AB1011

CLINICAL TRIAL OF INTRAVENOUS INFUSION OF FUCOSYLATED BONE MARROW MESENCHYMAL STEM CELLS IN PATIENTS WITH OSTEOPOROSIS

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Background: Osteoporosis (OP) is a systemic bone disease characterised by decreased bone mass and deterioration of bone microarchitecture with increased brittleness and fracture risk. It associates high morbidity and mortality for patients and has a high impact on health expenditure. Bone marrow stromal mesenchymal stem cells (BM-MSC) give rise to osteoprogenitor cells and osteoblasts and influence bone homeostasis. However after their intravenous (i/v) infusion their osteotropism is limited. Our group has demonstrated that the exofucosylation of the CD44 membrane antigen in MSC improves their homing to bone tissue and that the infusion of these cells is safe in a murine model.

Objectives: To evaluate the safety of i/v infusion of fucosylated BM-MSC in patients with OP, and secondarily assess their ability to improve the course of the disease

Methods: 10 women between 50 and 75 years old diagnosed with osteoporosis with a low impact fracture will be included and treated i/v with autologous fucosylated BM-MSC. The first 4 patients were treated with a dose of 2×10^6 cells/kg body weight and the other 6 with 5×10^6 cells/kg body weight. A 24 month follow-up will be conducted to evaluate the rate of severe and non-serious adverse events and secondary endpoints (decreased fracture rate, pain scores, functional status and quality of life, biochemical indexes of bone metabolism, quantitative computed tomography for morphometric and mechanical analysis of bone quality, densitometry, and histomorphometry)

Results: Seven patients have been recruited to date. Two left the study for lack of cell proliferation and appearance of a complex form in karyotype during the cell culture, respectively. The first 4 patients were successfully infused, and after a median follow-up of 3 months no related adverse effects have been observed, no new osteoporotic fractures have appeared, and the analogue pain scale score (EVA) shows a tendency to decrease of pain in 3 of the 4 patients.

Conclusions: Our preliminary data indicate that clinical and GMP-grade production of BM-MSC is feasible. We have not observed any short-term adverse effects associated with treatment in infused patients.

Disclosure of Interest: None declared

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AB1012

BONE MASS CHANGES CORRELATE WITH DISEASE ACTIVITY IN NON-ARTHRITIC PSORIATIC PATIENTS

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Background: Psoriasis is a chronic inflammatory skin disease, and as all inflammatory processes, it could induce osteoclast activation¹ ending up with osteoporosis. It is well known that a recognised contributing factor to bone strength, independent from bone mass, is micro-architectural damage; therefore, evaluation of microarchitecture seems to be necessary to get adequate information about bone quality health. Trabecular bone score (TBS) is a new tool to assess bone quality.² To date, studies on TBS assessment in psoriasis are lacking, even if it was suggested to be correlated with inflammation and metabolic parameters.³

Objectives: The aim of the study was to investigate bone quality and bone quantity in psoriatic patients without arthropathic involvement and its relationship with dermal disease activity (PASI).

Methods: Thirty-five psoriatic patients and thirty-four healthy controls were enrolled. We first assessed Body Mass Index (BMI), Bone Mineral Density (BMD)

and Trabecular Bone Score (TBS) in both patients and healthy control. The Bone Mineral Density (BMD) (g/cm²) was analysed by dual-energy X-ray absorptiometry scan (Lunar Prodigy) and, using same machine, anteroposterior spine analysis was performed to evaluate TBS for L1-L4 using TBS insight Medimaps software. TBS >1.350 units was considered normal. Psoriatic patients were also divided in two subgroups according to skin lesion presentation (plaque psoriasis and guttate psoriasis) and dermal disease activity was measured by Psoriasis Area and Severity Index (PASI).

Results: In the psoriatic cohort (mean age 62.8 ± 12.6 years, BMI 27.8 ± 3.4 g/m², disease duration 18.6 ± 11.9 years, PASI 8.3 ± 7.6) 36% of patients showed low bone mass, particularly, 33.3% showed osteopenia and 2.7% osteoporosis. There was not significantly statistical difference between mean BMD and TBS in psoriatic patients when compared to the healthy control group. However, in psoriatic patients a negative correlation between neck-BMD and PASI ($p=0.003$) was detected independently of sex and age. Conversely, TBS was not statistically correlated with PASI or with BMI. It was interesting to verify that the plaque psoriasis group showed a positive correlation between PASI and age ($p=0.01$). Conversely, PASI was negatively correlated with lumbar spine T-score ($p=0.01$) and both lumbar spine and femoral neck BMD ($p=0.04$ and $p=0.02$ respectively).

