Bone turnover disorder and osteopenia/osteoporosis after liver transplantation – preliminary report.

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Ankylosing spondylitis (AS) is characterized by both bone formation and bone loss in the spine. Conflicting data have been published about markers of bone turnover in AS. The aim was to study the relationship between age and bone turnover in patients with active AS.

Seventy-five patients with AS based on the modified New York criteria and active disease defined by BASDAI score = >4.0 (range 0–10) were included. Excluded were the concomitant presence of intestinal diseases, malnutrition, chronic renal or hepatic disease, diabetes mellitus, parathyroid or thyroid disease, and drug intake affecting the bone metabolism.

Seventy patients were receiving nonsteroidal anti-inflammatory drugs and 13 patients disease-modifying antirheumatic drugs at the time of the study. The bone formation markers, procollagen type 1 N-terminal peptide (PINP), bone-specific alkaline phosphatase (BALP), osteocalcin (OC), and bone resorption marker, serum C-telopeptides (sCTX), were measured. Z-scores of the bone turnover markers were calculated using matched 10-years-cohorts of a Dutch reference group (150 men or 350 women), checked for normal serum 25-hydroxyvitamin D levels and also for normal bone mineral density after 50 years of age. Mean age of patients was 40.2 years (SD ± 10.6) and 71% were male. The median (range) disease duration was 14 years (2–47). Age was positively correlated (Spearman) with all bone turnover markers: PINP Z-score ho = .512 ($p < 0.001$), BALP Z-score ho = .277 ($p < 0.05$), OC Z-score ho = .330 ($p < 0.01$), and sCTX Z-core ho = .258 ($p < 0.05$). Age is positively correlated with the Z-scores of markers of both bone formation and bone resorption in patients with active AS. The use of Z-scores corrects for the influence that age has on bone turnover markers in healthy persons: a slow decrease in men and an increase after menopause in women. Therefore, the positive correlation of age with all bone turnover markers in our cross-sectional cohort indicates that AS affects bone. Further study is needed to clarify the relationship between bone turnover and disease duration, disease activity and damage in patients with AS.

Conflict of interest: None declared.

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P097

Bone turnover disorder and Osteopenia/Osteoporosis after liver transplantation – preliminary report

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Chronic liver disease and liver transplantation may cause hepatic osteodystrophy due to many risk factors, e.g. malnutrition, immobility, hypogonadism and immunosupressants. Reduced bone formation and increased resorption contribute to osteoporosis and fractures after liver transplantation. The aim of this study was to investigate bone metabolism after liver transplantation. Patients and methods – Bone markers were measured in in 35 liver transplant recipients (32–59 years) on day 0 and 14, 3 months and 6 months after surgery.

DEXA (L1-L4, left hip) was performed at 6 months in 20 patients. Bone markers measured: osteocalcin (OC), procollagen 1 propeptide (P1CP), beta crosslaps (CS), bone alkaline phosphatase (BAP) and osteoprotegerin (OPG). Immunosupressive therapy included corticosteroids, tacrolimus and mycophenolat mofetil. Results – Initially CS was high, BAP and P1CP were moderately increased, and OC decreased. BAP and OC increased significantly (paired Wilcoxon test) in the follow-up period, alhtough OC remained low. P1CP normalised in the first three months and CS after 6 months, both changes were significant.

Osteoprotegerin decreased by half after 14 days ($p < 0.01$) and remained during this period. Osteoporosis of both sites was found in 3 (M), osteopenia in 8 (5M, 3F) and osteopenia of hip only in 2 patients (1M, 1F). No differences between sexes for bone markers or densitometry *T*-scores were found. These results indicate disorder of bone turnover after liver transplantation. Bone resorption was increased and also OPG . Differences were observed for bone formation markers, BAP and P1CP were moderately or initially increased, but OC was decreased. This finding cannot be explained by differences in clearance routes of bone formation markers. Conclusions- Increased bone resorption normalised within 6 months after liver transplantation. Bone formation markers did not unequivocally indicate decreased, increased or normal osteoblast activity, and it remains to be further investigated. Bone turnover imbalance together with high incidence of osteoporosis and osteopenia (11/20) after liver transplantation points to skeletal impairment.

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P098

Renal calcium excretion impairment in kidney recipients-relationship to bone turnover

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The relationship between renal calcium excretion impairment and bone turnover was investigated in kidney recipients with good and stable kidney function. In 78 (41 M, 37 F, aged 24–70 years, creatinine clearance >60 ml/min/1.73 m2) kidney recipients, the following serum parameters were estimated: iPTH, total alkaline phosphatase (tALP), bone alkaline phosphatase (bALP), procollagen I C-terminal propeptide (PICP), osteocalcin (OC), crosslaps (cs), 25(OH)D3, total Ca, Ca+, Pi, creatinine. Urine creatinine and Ca were also measured and creatinine clearance and Ca:Creatinine clearance ratio were estimated. According to the Ca:Cr Cl ratio, patients were divided into three groups; 1) <0.01 (probably impaired sensitivity of calcium-sensing receptors, CaR), 2) 0.01–0.02 (normal ratio) 3) >0.02 (usually found in hyperparathyroidism). Results: Ca, median 2.535 (2.05–3.18) mmol/L Groups of patients according to the Ca:Cr clearance ratio: number of patients (Ca,iPTH, Ca and iPTH above reference range): 1) 21/78 (7/21, 8/21, 4/21), 2) 40/78 (19/40, 21/40, 13/40), 3) 17/78 (15/17, 15/17,13/17). When the groups were compared (Kruskall Wallis test), a significant difference was found for iPTH, serum total calcium and Ca+ (the highest values in group 3). When comparison was made between groups 1 and 2 (Mann-Whitney U test), no significant difference was found. Posttransplant period was significantly shorter and serum iPTH, tALP, bALP, OC,cs, Ca, Ca+ were significantly higher in group 3 than in groups 1 and 2 (Mann-Whitney U test). *P* values <0.05 were considered significant. Thus, the majority of patients in group 3 were considered hyperparathyroid. In some patients, Ca:Creatinine clearance ratio was the same as in conditions characterized by impaired sensitivity of calcium-sensing receptors.

In conclusion: Impairment of renal calcium excretion occurs in some kidney recipients with good renal function. High renal calcium excretion was found in hyperparathyroid patients i.e. it was associated with high bone turnover. Low calcium excretion was not influenced by bone turnover itself, but may be associated with impairment of calcium-sensing receptor sensitivity.

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