RELATIONSHIP BETWEEN LUMBAR BONE MINERAL DENSITY (BMD) AND BODY MASS INDEX (BMI) IN ITALIAN POPULATION

Background: It's well known that higher BMI scores are protective for osteoporosis in postmenopausal women. Several studies have evaluated the relationship between Bone Mineral Density (BMD) and Body Mass Index (BMI) in patients affected by osteoporosis in different parts of world but few data are present among Italian population.

Objectives: Primary aim of this study was to obtain data about BMI and bone mineral levels in the lumbar spine of Italy adult females based on a nationally representative sample of more than 15000 women aged 20 years and older and so to determine the relationship between BMI and BMD. Data were retrospectively extracted from the Magenta's Rheumatology Unit Densitometry Registry

Methods: Demographic (age, age at menarche and menopause) and anthropometric (BMI) data of females aged 20 years and older that performed their first DEXA in our Hospital between 2006 and 2014 were extracted from our local registry using a random sampling technique. Bone mineral density (BMD) was determined using dual-energy X-ray absorptiometry (DXA) on a Hologic bone densitometer (QDR 9000 Hologic, Waltham, Mass.). Subjects performed the DEXA scan for screening for osteopenia or because of their increased awareness of their health. Criteria for patient selection were: absence of known risk factors of Osteoporosis (eg smoke, alcohol, metabolic disease that affects bone, fractures), a concomitant or previous treatment of osteoporosis or corticosteroids. Patients with low or high BMI (over 95 percentile) were eligible. Osteopenia and osteoporosis were defined by T-score< -1 and < -2.5, respectively. In this study we used the WHO BMI classification: underweight <18.5 kg/m2; normal weight 18.5-24.9 kg/m2; over weight 25-29.9 kg/m2; obese>30 kg/m2

Results: 15335 DEXA scan analysed. Mean age was 64.2±12.8 years (range 20.8 to 90). 14138 patients were post menopausal. Mean BMI was 26.4±5.1 (range 15 to 36). Mean menopause age was 48.3±5 (range 31-54). Mean menarche age was 16.3±5 (range 11-17). The prevalence of osteoporosis and osteopenia in post menopausal women were 34,3% and 43,9% respectively. In post menopausal subjects we found a positive correlation between BMD and the other variables collected BMI and age at menopause (0.271 and 0.114 respectively, $p<0.001$). An ANOVA univariate confirmed the direct relationship between BMD and BMI for every value of BMI. In the pre menopausal women we found a relationship with a inverted U-shape. In this subpopulation the lowest and highest BMI values were associated to the lowest BMD values

Conclusions: Our study shown a different role of BMI on BMD values: in post menopausal women the BMD seems to have a direct relationship with BMI for every BMI value. On the other hand there is a trend like a parabolic curve, with lower BMD at BMI levels of underweight or overweight, in the premenopausal women.