ultrasonography. International collaborative studies and randomized clinical trials will help in clarifying these areas of uncertainty.

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THU0436

THE RELATIONSHIP OF BONE MINERAL DENSITY OF THE AXIAL SKELETON ON THE RISK OF PROGRESSION OF OSTEOARTHRITIS OF THE KNEE

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Objectives: To find the relationship between bone mineral density (BMD) and risk of knee OA progression in a 5-year prospective study.

Methods: 110 females with knee OA were examined twice with 5-year interval. Examination included filling questionnaires, VAS pain assessment, plain knee radiography and axial skeleton densitometry. I stage knee OA was established in 33 (30%) patients, II stage - in 46 (41.8%), III stage - in 26 (23.6%), and IV - in 5 (4.5%). Normal lumbar vertebrae densitometry BMD values were found in 45 patients (40.9%), osteopenia-corresponding BMD values - in 33 (30.0%), and osteoporosis - in 32 (29.1%). Normal femoral neck BMD values were identified in 60 (54.5%) patients, osteopenia-level BMD - in 48 (43.7%), osteoporosis - in 2 (1.8%). In all premenopausal patients (n = 15) axial skeleton BMD values were normal.

Results: In 5-year interval radiographic progression was established in 40 patients (Group 2), while in 70 (Group 1) patients no progression occurred. Both groups were comparable in terms of age and disease duration, although, more patients from Group 2 tended to have normal baseline densitometry BMD values - both in lumbar vertebrae and femoral neck: 47.5% vs 37.1%, and 62.5% vs 44.3% as compared to Group 1 patients. Patients from Group 1 more often had BMD values corresponding to osteoporosis and osteopenia: 32.9 vs 22.5%, and 55.7 vs 37.5%, respectively, as compared to Group 2 patients, although not achieving statistical significance. These differences were still identifiable after 5-year interval. Absolute BMD values at the second examination in 5 years were indicative of statistically significant increase in femoral neck and total hip BMD in Group 2 patients with knee OA progression: 0.79 ± 0.11 vs 0.73 ± 0.16 , $p < 0.01$, and 0.93 ± 0.14 vs 0.84 ± 0.25 , $p < 0.05$; respectively.

Abstract THU0436 –Table 1.

Femoral BMD differences correlating with OA stage
(Scheffe's method, $p < 0.05000$)

	I stage	II stage	III stage	IV stage
I stage		0,651186	0,996946	0,039177
II stage	0,651186		0,747927	0,213481
III stage	0,996946	0,747927		0,046981
IV stage	0,039177	0,213481	0,046981	

Abstract THU0436 –Table 2.

Lumbar vertebrae BMD differences correlating with OA stage
(Scheffe's method, $p \leq 0.05000$)

	I stage	II stage	III stage	IV stage
I stage		0,726047	0,998565	0,004315
II stage	0,726047		0,790777	0,021175
III stage	0,998565	0,790777		0,004115
IV stage	0,004315	0,021175	0,004115	

Thorough analysis of lumbar vertebrae BMD (g/cm^2) relationship with OA stages revealed that in patients with stage IV OA lumbar BMD values were significantly higher than in patients with stages I-III OA (stage I OA - BMD $0.87 \pm 0.12 \text{ g}/\text{cm}^2$; stage II OA - $0.92 \pm 0.21 \text{ g}/\text{cm}^2$; stage III OA - $0.88 \pm 0.13 \text{ g}/\text{cm}^2$; stage IV OA - BMD $1.07 \pm 0.17 \text{ g}/\text{cm}^2$) (Table1). Femoral BMD values didn't show evident correlation with knee OA stage, although there was a trend towards higher BMD values in patients with

stage IV OA compared to stage III OA ($p = 0.06$). Total hip BMD values were quite similar to lumbar BMD values ($p = 0.01$) (Table 2). BMD values were statistically significantly higher in patients with stage IV OA, than in patients with stages I and III (respectively, IV - $0.98 \pm 0.13 \text{ g}/\text{cm}^2$, I - $0.85 \pm 0.10 \text{ g}/\text{cm}^2$ and III - $0.86 \pm 0.16 \text{ g}/\text{cm}^2$). Correlation analysis also confirmed direct correlation between knee OA stage and BMD values in all evaluated compartments ($p < 0.05$).