Conclusions: This pilot study suggests that in psoriasis, particularly in the plaque subgroup, the severity of skin involvement might correlate with bone mass but not with bone quality (TBS). Despite previous evidences, we can't assess any correlation between TBS and metabolic parameters. Further studies with larger cohorts are needed on this topic.

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AB1013

PREDICTION OF BONE MINERAL DENSITY CHANGES IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background: Osteoporosis and its related fractures is one of the most dominant, troublesome complications in rheumatoid arthritis (RA). Newly-introduced drugs such as methotrexate and biological and targeted synthetic disease modifying anti-rheumatic drugs have decreased disease activity drastically, but the improvement of osteoporosis remains to be investigated.

Objectives: To find useful factors for bone mineral density (BMD) management of RA patients under the current treatment.

Methods: We consecutively recruited 370 RA patients treated at Kyoto University Hospital in 2012. We prospectively collected the BMD values of the lumbar spine and the distal forearm measured by dual-energy X-ray absorptiometry (DXA), blood sampling test, urinalysis including bone metabolic biomarkers and clinical parameters of the RA patients in 2012 and 2014. Multivariate regression analysis was performed after adjustment by age, sex, body mass index (BMI), steroid use, anti-osteoporosis medication. We set the annualised BMD change as an outcome variable and allotted the other parameters as explanatory variables by a stepwise procedure.

Results: The average values (minimum-maximum value) of age and BMI were 63.3 (32–85) years and 22.1 (12.3–30.0), respectively. Female patients and steroid users accounted for 91.1%, and 41.0%, respectively. Coincidentally, anti-osteoporosis drug-user also reached 41.0%. User of biological accounted for 30.8%. The averages of disease activity score (DAS) 28-erythrocyte sedimentation rate, Health Assessment Questionnaire were 2.6 (0.1–5.9) and 0.8 (0–2.9), respectively. The average of total Sharp score was 122.6 (0–443). Laboratory data showed serum tartrate-resistant acid phosphatase (TRACP)–5b, serum homocysteine, serum undercarboxylated osteocalcin, bone specific alkaline phosphatase, and urinary pentosidine were 320.0 (68–877) mU/dl, 9.7 (3.2–28) nmol/ml, 4.8 (0–23) ng/mL, 15.6 (5.8–43.6) µg/L, and 50.0 (11.5–561) pg/ml, respectively. Next, we describe by the result of multiple regression analysis. The levels of serum homocysteine ($\beta=-0.19$; 95%CI: 0.24 to 1.75; $p=0.01$) and anti-osteoporosis drug ($\beta=-0.19$; 95%CI: -0.26 to -0.04 ; $p=0.009$) were consistently significant predictive variables of annualised BMD change of the lumbar-spine. On the other hand, serum TRACP-5b ($\beta=-0.28$; 95%CI: -0.005 to -0.001 ; $p=0.002$) was significant predictive one for the distal forearm.

Conclusions: Anti-osteoporosis medication may be particularly important for lumbar spine BMD for RA patients, regardless of steroid-use. Specific biomarkers would be useful such as homocysteine as lumbar spine BMD and TRACP-5b as

the forearm BMD. These findings would be helpful for osteoporosis management in RA patients.

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AB1014

EPIDEMIOLOGICAL FEATURES OF PERIPHERAL FRAGILITY FRACTURES IN WOMEN IN REPUBLIC OF MOLDOVA

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Background: Osteoporosis is a disease which is frequently asymptomatic until fragility fractures occur. The study of risk factors in osteoporosis is continuously developing, considering that there is a tremendous geographic variety in osteoporosis occurrence. We present the results of an epidemiological study of fragility fracture cases in Republic of Moldova, trying to underlie differences in fragility fracture epidemiology, based on residence region, and possibly lifestyle factors, in a female population.

Objectives: The purpose of the study was to determine the incidence and prevalence of fragility fractures in women, with comparison of epidemiological indexes between urban and rural areas in Republic of Moldova.

Methods: Approximately 6% of the state population was included in the study. Data regarding peripheral fragility fracture cases was collected from all specialised and primary medical institutions from the defined area. Fragility fractures of proximal humerus, distal forearm, proximal femur and distal calf, in women aged over 40 years old were collected. Using population statistics provided by the National Bureau of Statistics, epidemiological indexes regarding fracture incidence and prevalence were derived, with further comparison of derived epidemiological indexes for urban and rural areas, as well as separate epidemiological indexes for the four fracture regions.

