in MS patients, working together with neurologists, to prevent the appearance of fractures and protect the quality of life of these patients. An analysis of our whole cohort of MS patients will help us in correctly assessing the magnitude of this problem.

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POS0169 FETUIN-A AS A MARKER OF OSTEOPOROSIS AND OSTEOPOROTIC FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background: The main mechanism of the effect of fetuin-A (FeA) on bone metabolism is its ability to bind calcium and proteins of the TGF-β family. It has been proven that the optimal concentration of TGF-β is necessary for the differentiation of bone tissue, and a high concentration inhibits bone mineralization. Thus, adequate osteogenesis is based on a complex balance between FeA and TGF-β levels. It can be assumed that the determination of the FeA level in the blood of patients with rheumatoid arthritis (RA) will help to optimize the diagnosis and predict the severity of osteoporosis (OP).

Objectives: to study the possibility of predicting the development of osteoporosis and osteoporetic fractures in patients with RA, depending on the level of FeA in blood serum.

Methods: We examined two groups of patients (52 patients with RA complicated by OP, 58 patients with RA without OP) and 30 apparently healthy individuals. The age of the surveyed ranged from 18 to 72 years, the average duration of the disease was 7.53±0.89 years. In both groups, the FeA level was determined by an indirect enzyme-linked immunosorbent assay using a commercial test. Bone mineral density (BMD) was also measured in both groups (Lunar DPX-NT GE).

Results: The average FeA level in the group of RA patients was lower than in the group of conventionally healthy individuals (731.21±109.9 μg/ml and 812.9±76.2 μg/ml, respectively; F=13.34; p=0,0004). The normal FeA level was calculated using the formula M±2σ in the group of apparently healthy individuals and ranged from 653.55 μg/ml to 972.19 μg/ml.

A decreased level of FeA was found in 20 patients (86.96%) in the group of patients with OP and only in 3 (13.04%) patients with RA who did not suffer from OP (p<0.001). It can be concluded that patients with RA and a low concentration of FeA in the blood serum have a higher risk of developing OP.

In the group of patients with normal FeA level, osteoporetic fractures were observed in 12 (13.79%) patients and were absent in 75 (86.21%) patients (p<0.001). Thus, RA patients with normal serum FeA levels have a lower risk of osteoporetic fractures.

We also found a positive significant correlation between the level of FeA and BMD in the femoral neck area. In the group of patients with a reduced FeA level (23 people), the mean BMD values were 0.732±0.022 g/cm2, and in the group of patients with a normal FeA level (87 patients) - 0.890±0.014 g/cm2 (p<0.001, F=27.663). The obtained values are in agreement with the literature data on the effect of the serum FeA concentration on the BMD values.

Conclusion: We consider it expedient to determine the serum FeA concentration in patients with RA. At a FeA level of 653.55 μg/ml and below, a higher risk of developing OP and osteoporetic fractures can be predicted. In this case, the patient is shown a standard examination for osteoporosis. At values of 653.55 μg/ml and above, a more expectant management of the patient is allowed. Thus, by determining the serum concentration of FeA, it is possible to implement an integrated approach to the patient and to optimize the schemes for the diagnosis of OP in patients with RA.

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POS0170 IMPROVING MANAGEMENT OF GLUCOCORTICOID INDUCED OSTEOPOROSIS IN RHEUMATOLOGY

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Background: Glucocorticoids (GC) are used in the treatment of various inflammatory conditions and it is estimated that about 1% of US population is treated with long term steroids. High doses of GC particularly those used by rheumatologists have adverse effects on bone health and is associated with rapid bone loss resulting in Glucocorticoid induced Osteoporosis(GIO) and an increased risk of fractures. The risk of bone loss relates to high daily dose and the high cumulative dose of the GC.

Despite the availability of effective preventative and treatment options, GIO is often under treated with many patients treated only after a fracture has occurred.

Objectives: The purpose of this study was to examine if providing education to care providers lead to an improvement in the identification, evaluation, and treatment of GIO.

Methods: This is a single center, prospective study that was performed at a university based tertiary referral center. Patients over 40 years, receiving a total cumulative dose of GC of >5 grams and/or a single dose of >30 mg of prednisone or equivalent was enrolled. A patient list was generated by our technology group. All providers received intervention in the form of an academic Journal Club, at which the current ACR guidelines regarding GIO was reviewed. Monthly reminders were shared with all providers within our monthly communications.

