FRI0525 ASSOCIATION OF DYSMOBILITY SYNDROME WITH FRACTURE RISK IN THE MROS COHORT

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Background: Osteoporosis, obesity and sarcopenia are risk factors for fractures and their combination has a negative effect on musculoskeletal health (MSKH). We proposed a score-based approach to define this combination as "dysmobility syndrome (DS)". DS increases mortality in the NHANES cohort but no data exist on fracture risk. The most widely used fracture risk calculator, the WHO FRAX® tool, does not include several measures of MSKH such as physical function, muscle mass or falls. In this analysis of the Osteoporotic Fractures in Men (MrOS) cohort, we examine whether individuals with impaired MSKH/DS have a higher incidence of fragility fractures and whether this composite score confers additional risk for fracture, beyond risk estimates provided by FRAX®.

Objectives: In this analysis of the Osteoporotic Fractures in Men (MrOS) cohort, we examine whether individuals with impaired MSKH/DS have a higher incidence of fragility fractures and whether this composite score confers additional risk for fracture, beyond risk estimates provided by FRAX®.

Methods: The MrOS cohort was utilized in this study. The score-based approach to define DS includes six factors with one point assigned to each: appendicular lean mass/height2 $<$7.26 kg/m^2, body fat $>$30%, T-score $\leq$-2.5, grip strength $<$30 kg, gait speed $<$1.0 m/s, and falls in last 12 months. A score $\geq$3 indicated DS. We use odds ratios and cox proportional hazard models to analyze risks of major osteoporotic fracture (MOF). Men were censored at the time of fracture or last follow up. We determined the hazards of fracture using presence of dysmobility syndrome, the FRAX® score, and the FRAX® score in quartiles. We used the program R (www.r project.org) to perform all analyses.

Results: 5827 men ages 74±6 years with a mean BMI of 27.4±3.8 kg/m^2 had complete data necessary for this analysis. 391 males (6.7%) met criteria for DS. 571 (10%) experienced a MOF including 245 (4%) hip fractures. DS increased the hazards of major osteoporotic (HR 3.31, 95% CI, 2.58, 4.23) and hip (HR 3.48, 95% CI 2.41, 5.03) fractures. In adjusted models, DS and elevated FRAX® risk each increased the hazards of major osteoporotic and hip fracture. Interaction models showed no significant interaction between the presence of DS and FRAX® score for major osteoporotic (p=0.184) or hip (p=0.177) fractures.

Table 1. Cox Proportional Hazard Models for Fracture

Models	Major Osteoporotic Fracture 571 events Hazard Ratio (95% CI)	Hip Fracture 245 events Hazard Ratio (95% CI)
Dysmobility Index[a]	3.31 (2.59, 4.23)	3.48 (2.41, 5.03)
FRAX Score above treatment threshold	3.56 (2.51, 5.07)	5.52 (4.28, 7.11)
Dysmobility Index *and* FRAX Score	3.14 (2.45, 4.02) 3.17 (2.22, 4.51)	2.21 (1.52, 3.21) 5.14 (3.97, 6.65)

CI, Confidence Interval.

Conclusions: DS was associated with increased MOF fracture incidence even after adjusting for quartiles of FRAX® risk in this cohort of older men. Our study suggests that using a composite assessment of MSKH in addition to already available tools such as FRAX® may improve identification of individuals at high fracture risk. Additional analyses are necessary to examine whether this approach can better distinguish between those who will fracture and who will not and whether the results can be reproduced in women.

Disclosure of Interest: None declared

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FRI0526 ANTI-OSTEOPOROTIC THERAPY DECREASE CANCER RISK IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES

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Background: Some studies had looked at the long-term effect of anti-osteoporotic therapy on risks of different cancers in the general population. But epidemiological studies have consistently reported a reduced risk of breast cancer in bisphosphonate users. so there is little data to establish definitive conclusions.

Objectives: This study aimed to determine if anti-osteoporotic therapy can influence cancer risk in patients with osteoporotic vertebral fracture.