Conclusion: Increasing during the 5-year follow up period femoral neck and total hip BMD values can be interpreted as the predictor of knee PA progression. More advanced OA stages are associated with higher BMD values. Future multicenter prospective studies are deemed to better establish the correlation between BMD and knee OA progression.

Disclosure of Interests:

Natalia Kashevarova: None declared, Elena Taskina Speakers bureau: Bayer, Sandoz, Boeringer-Ingelheim, Ludmila Alekseeva Speakers bureau: Bayer, Boeringer-Ingelheim, Gedeon-Richter, Servier, Nikolay Demin: None declared, Aleksandr Lila Speakers bureau: Sandoz, Pfizer, Abbvie, Novartis, Bayer

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THU0437

INCIDENCE OF OSTEOPOROTIC FRACTURE IN PATIENTS WITH KNEE OSTEOARTHRITIS: CLINICAL IMPACT OF FRAX-BASED OSTEOPOROSIS TREATMENT

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Background: The relationship between osteoporosis and osteoarthritis is complex and controversial. Several previous studies have indicated inverse relationship between osteoporosis and osteoarthritis [1-2]. However, the increased bone mineral density in osteoarthritis does not confer a reduce risk for fractures in other studies [3-4]. From the Rotterdam study, although patients with knee osteoarthritis had a higher bone mineral density, their incident fracture risk was increased as compared with those without knee osteoarthritis [5]. Therefore, fracture risk assessment in patients with knee osteoarthritis should not be overlooked.

Objectives: We aimed to evaluate the incidence of high risk group of osteoporotic fracture in patients with knee osteoarthritis comparing the FRAX and WHO criteria. We also examined whether patients with knee OA differ from age, sex, and BMI matched community-based control group without knee OA in terms of the incidence of high risk group of osteoporotic fracture.

Methods: We retrospectively assessed 282 Korean patients with knee OA who visited 5 medical centers between November 2012 and November 2015. For control group, 991 subjects aged of ≥ 50 years-old were enrolled in database of health checkup centers. After matching for age, sex and body mass index, 552 subjects (276 subjects in knee OA group and 276 subjects in control group) included for this study.

Results: Osteoporosis according to WHO criteria was detected 110 (39.86%) subjects in OA group, and 101 (36.59%) subjects in control group; these difference were not significant. However, mean FRAX major osteoporotic fracture probabilities calculated with femur neck T-score were significant different between OA group and control group (7.72% vs 6.10%, $p < 0.001$). Mean FRAX major osteoporotic fracture probabilities calculated without femur neck T-score were also significant different between OA group and control group (8.85% vs 6.86%, $p < 0.001$). Mean FRAX hip fracture probabilities calculated with femur neck T-score were significant different between OA group and control group (2.48% vs 1.73%, $p < 0.001$). Mean FRAX hip fracture probabilities calculated without femur neck T-score were also different significant between OA group and control group (3.50% vs 2.37%, $p < 0.001$). When FRAX calculations without the use of femur neck BMD was adjusted for knee OA group rather than control group, 5.9% more patients would be recommend for osteoporosis treatment. Among the clinical risk factors of FRAX, previous fracture was significant different between knee OA group and control group (15.9% vs 0%, $p < 0.001$).

Figure 1. Candidates for pharmacologic intervention by WHO criteria and FRAX criteria.

*P < 0.05. Statistical analysis was performed using McNemar's test. WHO, World Health Organization.

FRAX, Fracture risk assessment tool; OA, osteoarthritis; BMD, bone mineral density.

Abstract THU0437 – Figure 1

Conclusion: We demonstrated that knee OA patients have an increased risk of osteoporotic fracture according to FRAX criteria, but not WHO criteria. Our study suggests that FRAX supports clinical decision to reduce osteoporotic fracture in patients with knee OA.

Disclosure: All authors agree that there are no conflicts of interest (both personal and institutional) regarding scientific financial interests that are relevant to the work conducted or reported in this manuscript.