All the pre and post interventional data was analyzed. The continuous variables were analyzed using T-test or Mann-Whitney U test. Categorical variables were analyzed using Chi-square Tests or Fisher's exact tests. Statistical analysis was performed using SAS9.4, and p value <0.05 was considered statistically significant.

Results: Post education, there was a statistically significant increase in vitamin D replacement and the use of bisphosphonates as well as a reduction in the use of bone mineral density (BMD) tests within the at risk group while on GC.

Table 1. Glucocorticoid induced Osteoporosis (GIO)

	Pre-treatment (N=72)	Post-treatment (N=54)	p-value
Demographics			
Age (years)	58.9 ± 19.2	64.2 ± 16.7	0.11
Body Mass Index	29.0 ± 6.7	29.4 ± 8.4	0.77
Gender (Female)	73.6%	74.1%	0.95
Race			
White	83.3%	77.8%	0.43
Hispanic	1.4%	5.6%	0.31
Insurance			
ANTHEM BCBS	16.9%	26.9%	
Commercial	11.3%	11.5%	
Medicaid	12.7%	9.6%	
Medicare	59.2%	51.9%	
			0.58
Medical History			
Osteoporosis	68.1%	64.8%	0.70
Osteoporotic Fracture	15.3%	11.1%	0.50
Vasculitis	26.4%	22.2%	0.59
Systemic Lupus Erythematosus	18.1%	13.0%	0.44
Rheumatoid Arthritis	12.5%	25.9%	0.05
Polymyalgia Rheumatica	6.9%	11.1%	0.41
Inflammatory Muscle Disease	18.1%	20.4%	0.74
Spondyloarthritis	1.4%	1.9%	0.99
Lab Results			
Serum Vitamin D (Normal)	41.3% (19/46)	52.8% (19/36)	0.3
GIO Prevention Measures			
Calcium	2.8%	13.0%	0.04
Vitamin D	18.1%	61.1%	<0.01
Bisphosphonates	9.7%	35.2%	<0.01
RANKL inhibitors	4.2%	11.1%	0.17
Bone Mineral Density	43.5% (10/23)	10.5% (2/19)	0.02

Conclusion: There was a significant improvement between the GIO pre and post-educational data, with increasing use of GIO preventive measures. Importantly, there was also a reduction in BMD testing of patients while still on GC. This research show the importance of provider education as a means of disseminating information and improving the quality of patient care.

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POS0171

UNDERESTIMATION OF THE FRACTURE RISK BY THE FRAX FORMULA IN CHRONIC GLUCOCORTICOID USERS: A 10-YEAR LONGITUDINAL VALIDATION STUDY

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Background:

Objectives: To compare the actual fracture incidence over 10 years in a longitudinal cohort of patients using glucocorticoids (GCs) with the risk prediction from FRAX (fracture risk assessment tool).

Methods: Patients who attended our out-patient rheumatology clinics were included according to the following criteria: (1) adult patients ≥18 years; (2) underlying rheumatic diseases requiring prednisolone treatment (≥5mg/day); and (3) have had a DXA scan (baseline) performed between years 2007-2009. The predicted rates of major osteoporotic and hip fractures were estimated using FRAX (China database) based on the clinical data at the time of DXA, with adjustment when daily dose of prednisolone ≥7.5mg (multiply by 1.15 for major osteoporotic and 1.20 for hip fracture). The actual observed incidence of symptomatic vertebral and non-vertebral fractures at 10 years (in years 2017-2019) follow-up was retrieved by medical record review and compared with the estimated rates by FRAX. Factors associated with symptomatic clinical fractures at 10 years were studied by logistic regression.