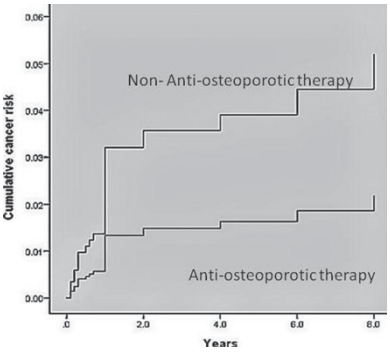
Methods: This retrospective study reviewed of cases of osteoporosis patients with acute vertebral fractures between 2001 and 2015. Anti-osteoporotic therapy were recorded (alendronate, ibandronate, zolendronic acid, raloxifen, teriparatide, denosumab). We followed these patients to develop cancer. All associated co-morbidities were recorded. Cox regression analysis were performed.

Results: There were 1128 patients with acute vertebral fractures were enrolled, among them 693 patients accepted anti-osteoporotic therapy, 432 were not. The mean age of anti-osteoporotic therapy was 73.86±7.52, while the age of nonanti-osteoporotic therapy was 72.82±10.92 (p=0.059). 15 (2.2%) patients of anti-osteoporotic therapy developed cancer, while 24 (5.6%) patients of non-antiosteoporotic therapy developed cancer (p=0.004). After adjusting for potential confounders, patients with antiosteoporotic therapy still had a lower cancer risk (p=0.038; HR: 0.428, 95% CI: 0.192∼0.955). The cancer risk also increased among smokers (p=0.002; HR: 10.505; 95% CI: 2.375∼46.462).

Table 1. Multivariable cox regression analysis of the hazard ratios for cancer

	Regression coefficient	SE	P value	HR (95.CI)
Anti-osteoporosis	-0.848	0.409	0.038	0.428 (0.192–0.955)
Gender	-0.693	0.584	0.236	0.500 (0.159–1.572)
Age	-0.029	0.016	0.071	0.972 (0.942–1.002)
Smmoking	2.352	0.759	0.002	10.505 (2.375–46.462)
liver disease	2.012	0.487	0.001	7.477 (2.880–19.412)
Kidney disease	-0.338	1.224	0.783	0.713 (0.065–7.859)
Cardiovascular disease	0.856	0.677	0.206	2.355 (0.624–8.882)
Pulmonary disease	0.771	0.597	0.197	2.162 (0.671–6.971)

Abbreviations: HR, hazard ratio; SE, standard error.



Conclusions: In this study, anti-osteoporotic therapy decrease cancer risk. So we could safely use these drugs in osteoporotic management.

References:

[1] British Journal of Cancer (2013) 109, 795–806.

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FRI0527 LACUNARITY OF TRABECULAR BONE MICROARCHITECTURE, TBLβ, AS A PREDICTOR OF BONE FRAGILITY FRACTURE AND POTENTIAL INDEX OF OSTEOPOROSIS TREATMENT EFFICACY. THE LOTO STUDY

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Background: Bone mineral density (BMD) by dual-energy X-ray absortiometry (DXA) is still the routinely diagnostic approach for osteoporosis. However, BMD alone is not a good predictor of fracture risk while bone microarchitecture emerges as a determinant of bone fragility independent of BMD. High-resolution magnetic resonance imaging (MRI) represents an effective tool for in vivo characterization of trabecular bone microarchitecture (TBA) by noninvasive/nonionizing methods. Nevertheless, texture analysis is not used in clinical practice because of the large number of parameters to be calculated and analyzed.

We previously developed a MRI method to provide one parameter (TBLβ) sensitive to TBA changes in aging and osteoporosis[1]. Fractal lacunarity was chosen for TBA texture analysis as it is able to describe bone network discontinuity and sizes of bone marrow spaces, whose changes are index of increased fracture risk.

Objectives: Clinical validation of the method as a new tool useful in early diagnosis of osteoporotic fracture risk is the strategic aim of LOTO study. One major objective is to verify the potential of TBLβ in discriminating patients with (VF+) and without (VF-) vertebral fractures. TBLβ as a potential marker of osteoporosis treatment efficacy is also investigated.

Methods: An observational, cross-sectional and prospective study on over50s women at risk for bone fragility fractures was designed to validate the method[2]. Sample size was estimated equal to 280 osteopenic/osteoporotic women with/without prior vertebral bone fragility fractures. The main outcome measure is TBLβ as an index of osteoporotic fracture risk. It is calculated by a software prototype of the gray-scale version of our method on L4 axial images acquired by 1.5T MRI spin-echo multislice technique[3].

