulin resistance (IR) are prevalent in uremia. Leptin may decrease bone remodeling and IR has also been suggested to have a role in the pathogenesis of bone loss mostly through an inhibitory effect on renal 1-
alpha hydroxylase.

Objectives:
This study was carried to assess bone mineral density (BMD) in Egyptian children with CRF and to study its relation with leptin, insulin resistance and parathormone (PTH) levels.

METHODS: BMD was measured using Dual Energy X-ray Absorptiometry (DEXA) at lumbar spine in 35 Egyptian children with CRF (20 children in the predialysis phase and 15 children with end stage renal failure on regular haemodialysis). Fasting serum leptin; insulin, blood glucose and PTH levels were assessed. Insulin resistance index (IRI) was calculated. Patients were compared to a control group consisting of 15 healthy children of matched age and sex.

RESULTS: Low bone mass was found in 13 CRF patients (37.1 %); 8 dialysis children (53.3%) and 5 predialysis children (25%); respectively. BMD Z-score was not significantly different between predialysis and dialysis patients (P = 0.09). In comparison to controls; patients had significantly elevated serum leptin level [Median (IQR) = 0.9 (0.6-1.0) Vs 1.00 (0.8-2.2) ng/ml respectively; (P = 0.002)]; significantly elevated IRI [Median (IQR) = 0.78 (0.34-1.9) Vs 2.84 (1.9-3.5) respectively; (P <0.001)] and significantly elevated serum PTH level [Median (IQR) = 24.3 (22-33.5) Vs 97 (17-250) pg/ml respectively; (P <0.001)]. BMD Z score correlated negatively with PTH (r= - 0.79; P <0.001). There was no significant correlation between BMD Z score and leptin (r = 0.17; P = 0.31) or IRI (r = 0.07; P=0.66).

CONCLUSIONS: Low bone mineral density in children with CRF is mostly due to secondary hyperparathyroidism. Elevated leptin levels and IRI do not seem to have a role in the pathogenesis of bone disease in these patients.

2

Bone Mineral Density in Newly Diagnosed Children with Neuroblastoma.

Abstract

BACKGROUND: Neuroblastoma is the second most common extracranial malignant tumor of childhood and the most common solid tumor of infancy which is characterized by bone metastasis. Previous reports on bone mineral density (BMD) in patients with leukemia and solid malignancies concentrate on long-term survivors and on the effect of chemotherapeutic agents and irradiation. Also, evaluation of BMD in neuroblastoma was reported in few studies which were conducted upon adult survivors of childhood cancer. Previous studies on both acute leukemia and lymphoma patients suggested that the disease process itself played a role in decrease BMD.

METHODS: We evaluated 27 patients with newly diagnosed neuroblastoma for both lumbar (L2-L4) BMD and total BMD using dual energy X-ray absorptiometry (DXA) scan to highlight the effect of neuroblastoma as a disease process on BMD as this disease characterized by bone metastasis.

RESULTS: Three out of the 27 patients showed low bone mass in both lumbar and total BMD studies.
CONCLUSION: Low bone mass may occur in early disease process of neuroblastoma and it is important to consider BMD assessment during the early course of the disease as well as the long-term survivors as a part of the patient screening in suspected cases.