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 shows the importance of provider education as a means of disseminating information and improving the quality of patient care.

REFERENCES:

- [1] Compston J. Glucocorticoid-induced osteoporosis: an update. *Endocrine*. 2018 Jul;61(1):7-16. doi: 10.1007/s12020-018-1588-2.
- [2] 2017 American college of rheumatology guideline for the prevention and treatment of Glucocorticoid-induced Osteoporosis. *Arthritis & Rheumatology* Vol. 69, No. 8, august 2017, pp 1521-1537. DOI 10.1002/art.40137.
- [3] Fardet L, Petersen I, Nazareth I. Monitoring of patients on long-term glucocorticoid therapy: a population-based cohort study. *Medicine* (Baltimore). 2015 Apr;94(15):e647. doi: 10.1097/MD.0000000000000647.

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2021-eular.127

POS0171

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

C. C. Mok¹, L. Y. Ho¹, S. M. Tse¹, K. L. Chan¹. ¹Tuen Mun Hospital, Medicine, Hong Kong, Hong Kong (SAR)

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 (≥ 5 mg/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 ≥ 7.5 mg (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 ± 6.5 mg (38% patients had daily dose ≥ 7.5 mg). 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 ± 3.3 kg/m² ($4.5\% \leq 18$ kg/m²). 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 (OR 7.11 [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.

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2021-eular.3400

Molecular profiles in connective tissue disease outcome

POS0172

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

M. Radin¹, A. Barinotti¹, I. Cecchi¹, S. G. Foddai¹, E. Rubini¹, D. Roccatello¹, E. Menegatti¹, S. Sciascia¹. ¹University of Turin, Clinical and Biological Sciences, Turin, Italy

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 $\beta 2$ GPI-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 $\beta 2$ GPI IgG/IgM (Group 2), 31 with aPS/PT and $\beta 2$ GPI IgG/IgM (Group 3), 27 with aPS/PT and/or $\beta 2$ GPI 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 $\beta 2$ GPI when compared to those with an isolated positivity for aPS/PT or $\beta 2$ GPI and patients with aPS/PT and/or $\beta 2$ GPI IgM at low titres (Figure 1). Similarly, patients with aPS/PT and/or $\beta 2$ GPI 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 $\beta 2$ GPI 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.

REFERENCES:

- [1] Miyakis S et al. International consensus statement on an update of the classification criteria for definite antiphospholipid syndrome (APS). *J. Thromb. Haemost.* 2006;4(2):295-306.

Table 1. “Classical” and “Extra-criteria” APS clinical manifestations of each group (considering solely patients with a confirmed diagnosis of APS).

	Group 1: isolated aPS/PT+ IgG/IgM (16)	Group 2: isolated aβ2GPI+ IgG/IgM (20)	Group 3: aPS/PT+ and aβ2GPI+ IgG/IgM (24)	Group 4: aPS/PT+ and/or aβ2GPI+ IgM low titres (15)
APS clinical manifestations				
Thrombosis (Y/N), n (%)	14 (87,5%)	16 (80%)	21 (87,5%)	13 (86,6%)
N of thrombotic events	21	23	36	15
Arterial thrombosis (Y/N), n (%)	10 (62,5%)	9 (45%)	14 (58,3%)	11 (73,3%)
Arterial events, n (%)	13	10	21	12
Venous thrombosis (Y/N), n (%)	6 (37,5%)	10 (50%)	11 (45,8%)	3 (20%)
Venous events, n (%)	9	13	15	3
Pregnancy morbidity, n (%)	3 (18,8%)	4 (20%)	3 (12,5%)	2 (13,3%)
Recurrent thrombosis (Y/N), n (%)	3 (18,8%)	3 (15%)	7 (29,1%)	0
Livedo reticularis, n (%)	1 (6,2%)	1 (5%)	4 (16,6%)	0
Thrombocytopenia, n (%)	4 (25%)	4 (20%)	6 (25%)	2 (13,3%)
Valvular, n (%)	1 (6,2%)	0	2 (8,3%)	0
Peripheral artery disease, n (%)	0	3 (15%)	4 (16,6%)	0
Diffuse alveolar hemorrhage, n (%)	0	0	1 (4,1%)	0

Figure 1. Graphical representation of the differences between TGA and LA profiles between groups.**Disclosure of Interests:** None declared**DOI:** 10.1136/annrheumdis-2021-eular.2341