Results: A complete set of baseline recording, including DXA-BMD, conventional column Rx morphometry, and lumbar spine MRI-spin echo images for TBA characterization, was obtained for 279 out of 309 subjects eligible for the study. Prevalent VF were found in 31.5% subjects, 47.7% of which defined osteopenic at lumbar spine by DXA-BMD and 67% younger than 65 years. Baseline results from ROC analysis show that the contribution of TBA degeneration (TBLβ=40) to prevalent fractures is statistically higher (p=0.032) than BMD (T-score=-2.5). TBLβ results (Table 1) show that the proposed method is able to discriminate between

VF+ and VF- patients (p=0.001). This result is further stressed in untreated T- subjects (p<0.0001). Treatment, any medication (T+), and drug therapy in particular, significantly counteract the difference between VF+ and VF- within groups (Table 1) and between groups with TBLβ values comparable to untreated VF- patients (p=0.319) and statistically higher than untreated VF+ (p=0.014).

Table 1 Lacunarity of trabecular bone microarchitecture, TBLβ, can assess osteoporosis fracture risk and treatment efficacy

Patients	n VF-/VF+ (%)	TBLβ		p
		VF-	VF+	
Overall	191/88 (100)	66±51	46±42	0.001
T-	121/35 (55.9)	67±51	36±29	0.001
T+, any medication	70/53 (44.1)	65±52	52±48	0.091
VitD/Ca supplements *	25/19 (35.8)	56±49	36±24	0.051
Drug therapy*	45/34 (64.2)	70±54	62±56	0.276
Bisphosphonates**	43/27 (88.6)	70±55	60±54	0.225

VF: prevalent vertebral fractures; **T-** without treatment; **T+** with treatment; * % within T+ patients; ** % within drug therapy group; p: statistical significance from one-tail t-test

Conclusions: These promising results stress the usefulness of the method as a diagnostic tool in the assessment of osteoporotic fracture risk and suggest a potential role of TBLβ as a marker of treatment efficacy. More intriguing results are expected from prospective LOTO data.

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FRI0528 SUCCESSFUL IMPLEMENTATION OF A PHARMACIST-LED FRACTURE LIAISON SERVICE AT A US VETERAN AFFAIRS (VA) HOSPITAL

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Background: Worldwide, an osteoporosis (OP) care gap exists for individuals with a fragility fracture (FF). Published data shows that US veterans are no exception. To address the OP care gap, fracture liaison services (FLS) are being implemented with the goal to prevent additional FF.

Objectives: Here we report the patient outcomes after initiating a FLS at a US Veterans Affairs (VA) hospital.

Methods: We identified veterans with a pelvic, hip and/or femur shaft fracture by querying a central database. Veterans with traumatic fractures, active OP medication, recent dual-energy X-ray absorptiometry (DXA) and/or hospice status were excluded. The remaining veterans were contacted via letter and the responsible primary health care team was sent a template letter with OP management recommendations via the electronic medical record. Recommendations included DXA, laboratory evaluation, and pharmacologic and non-pharmacologic interventions. In most cases, trained clinical pharmacists serving as FLS coordinators performed all tasks with an expert physician available for questions. Presented data are based on a review 4 months after recommendations were sent.

Results: The initial query revealed 149 veterans with pelvic, femoral, and/or hip fractures without a recent DXA and/or active OP therapy. Of those, 32 (31 males, 1 female) patients suffered a FF and were included in the FLS intervention. Our review showed that 59% of these had a DXA scan, 35% had their calcium/vitamin D intake reviewed, and 40% had started OP therapy or were referred to an OP specialist. When the primary care team's clinical pharmacist instead of the primary care provider implemented the FLS recommendations (10/32), 100% of the recommendations were addressed. Furthermore, 70% of patients had a bisphosphonate ordered, whereas it was 9% when no pharmacist was involved (p=0.0004).

Conclusions: Our study suggests that a pharmacist-led FLS improves post-FF care in US veterans. We found a high percentage of OP care goals met when patients interacted with clinical pharmacists. This observation might be due to the fact that most pharmacists had dedicated training in OP management and their interaction with the patient focused on their FF. In summary, our data suggests that clinical pharmacists trained in OP management can very effectively implement a FLS intervention.

