New biomarkers for cardiovascular risk in patients with juvenile-onset systemic lupus erythematosus (JSLE)

June 13 2019

The results of a study presented today at the Annual European Congress of Rheumatology (EULAR 2019) identify ApoB:A1 ratio and metabolomic lipoprotein signatures as potential biomarkers for cardiovascular risk in patients with juvenile-onset systemic lupus erythematosus (JSLE).

In depth metabolomics was used to investigate dyslipidaemia and cardiovascular risk in a cohort of patients with JSLE. Unbiased hierarchical clustering stratified patients by metabolomic profile and revealed three distinct groups. Groups One and Two were identified as high and low cardiovascular risk respectively based on their unique lipoprotein profile, immune cell phenotype and clinical presentation. Further analysis identified ApoB:A1 ratio as a highly predictive biomarker distinguishing between these high and low cardiovascular risk groups. Longitudinal analysis revealed that the ApoB:A1 ratio biomarker remained stable over time.

"Our study identifies ApoB:A1 ratio and metabolomic lipoprotein signatures as potential new biomarkers to predict cardiovascular risk in patients with juvenile-onset SLE," said Dr. George Robinson, Senior Research Associate, Centre for Adolescent Rheumatology Versus Arthritis, University College London, London, England. "Patient stratification using these biomarkers could provide an opportunity for tailored disease treatments using lipid modification therapy and lifestyle

interventions."

The patients in Group One were identified as high cardiovascular risk due to their lipoprotein profile (decreased high density lipoproteins (HDL) and increased very low and low density lipoproteins (VLDL/LDL)). Group One had a significant increase in plasmablasts and activated T-cells compared to matched healthy controls and had clinical features associated with increased disease activity. These immunopathogenic properties were not seen in the low cardiovascular risk Group Two which also had the opposite lipoprotein profile (increased HDL and decreased VLDL/LDL). Group Three had an intermediate CVR but a pro-inflammatory immune cell profile.

"Regular assessment for traditional and disease-related risk factors for cardiovascular disease is very important in patients with SLE," said Tanita Wilhelmer, Chair, Young PARE. "We welcome these data to support the identification of those at greatest risk."

This form of risk assessment is particularly important in patients with SLE as they have been found to be twice as likely to suffer from cardiovascular disease. Research shows that SLE patients are between 9- and 50-fold more likely to suffer a myocardial infarction over the general population, and 3-fold more likely to suffer a fatal myocardial infarction.

Systemic lupus erythematosus is an autoimmune disease typically affecting women between the ages of 15 and 50, and symptoms flare up unpredictably. Approximately 20% of cases begin during childhood and in these patients the disease is suggested to be more severe. The risk for certain types of deaths, primarily related to lupus activity (such as renal disease), has decreased over time, while the risk for deaths due to circulatory disease does not appear to have diminished.

The study included a discovery cohort of 35 JSLE patients and 39 age/sex matched healthy donors. Metabolic biomarker analysis and in-depth immune cell phenotyping was performed on the serum and peripheral blood mononuclear cells (PBMCs) taken from the participants. Data were analysed using cluster and correlation-correlation and receiver operating characteristic analysis. The metabolomic patient stratification was validated in a second cohort of 31 JSLE patients.

More information: Robinson G, Radziszewska A, Wincup C, et al. Metabolomics in juvenile-onset SLE: identifying new biomarkers to predict cardiovascular risk. EULAR 2019; Madrid: Abstract OP0148.

Provided by European League Against Rheumatism