POS0173 METABOLOMIC PROFILING AND SYMPTOM BURDEN IN BLACK WOMEN WITH SYSTEMIC LUPUS ERYTHEMATOSUS

L. P. Kimble¹, A. Khosroshahi², R. C. Eldridge¹, G. S. Brewster¹, N. S. Carlson¹, E. J. Corwin³. ¹Emory University, School of Nursing, Atlanta, United States of America; ²Emory University, School of Medicine, Rheumatology Division, Atlanta, United States of America; ³Columbia University, School of Nursing, New York, United States of America

Background: Black individuals with systemic lupus erythematosus (SLE), who are predominantly women, have disproportionately poorer health outcomes across the trajectory of their disease including increased mortality, higher symptom burden, and poor quality of life than non-Hispanic Whites. The heterogeneity of immunopathology and biochemical complexity of SLE create major knowledge gaps around the mechanisms of disease and differences in SLE symptom

expression. Metabolomics may reveal biochemical dysregulation that underlies SLE symptoms and provide novel metabolic targets for precision symptom interventions.

Objectives: We conducted untargeted metabolomic plasma profiling of Black females with SLE and Black female non-SLE controls to gain insight into metabolic disturbances associated with SLE.

Methods: We analyzed blood specimens collected from 23 Black female patients with diagnosis of SLE during a routine outpatient rheumatology visit and from 21 Black female non-SLE controls whose data were collected as part of another study of obese caregivers. Data collection for both cases and controls was completed with harmonized protocols. Clinical data for cases were obtained via chart review and both cases and controls completed identical, reliable and valid measures of fatigue, depression, anxiety, and sleep disturbance. A commercial metabolomics analysis company within the US conducted untargeted metabolomics on the 44 plasma samples using ultrahigh performance liquid chromatography/tandem mass spectrometry along with metabolite identification and quantification to examine differences between SLE/non-SLE groups.

Results: All SLE subjects met 2019 EULAR/ACR criteria (Aringer et al., 2019). SLE subjects were significantly ($p < .05$) younger (42.5 ± 12.2 vs. 63.2 ± 6.4), had a lower BMI (30.3 ± 9.4 vs. 34.9 ± 4.1), and greater co-morbidities (2.3 ± 1.3 vs. 1.1 ± 1.3) than non-SLE controls. SLE subjects reported higher symptoms than controls across all measures, but differences were not statistically significant. Metabolomics analysis revealed 290 biochemicals that were statistically significant ($p \leq .05$) between SLE and non-SLE groups. Random Forest analysis had a predictive accuracy of 91% in differing between the two groups using out-of-bag sampling. Significant metabolic differences between groups were noted in biochemicals associated with glycolysis, the TCA cycle (see Table 1), fatty acid metabolism, branched chain amino acids, sterol levels, heme catabolism, and potential markers of renal impairment. Overall, the differences would suggest reduced energy production among SLE patients compared to controls.

Table 1- Comparison SLE (n= 23) and No SLE Subjects (n=21) on Biochemicals in the TCA Cycle

Pathway	Metabolite	SLE/ No SLE log ₂ fold change	p-value	FDR q-value
TCA Cycle	citrate	0.82	0.0005	0.008
	aconitate [cis or trans]	0.65	< 0.0001	0.001
	alpha-ketoglutarate	0.74	0.0017	0.017
	succinylcarnitine (C4-DC)	0.94	0.3558	0.362
	succinate	0.75	0.0001	0.003
	fumarate	0.64	0.0002	0.004
	malate	0.73	0.0149	0.057
	citraconate/glutamate	1.46	0.6843	0.507

Note: SLE= systemic lupus erythematosus. Welch's Two sample t-test used to compare groups. FDR= False discovery rate. Green color indicates value for SLE group significantly lower than non-SLE controls.

Conclusion: Black women with SLE had biochemical profiles consistent with reduced energy production which has implications for the high burden of fatigue and other symptoms in this population. Future work with larger sample sizes should involve integrating symptom and metabolomics data to identify potential biomarkers of symptom burden.

References: Aringer, M., Costenbader, K., Daikh, D. et al. (2019). 2019 European League Against Rheumatism/American College of Rheumatology classification criteria for systemic lupus erythematosus. *Ann Rheum Dis*, 78,1151-1159.

Acknowledgements: This work was supported by a research re-entry supplement to L. Kimble under the parent award 1P30NR018090-02S1 Center for the Study of Symptom Science, Metabolomics, and Multiple Chronic Conditions