

# Osteoporosis International

with other metabolic bone diseases

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1,38m, weight: 55Kg, diagnosis at 24 years; no cardiovascular, renal or thyroid disorders. Since diagnosis treated during 6 years with estradiol valerate 2.00mg, ciprotherone acetate 1,00 mg and calcium 1.000mg per day. BMD showed no increase remaining in L2L4(Lunar) at 0,805g/cm<sup>2</sup>, Tsc : -3,29. Alendronate, 70 mg/week, was added along 1 year, and her BMD at L2L4 increased substantially 9.3%: 0,880g/cm<sup>2</sup>, Tsc: -2,67.

**CONCLUSIONS:** In this adult patient with TS, severely osteopenic, the addition of alendronate to HRT successfully increased BMD. More reports are necessary to confirm our findings.

P524SU

### NEW FIXATION TECHNIQUES FOR THE OSTEOPOROTIC PATIENT

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External fixation is often contraindicated and problematic for patients with osteoporosis. Two prospective randomized studies were conducted on osteoporotic patients to evaluate the effectiveness of HA-coated pins. HA pins, when compared to standard screws, would ensure proper fixation because of superior osteointegration of the bone-pin interface.

**METHODS:** 1)Female patients (n=20, BMD<-2.5 T-score, age≥65)with wrist fractures were randomized to receive external fixation treatment with either standard tapered pins or HA-coated tapered pins. After pre-drilling, two pins were implanted into the radial shaft and two pins into the second metacarpal. Fixators were removed after 6 weeks. Insertion and extraction torque were measured. 2)Female patients(n=40, BMD<-2.5 T-score, age≥65)with trochanteric fractures were randomly assigned to two groups. Group A(DHS) were implanted with standard pins and Group B(OPF)with HA-coated pins. Insertion, extraction torque and FNSA were measured. All fixators were removed at 3 months.

**RESULTS:** In patients with wrist fractures, pin extraction torque in the HA-coated pin group was 3-fold higher than the standard pin group. Significant deterioration in fixation was observed with standard pins. In the patient group with trochanteric fractures, Group A showed overall better results than Group B. There were no significant differences between post-operative and 6-month FNSA. Pin fixation improved over time as shown by a pin extraction torque higher than pin insertion torque.

**CONCLUSIONS:** This study showed that standard pins should be implanted with high insertion torque. This is impossible to achieve in osteoporotic bone. With HA-coated pins, extraction torque was not correlated with insertion torque. When HA-coated pins are implanted, good fixation is achieved regardless of pin insertion torque or bone density. No pin-tract infection occurred. Even under challenging biomechanical conditions, HA-coated pins achieve good fixation which is maintained over time. Since good fixation was achieved, FNSA did not change over time and no pin loosening and infection were observed. HA-coated pins make external fixation a legitimate treatment option for the surgeon to consider. Short surgery time, no need for transfusion, reduced hospital stay, early rehabilitation, minimal pin care and positive clinical results are the major advantages of this technique when treating this patient population with osteoporosis.

P525MO

### THE RELATION BETWEEN THE BONE MINERAL DENSITY AND BIOMECHANIC PARAMETERS AFTER THE OVARECTOMY ON RAT

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Recently some authors suggested that bone quality is more important than bone mineral density for the evaluation of the osteoporosis, fracture risk and osteoporosis treatment. Bone quality is evaluated by biomechanical parameters, histopathologically and quantitative computerized tomography. Biomechanical assessment is the most important parameter for the evaluation of the bone strength and the fracture risk for the osteoporosis.

In this study we investigated the effect osteoporosis on rat femur cortical bone biomechanical parameters. 14 female Sprague-Dawley rats, aged six months, were assigned randomly and 7 rats were ovariectomized for the development of osteoporosis and the other 7 rat was accepted as control group. Bone mineral density and bone biomechanical parameters were evaluated. Before ovariectomy and after the 14 weeks of the ovariectomy, we measured bone mineral density (BMD; g/cm<sup>2</sup>) by using dual-energy X ray absorptiometry and analyzed by regional high-resolution analysis of the small animal program. After the bone densities were measured, the animals sacrificed and femurs harvested for biomechanical evaluation. Biomechanical parameters of femoral midshaft were determined using a tensile test. The bones were loaded in biomaterial testing machine (MAY 03, USA) until failure, and load-displacement curves were recorded. Cortical bone area of femoral midshaft was measured by using computerized tomography. From the load-deformation curve, the following values were calculated: maximum load, stiffness, energy absorption capacity, elastic modulus and tensile strength. The ovariectomized rat femur's BMD had 14 % lower compared to control rats. Similarly, maximum load, stiffness, energy absorption capacity, elastic modulus and tensile strength were reduced 55 %, 72 %, 32 %, 53%, 21 %, respectively, in the ovariectomized rats. A positive correlation was found between the BMD and maximum load (r = 0.658), BMD and stiffness (r = 0.654), BMD and cortical bone area (r = 0.645). In conclusion we found that there was a positive correlation between the bone mineral density and bone biomechanical power at cortical bone. We suggested that further studies that investigate the effect of ovariectomy on trabecular bone are needed.

