



ECR2019 the bigger picture

BOOK OF ABSTRACTS



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0.05 mm ($p < 0.001$), a reduction of 0.005 mm per kg of weight lost. Conservative approach did not impact cardiovascular risk markers.
Conclusion: Weight loss after bariatric surgery substantially reduces carotid IMT values consistent with a lowering in risk of cardiovascular events.

10:30 - 12:00

Room N

Musculoskeletal

SS 210a

Haematological, metabolic and endocrine diseases

Moderators:

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B-0045 10:30

Incidence of vertebral fractures in patients with β -thalassaemia major in treatment with oral bisphosphonate

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Purpose: To analyze the efficacy of oral bisphosphonate therapy (alendronate and risedronate) in patients with β -Thalassaemia evaluating incidence of vertebral fractures (VFs) and bone mineral density (BMD) values.

Methods and Materials: 60 patients (31 M, 29 F) with β -thalassaemia major of average age 35.02 ± 6.32 afferent at the center of Ferrara were selected retrospectively with age > 25 years, at least 1 between reduced BMD (Z-score < -2 premenopausal women and men aged < 50), osteoporosis (T-score < -2.5), ≥ 1 fragility fracture. We analyzed BMD values, thoracolumbar radiographs for VFs evaluation (according Genant classification) and biochemical data at 2, 3 and 5 years.

Results: The mean duration of therapy was 6.23 ± 1.93 years. We observed an improvement from baseline of lumbar spine BMD of 4% to 2 yr of treatment, 2% to 3 yr and 3% to 5 yr. BMD is increased by 1% in the femur (F) and 2% at the neck of the femur (FN) at 2 yr of treatment, at 3 yr + 1% (F) and 0% (FN), at 5 aa -3% (F) and -2% (FN). Incidence of new vertebral fractures was of 27%.

Conclusion: Therapy was useful in rising BMD at the lumbar level with an improvement of Z and T-score and in stabilizing BMD at the femoral level (F and FN) in the first 3 yr of therapy with a slight reduction at 5 yr, but VFs in these well-treated patients were still common and morphometry measurement remains a useful test in surveillance of these patients.

B-0046 10:38

Lumbar spine bone mineral density Z-score discrepancy by DXA and QCT in thalassaemic major patients

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Purpose: Dual X-ray absorptiometry (DXA) is the most common mode of bone mineral density (BMD) evaluation in young adults with β -thalassaemia major (TM). In addition to DXA that determines an areal BMD, Quantitative Computerised Tomography (QCT) also detects volumetric BMD which is independent of bone size. Our aim is to evaluate concordance of BMD values in thalassaemic patients obtained by QCT and DXA.

Methods and Materials: We enrolled 15 patients with TM from the Hospital of Ferrara who underwent both a DXA scan of lumbar spine in regular follow-up and an unenhanced CT, performed for other causes, within 4 months. CT images of lumbar spine were evaluated with a quantitative dedicated post-processing software calculating volumetric BMD for L1-L4 vertebrae. BMD values of both methods were expressed as Z-scores and T-scores and the results were correlated.

Results: Of 10 patients (6 males < 50 aged, 4 premenopausal woman), the overall prevalence of severely low bone density (Z-score ≤ -2) was 9/10 (90%) by DXA and 3/10 (30%) by QCT with concordance in 4/10 patients (40%). In all 10 patients of this group QCT Z-score was higher than DXA Z-score with significant difference (p -value = 0.002). 5 patients (>50 years old) showed T-score ≤ -2.5 correspondent to osteoporosis both on DXA and QCT with 100% of concordance.

Conclusion: Our data show a discrepancy in lumbar BMD Z-scores by DXA and QCT in thalassaemic patients suggesting that DXA BMD could be falsely low in young subjects with short bones and QCT could be more accurate to assess it.

B-0047 10:46

Opportunistic osteoporosis screening using hydroxyapatite-specific vertebral bone mineral density measurements derived from dual-layer CT
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Purpose: To evaluate the applicability of in vivo hydroxyapatite (HA)-specific bone mineral density (BMD) measurements based on non-contrast-enhanced phantomless dual-layer spectral CT (DLCT).