Results: 89 patients were studied (age 49.3±8.8 years at DXA examination; 98% women). The underlying rheumatic diseases were systemic lupus erythematosus (69%), rheumatoid arthritis (17%) and others (14%). The mean daily dose of prednisolone at baseline was 7.7±6.5mg (38% patients had daily dose ≥7.5mg). History of personal fracture was present in 4(4.5%) patients and 22% of female patients had menopause before the age of 45 years. The mean body mass index (BMI) was 23.5±3.3kg/m^2 (4.5% ≤18kg/m^2). Osteoporosis (bone mineral density [BMD] T score ≤-2.5) of the hip, femoral neck and lumbar spine occurred at a frequency of 11.2%, 13.5% and 25.8%, respectively at baseline (32% at any of the 3 sites). 30(34%) patients received anti-osteoporotic treatment (oral bisphosphonates in 25, raloxifene in 3 and denosumab in 2 patients). The estimated mean 10-year risk of major osteoporotic and hip fractures using the BMD data and other risk factors in the FRAX formula, adjusted for prednisolone dose, was 4.3% and 1.0%, respectively. After a follow-up of 10 years, one patient had a hip fracture, 3 patients had humerus fractures and 9 patients had symptomatic vertebral fractures. The actual observed major osteoporotic and hip fracture incidence was 14.6% and 1.1%, respectively (0.146 and 0.011 per 10 patient-years). The observed major clinical fracture rate was significantly higher than that estimated by FRAX (14.6% vs 4.3%; p=0.04). Logistic regression revealed that the only factor independently associated with major clinical fracture at 10 years was BMD T score ≤-2.5 at spine, hip or femoral neck at baseline (OR7.11[1.73-29.2]; p=0.007). Age, prednisolone daily dose, BMI, history of fracture, chronic smoking, having underlying SLE vs not and early menopause were not significantly associated with new clinical fractures.

Conclusion: Despite adjustment for prednisolone dosage, the FRAX formula underestimates the major clinical fracture risk in patients using long-term GCs. The deleterious effect of GCs on bone quality, high proportion of SLE patients, disease activity and use of additional doses of GCs and other immunosuppressive drugs during follow-up are among the contributing factors for this underestimation.

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Molecular profiles in connective tissue disease outcome

POS0172

THROMBIN GENERATION ASSAY AND LUPUS ANTICOAGULANT IDENTIFY DIFFERENT POPULATIONS OF PATIENTS WITH ANTIPHOSPHOLIPID ANTIBODIES

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Background: Risk stratification in patients with antiphospholipid antibodies (aPL) remains a clinical challenge [1].

Objectives: We aimed to evaluate the role of Thrombin Generation Assay (TGA) in distinguishing various populations of aPL positive patients (with and without lupus anticoagulant - LA) and its association with β2GPI-dependent and anti-phosphatidyl-serine/prothrombin(aPS/PT) antibodies.

Methods: One-hundred-and-eight patients were tested with TGA and divided as follows: 21 patients with aPS/PT IgG/IgM (**Group 1**), 29 with aβ2GPI IgG/IgM (**Group 2**), 31 with aPS/PT and aβ2GPI IgG/IgM (**Group 3**), 27 with aPS/PT and/or aβ2GPI IgM low-titers (**Group 4**). Table 1 resumes the clinical characteristics of the APS patients (excluding aPL asymptomatic). Thirty-one healthy donors (HDs) and 24 controls treated with VKA were also included.

Results: The most deranged TGA and LA profile was observed in patients with both aPS/PT and aβ2GPI when compared to those with an isolated positivity for aPS/PT or aβ2GPI and patients with aPS/PT and/or aβ2GPI IgM at low titres (Figure 1). Similarly, patients with aPS/PT and/or aβ2GPI at medium/high titres presented with the higher rate of clinical manifestations.

When comparing the TGA curves of APS patients, asymptomatic aPL positive (aPL+) subjects, HDs and controls treated with VKA, we observed that aPL+ patients (particularly those with a confirmed diagnosis of APS) showed a characteristic profile.

Differences among groups were confirmed also when comparing APS clinical manifestations. When comparing Group 1 and Group 4 we found significant differences with respect to the number of thrombotic events (21vs.15,p<0.05), the number of venous events (9vs.3,p<0.05), the recurrence of thrombosis (19%vs.0%,p<0.05). Group 2 and Group 4 showed differences in the occurrence of venous thromboses (50vs.20,p<0.05), and in the occurrence of DVT (8vs.2,p<0.05). Group 3 and Group 4, had higher number of thrombotic events (36vs15, p<0.05), the occurrence and the number of venous events (46%-15vs20%-3,p<0.05), the occurrence of TIA and DVT (4-11vs0-2,p<0.05).

When analysing the cumulative frequency of extra-criteria APS manifestations, Group 1,2 and 3 were comparable, while comparing Group 3 and those positive for aβ2GPI and/or aPS/PT IgM at low titres (Group 4) we found a statistically significant difference (71%vs13%,p<0.05).

Conclusion: TGA seems a valuable approach to stratify aPL+ patients according to their risk profile. The differences among groups and different populations of autoantibodies specificities obtained from this test can be considered a translational validation of the increased thrombotic risk of patients with triple or tetra aPL positivity.

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