Results: A general incidence of 1033.4 peripheral fragility fractures per 1 00 000 female population >40 years was determined, with a significantly higher incidence in urban areas (1216.7 vs 980.1, $p<0.05$). The incidence of proximal humerus fracture was 149 per 1 00 000 female population >40 years, with a small, but significantly higher incidence in urban areas (159.5 vs 145.9, $p<0.05$). The incidence of distal forearm fractures was 393.4 per 1 00 000 population >40 years, significantly higher in urban areas (528.5 vs 354.1, $p<0.05$). The incidence of proximal femur fracture was 208.5 per 1 00 000 population >40 years, significantly higher in urban areas (227.9 vs 202.9, $p<0.05$). The incidence of distal calf fractures was 282.5 per 1 00 000 population >40 years, with a small, but significantly higher incidence in urban areas (300.7 vs 277.2, $p<0.05$).

Conclusions: There was an overall higher incidence of fragility fractures in the urban female population compared to the rural one, with a similar relationship in all four fracture groups. The association between urban residence and increased incidence of fragility fractures in women, could be attributed to a less active physical lifestyle (known risk factor in osteoporosis) in urban areas. Distal forearm fractures showed a greater prevalence both in urban and in rural areas, compared to other fracture types. Moreover, the incidence difference between urban and rural areas was most prevalent in the distal forearm fracture group. The latter observation was not determined in a similar study in men, in the same population and period of time.

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AB1015

BONE MINERAL DENSITY IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Background: Chronic kidney disease (CKD) is commonly associated with disorders of mineral and bone metabolism.¹ However, the relationship between renal function and bone mineral density (BMD) is controversial.²⁻³

Objectives: We aimed the relationship between markers of renal function and BMD in patients with CKD.

Methods: 95 patients both sexes with CKD aged 55.49±10.07 years were studied. Control group included 84 healthy subjects the same age. Standard laboratory analyses were performed in all patients. Renal function was assessed by the estimated glomerular filtration rate (eGFR), which was calculated using an equation based on creatinine (eGFRcr) and cystatin C (eGFRcys_c). Osteoporosis was defined as a femoral neck BMD T-score below -2.5.

Results: The serum cystatin C level was negatively correlated with BMD and T-score right and left femoral neck ($p<0.05$), but not with BMD T-score lumbar spine. The level of creatinine was negatively correlated only with BMD and T-score right femoral neck ($r=-0.653$, $p<0.05$). Higher cystatin C levels were associated with a higher prevalence of osteoporosis in CKD patients (OR 3.54; 95% CI 1.63-7.85; $p=0.002$). In logistic regression analysis, after adjusting for age, body mass index, calcium, only cystatin C showed a negative correlation with femoral BMD. In addition, the eGFRcys_c showed a stronger positive correlation with femoral BMD than the eGFRcr.

Conclusions: Our findings suggest that serum cystatin C level could be a marker for femoral BMD and might help identify patients with osteoporosis who are susceptible to fractures.

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AB1016

OSSEOINTEGRATED IMPLANTS FOR LOWER LIMB AMPUTEES: EVALUATION OF BONE MINERAL DENSITY

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Background: The use of dual-energy X-ray absorptiometry (DXA) is a standard clinical procedure for the evaluation of bone mineral density (BMD). Amputee patients are known to have decreased BMD and an increased risk of osteoporosis in the affected proximal femur and hip region. The major cause of these issues in these patients is the absence adequate loading leading to bone resorption in accordance to Wolff's law.

Objectives: In this paper, we present a prospective study reporting changes in BMD among amputees who received osseointegrated implants to determine if the loading through the Osseointegrated implant can overcome the bone resorption issues.

Methods: This is a prospective study of 33 patients, consisting of 24 males and 9 females, aged 22-77 (mean=51.0±2.0) years with one and two-year follow-up. Selection criteria included age over 18 years, unilateral amputees with socket-related problems. All patients received osseointegrated implants press-fitted into the amputated limb. BMD was assessed using DXA in the femoral neck (operative and contralateral) and lumbar spine (L2-L4) regions, and corresponding Z-scores were generated. DXA scans were taken preoperatively as well as one-year and two-years following osseointegration surgery.

Results: Mean BMD and Z-scores of spine, and operative and contralateral sides were generated for all patients. Dependent t-tests were used to test for significant differences ($p<0.05$) preoperative, one-year, and two-years for mean changes in BMD and Z-Scores following surgery. Analysis of the BMD and Z-scores indicated that patients showed improvements at one-year post-surgery.

Conclusions: These results suggest that osseointegrated implants are effective at encouraging bone growth and restoring BMD levels for amputees within a short period of time post-surgery. Osseointegrated implants therefore have the potential to address stress distribution issues associated with socket prostheses and restore the normal bone loading regime in lower limb amputees.

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