Disclosure of Interest: None declared

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FRI0529 ANALYSIS OF THE EVOLUTION OF CORTICAL AND TRABECULAR BONE COMPARTMENTS IN THE PROXIMAL FEMUR AFTER SPINAL CORD INJURY BY 3D-DXA

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Background: Spinal cord injury (SCI) is associated with a marked increase in bone loss and risk of osteoporosis development short-term after injury. 3D-DXA is a new imaging analysis providing volumetric measurements of the cortical and trabecular bone from DXA scans.

Objectives: The aim of this study was to assess the evolution of 3D femoral shape, trabecular macrostructure and cortical bone from DXA scans in patients with recent SCI followed over 12 months.

Methods: 16 males with recent SCI (<3 months since injury) were included. Clinical assessment, bone mineral density (BMD) measurements and 3D-DXA evaluation at proximal femur (analyzing the integral, trabecular and cortical volumetric BMD [vBMD] and cortical thickness) were performed at baseline and at 6 and 12 months of follow-up.

Results: vBMD measured by 3D-DXA significantly decreased at integral, trabecular and cortical compartments at 6 months (-31.1 mg/cm^3, -8.8%, p<0.001; -25.4 mg/cm^3, -11.6%, p=0.001; and -20.4 mg/cm^3, -2.4%, p=0.004), with a further decrease at 12 months, resulting in an overall decrease of -58.9 mg/cm^3 (-16.6%, p<0.001), -47.9 mg/cm^3 (-21.9%, p<0.001) and -42.4 mg/cm^3 (-5%, p<0.001), respectively. Cortical thickness also decreased at 6 and 12 months (-8%, p<0.001; and -11.4%, p<0.001), with the maximal decrease being observed during the first 6 months. The mean BMD loss by DXA at femoral neck and total femur were -17.7% (p<0.001) and -21.1% (p<0.001), at 12-months, respectively. Integral vBMD values at baseline were positively correlated with total femur BMD (r=0.874, p<0.001), however no correlation was observed in the changes in these values at 12-months.

Conclusions: 3D-DXA shows the differentiation of the marked bone loss that occurs at both proximal femoral compartments (cortical and trabecular) short-term after SCI. The present data suggest that 3D-DXA could be a useful complementary assessment tool in SCI patients.

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FRI0530 EFECTIVENESS OF AN ORTHOGERIATRIC FRACTURE LIAISON SERVICE COMPARED WITH STANDARD CARE

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Background: Our fracture liaison service (FLS) for outpatients has reported to maintain 73% of the patients on antiresorptive 2 years after the fracture. For hip fracture we are concerned about the low capture rate (27%).

Objectives: To analyze the efectiveness of a FLS for inpatients with hip fracture compared with standard care.

Methods: Observational study carried out in two hospitals, one with a FLS (Hospital Negrin) and the other one with standard orthogeriatric care (Hospital Candelaria). The reference population >65 y from H.Negrin and H.Candelaria are 63,382 and 63,249 inhabitants respectively.

We included patient >65 y with fragility hip fracture ocurred between 1th March 2016 and 31th July 2016. Severe dementia, non-fragility fractures and those patients who died during hospital admittance were excluded. All patients underwent hemogram and biochemistry. The densitometry was not performed on any patient. The only difference between hospitals was a dedicated nurse from the FLS H.Negrin who visited inpatients twice a week, interviewed patients, gave education and applied a treatment protocol to be started by Primary Care.

Data recorded were: age, sex, previous fractures and previous treatment for osteoporosis, including calcium, vitamin D, bisphosphonates, denosumab and teriparatide. We also collected the treatment that was included in the discharge report and treatment six month later (checking the electronic prescription).

Results: We included 185 patients (105 from Hospital Candelaria and 80 from Hospital Negrin), mean age 82 y (Table). The percentage of patients receiving a bisphosphonate or equivalent before hospital admittance was similar in both hospitals. However, the percentage after discharge rose by 91% in the hospital with FLS and remain 8% in the hospital with standard care. After six months, 75% of patients from FLS and 15% of patients with standard care had a treatment.

Conclusions: The implementation of an orthogeriatric FLS lead to an increase in treatment for osteoporosis compared with standard care and similar to our outpatient FLS model. The ideal approach to secondary fracture prevention is a FLS model of care in an integrated health care network, overseen by a nurse coordinator.