P526SA

### THE EFFECT OF LEAD EXPOSITION ON BONE: THE EVALUATION OF BONE MINERAL DENSITY AND BONE BIOMECHANIC PARAMETERS AT RAT FEMUR

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A study was evaluated the exposure of lead upon rat femur bone mineral content and biomechanical properties. 30 female 3-



month-old Wistar rats were divided randomly to a experimental group (n=20) and control group (n=10). Experimental group's rats were exposed to inorganic lead (100 mg Pb as lead acetate/kg body wt/day by gavage) for 70 days. Total bone mineral density was measured by using dual-energy X ray absorptiometry and analyzed by regional high-resolution analysis of the small animal program at the end of the exposition. Than the rats were sacrificed, blood samples were collected and femurs were harvested. Serum osteocalcin was measured by ELISA. Bone lead content was assayed by atomic absorption spectrophotometer. Cortical bone cross section area of femoral mid-shaft was measured by using computerized tomography. Biomechanical parameters of femoral mid-shaft were determined using a tensile test. The bones were loaded in biomaterial testing machine (MAY 03, USA) until failure, and load-displacement curves were recorded. From the load-deformation curve, the following values: breaking load, stiffness, energy absorption capacity were calculated. A significant increase in bone mineral density (p:0.001), breaking load (p: 0.027), stiffness (p:0.05), serum osteocalcin (p: 0.02) and bone lead content (p:0.009) was observed in the experimental group (p:0.001) Energy absorption capacity increased in experimental group but this was not significant (p: 0.168). There was a positive correlation between the BMD and bone strength. (r=0.678) In this study suggested that lead exposition was increase bone mineral density and bone strength and stiffness.

P527SU

#### PLASMA ANTIOXIDANTS IN AGED OSTEOPOROTIC WOMEN

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In recent years, reactive oxygen species (ROS) are considered to be responsible for ageing process. Under physiological conditions, the production of ROS by osteoclasts assists in accelerating destruction of calcified tissue and hence assists in bone remodeling. The aim of this study was to evaluate the serum antioxidant defenses in osteoporotic women and understand whether osteoporosis is a condition characterized by oxidative stress. In adequate sample of postmenopausal women, both superoxide dismutase (SOD) and glutathion peroxidase (GPx) were measured for antioxidant capacity and for oxidative stress lipid peroxidation was measured as malondialdehyde levels in both control and osteoporotic groups.

Twenty-four subjects whom mean age was 66.21 ± 8.39, chosen among postmenopausal osteoporotic women that had an independent mobility and a femoral neck T-score or L1-L4 T-score -2.5 or less. The control group consisted of 19 women with identical inclusion criteria and mean age 62.57 ± 7.76 (p > 0.05) but with a femoral or L1-L4 T-score -1 or more. All subjects were on a free diet and did not have any treatment for osteoporosis in the six months before the enrollment.

No differences in age, years since menopause, smoking and alcohol intake habits and functional activities were found between groups.

The activity of antioxidant enzyme GPx in serum was significantly lower in osteoporotics than in controls (142.72 ± 12.74, 167.37 ± 13.87 p < 0.05). Mean plasma levels of other antioxidant enzyme SOD did not show any significant difference between osteoporotics and control groups (6.36 ± 2.34, 6.71 ± 1.74 p > 0.05) MDA, a marker for oxidative damage also did not show any

significant difference between osteoporotics and control subjects (1.15 ± 0.45, 1.41 ± 0.53 p > 0.05)

These data seem to insist on a negative role for antioxidant deficit in age-related bone loss. By those results we can suggest that instead of increased production of free radicals decrease in antioxidant defenses is due to a poor dietary antioxidant intake. On the other hand, expected increased production of reactive oxygen intermediates may be providing the formation of molecules different from MDA.

P528MO

#### COMPARISON AND CONCORDANCE OF SERUM AND URINE LEVELS OF AMINO TERMINAL CROSSLINKED TELOPEPTIDES OF COLLAGEN I (NTX) IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS, PSORIASIS VULGARIS AND PSORIATIC ARTHRITIS

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Aims:

Biochemical markers of bone turnover have proven be of value to predict the rate of bone turnover, bone loss and the risk of osteoporotic fracture and so to help for prevention and treatment of metabolic bone diseases. NTX have shown higher diagnostic efficacy than the traditional serum like urine pyridinoline or deoxypyridinoline. Most rheumatologic disease have an evidence of osteoclastic activation rather than bone formation because of multifactorial etiologies thus resulting with osteoporosis. We performed a comparative study on the sensitivity and concordance of biochemical markers of bone resorption: serum(sNTX) and urine(uNTX).

Methods:

Twentythree postmenopausal osteoporotic women (PMO, aged 51-71), 19 patients with psoriasis vulgaris (PSV, aged 38-61) and 9 psoriatic arthritis (PSA, aged 18-71) were included in this study. Patients who were on any prior treatment with bisphosphonate, estrogen, calcitonin, anabolic steroids or glucocorticoid within the preceding 6 months or patients with serious renal or liver insufficiency were excluded. Blood sample and second morning void urine were collected between 08:00 and 10:30 hours after an overnight fast were collected. uNTX and sNTX levels were evaluated by an enzymelinked immunosorbent assay method. Statistical analysis of differences between groups was performed by Mann-Whitney U test and One Way ANOVA.

Results:

Our patients' sNTX and uNTX mean and SD values were as seen below (Table). uNTX mean values of PSA patients were highest and there was a significant difference when compared to mean values of PSV patients (p < 0.05). sNTX mean values of PSA and PMO patients were similar and both were significantly lower than sNTX mean values of PSV patients (p < 0.05)

Conclusions:

We have observed that NTX mean values of PMO and PSA were similar, and mean values of PSV patients were significantly different from others, similarly had highest and lowest values, so we can suggest that as uNTX levels are known to increase with age and can be useful in the evaluation of osteoporosis risk.