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THU0438 DO CORTICOSTEROIDS OR HYALURONIC ACID INTRA-ARTICULAR INJECTIONS IMPACT THE RISK OF TOTAL KNEE REPLACEMENT? REAL-LIFE DATA FROM THE KHOALA COHORT

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Background: Long-term structural outcomes of corticosteroids (CS) or hyaluronic acid (HA) intra-articular injections in knee osteoarthritis (KOA) are unclear. Whether HA injections delay the need for total knee replacement (TKR) remains controversial, and an increased risk of cartilage damage has been reported with repeated CS injections.

Objectives: We conducted this study to compare, in real-life setting, the risk of TKR in patients receiving CS or HA vs. in those who did not receive intra-articular injections.

Methods: Khoala cohort is a French nationwide population-based cohort of 878 patients with symptomatic hip or knee OA (ACR criteria), aged 40-75 years. This study included patients with baseline KOA only. Patients were followed annually by self-reported questionnaires and by clinical examination and radiography at baseline (year 0), years 3 and 5. The risk of incident TKR was compared between patients who had never received intra-articular injections vs. patients who received at least 1 CS or HA injection during follow-up.

We used a marginal structural model with inverse probability of treatment weighting to determine the causal relationship between treatment and the risk of incident TKR in the treated knee during the 5-year follow-up. This model allows the adjustment for time-varying confounding factors (i.e. pain, function and mental health scores) in addition to constant confounders (i.e. baseline age, sex, BMI, Kellgren-Lawrence grade).

Results: This study involved 656 patients (mean age 62.2 ± 8.5 years; 70.3% females) of which 91 (13.9%) underwent TKR during follow-up. CS or HA injections were performed in 143 (21.8%) and 191 (29.1%) patients, respectively, and 92 (14.0%) received both treatments. The 5-year relative risk of incident TKR in treated vs. untreated knee was 0.96 (95%CI 0.35 to 2.66; p=0.94) CS-treated knees and 0.38 (95%CI 0.15 to 1.03; p=0.06) in HA-treated knees.

Conclusion: In this study, CS injections for symptomatic KOA did not increase the 5-year risk of incident TKR. There was a non-significant trend for a reduced risk of TKR in HA-treated knees.

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THU0439

MEASUREMENT PROPERTIES OF PAIN CATASTROPHIZING SCALE IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Background: Up to 20% of patients with knee osteoarthritis (OA) do not respond well to knee replacement surgery (KR) despite surgical success. We hypothesize that pain catastrophizing among these patients may affect KR outcomes.

Objectives: To assess the validity and reliability of the Pain Catastrophizing Scale (PCS) in patients with knee osteoarthritis (OA) in Singapore.

Methods: We used cross-sectional data from 675 knee OA patients enlisted for knee replacement surgery (KR) in a Singapore tertiary referral hospital from May to September 2018. Data was collected 2 weeks prior to KR. Analyses were guided by the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) framework. Internal consistency was assessed using Cronbach's alpha. Construct validity was assessed through seven *a priori* hypotheses by correlation of overall PCS score with other patient-reported outcomes. Structural validity was evaluated via confirmatory factor analysis using maximum likelihood method. Measurement invariance across gender subgroups was assessed using multi-group confirmatory factor analysis.

Results: There were 675 patients (mean±SD age = 65.52±6.84 years, 70.37% female) with knee OA enlisted for KR (91.7% total, 8.3% unicompartmental). The mean±SD PCS score was 12.65±10.55, 0.14% and 8.63% ceiling and floor effects. PCS demonstrated high internal consistency (Cronbach's alpha=0.94). Construct validity was demonstrated by fulfillment of six out of seven (85%) *a priori* hypotheses. The PCS model showed good fit for a two-factor structure after accounting for appropriate modification indices (CFI=0.957, TLI=0.950, RMSEA=0.073, SRMR=0.043), demonstrating good structural validity. Measurement invariance across gender groups was demonstrated.

Conclusion: This study supports internal consistency, construct validity and structure validity of PCS as a measure of pain catastrophizing in knee OA patients in Singapore.