Methods and Materials: BMD were obtained using spectral information from DLCT as well as with quantitative CT (QCT) examining a spine phantom with three artificial vertebral bodies with known HA densities, while simulating different patient positions and grades of obesity. Furthermore, HA-specific BMD values were determined using non-contrast routine DLCT in 174 vertebrae (33 patients; 66 ± 18 years; 33% women; 45% with prevalent fractures) and the results were compared with QCT-based BMD. The discriminative power of HA-specific BMD for differentiating subjects with versus without osteoporotic fractures was analysed using ROC analyses, also for an extended cohort of 79 patients (66 ± 18 years; 52% women; 38% with prevalent fractures).

Results: HA-specific BMD measurements in the phantom were more accurate than QCT, particularly when simulating obese patients. In vivo, strong correlations were shown between DLCT and QCT ($r = 0.987$, $p < 0.001$) and a high agreement in a Bland-Altman plot was observed. ROC areas under the curve (AUC) were 0.889 for QCT- and 0.878 for DLCT-based BMD in 33 patients. The AUC for the extended cohort was 0.858 for HA-specific BMD measurements, with an optimal cut-off at 81 mg/ml.

Conclusion: In vivo, DLCT-based HA-specific BMD measurements showed comparable results to QCT measurements as well as for distinguishing patients with vertebral fractures and those without. This suggests that HA-specific BMD measurements obtained from phantomless DLCT may be used for opportunistic osteoporosis screening.

B-0048 10:54

Consistency of bone mineral density assessments between dual-energy CT and quantitative CT

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Purpose: To evaluate the consistency of bone mineral density (BMD) measurements between a phantomless dual-energy CT scanner and conventional quantitative CT (QCT) in vitro.

Methods and Materials: QCT and dual-energy CT scans of 23 fresh sheep vertebrae were performed on the same CT scanner which generated dual-energy images from rapid kilovoltage switches (80kv-140kv). A fixed tube voltage of 120kv was applied for QCT scans with the bone equivalent phantom placed below the samples. Trabecular BMD analyses of QCT images were performed using QCTpro software. The dual-energy CT images were processed to generate calcium hydroxyapatite (HAP) density images based on HAP-water material pairs. HAP densities of the same regions were measured. Pearson correlation, paired t test, and intraclass correlation coefficient (ICC) were applied for consistency assessment.

Results: BMD measurements of QCT ranged from 136 mg/cm^3 to 486 mg/cm^3 , and the BMD measurements of DECT ranged from 128 mg/cm^3 to 419 mg/cm^3 . BMD derived from DECT images were significantly lower than that of QCT ($p < 0.001$), while they displayed a strongly linear correlation ($r = 0.989$, $p < 0.001$). The ICC between the two measurements was 0.974 ($p < 0.001$).

Conclusion: In vitro, the HAP densities acquired by dual-energy CT displays a highly linear correlation with BMD measured by QCT of the same specimens. Although the results from dual-energy CT were not completely same as QCT, the phantomless dual-energy CT has the potential to be applied for BMD assessment clinically.

B-0049 11:02

Metacarpal bone diameter increases constantly, but escalated resorption of the inner surface at menopause explains decreased bone mineral density - a study in 1492 adult women

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Purpose: To assess how bone morphology and mineralization changes with age in women.

Methods and Materials: The non-dominant hand was analyzed with digital X-ray radiogrammetry (DXR) in 1,429 women aged 40-74 years undergoing mammography screening twice with 18 to 24 months interval, depending on age. Yearly change in bone parameters was calculated by averaging the individual changes.

Results: Both the inner and outer diameter of the metacarpals increased with age while DXR bone mineral density (DXR-BMD) decreased. There was a continuous increase in outer diameter in adult age while there was a five-fold increase in yearly inner diameter growth and DXR-BMD loss during 48 to 53