Background: Accurate cardiovascular risk stratification is essential in rheumatoid arthritis (RA) care. RA patients who are overweight incur greater total and cardiovascular mortality compared to those who are underweight or obese.

Objectives: We explored whether abdominal obesity impaired the accuracy of risk prediction estimates in RA patients without known cardiovascular disease (CVD). We further interrogated the potential utility of coronary atherosclerosis assessment and serum levels of related cardiac damage biomarkers to optimize risk prediction in obese RA patients.

Methods: In a single-center observational study, 150 participants with coronary CT angiography for atherosclerosis evaluation and prospective follow-up for cardiovascular events over 6.0±2.4 years were assessed. Framingham cardiovascular risk score was computed at baseline. Obesity was defined as waist circumference >88 cm in females and >102 cm in males. Segment involvement score (SIS) described the number of coronary segments with plaque. Serum highly-sensitive cardiac troponin I (hscTnI)-related both to coronary plaque burden and event risk in RA was measured with Erenna immunoassay. Serum leptin, which is closely related to obesity, was measured with radioimmunoassay. CVD risk estimates were contrasted in non-obese vs. obese patients and those with low vs. high leptin concentration accordingly using area under the curve (AUC) comparisons. Improvements in risk estimate accuracy in obese patients were explored by sequentially adding hscTnI information and coronary plaque burden estimates to a baseline model of Framingham score and evaluating incremental change in AUC, net reclassification index (NRI) and integrated discrimination improvement (IDI).

Results: A significant interaction between Framingham cardiovascular risk score and obesity was observed (p=0.032). Lower estimates were seen in obese [AUC 0.660, 95%CI 0.487-0.832] vs. non-obese RA patients [AUC 0.952, 95%CI 0.897-1.007, p<0.002, Figure 1A]. Likewise, risk estimates were lower in patients with higher (>22.1 ng/ml) vs. lower (<22.1 ng/ml) leptin [AUC 0.618, 95%CI 0.393-0.842 vs. 0.874, 95%CI 0.772-0.976 respectively, p=0.042, Figure 1B]. In obese patients, sequential addition of the highest hscTnI tertile values and extensive atherosclerotic plaque presence (SIS≥3) to a base model including Framingham risk score, significantly improved risk prediction estimates based on changes in NRI [1.093 95%CI 0.517-1.574], IDI [0.188, 95%CI 0.060-0.526], as well as AUC [0.179, 95%CI 0.058-0.378, p=0.02]. The final, combined model accurately predicted 83.9% of incident cardiovascular events (Figure 1C).

Conclusion: Obesity significantly reduced cardiovascular risk estimate accuracy in patients with RA. The optimization of cardiac risk stratification with the help of non-invasive assessment of coronary atherosclerosis burden and related cardiac damage biomarkers in the serum may warrant further study.

Disclosure of Interests: George Karpouzas Speakers bureau: Sanofi-Gen- zyme-Regeneron, Janssen, Bristol-Meyer-Squibb, Consultant of: Sanofi- Genzyme-Regeneron, Janssen, Bristol-Meyer-Squibb, Grant/research support from: Pfizer, Bianca Papotti: None declared, Sarah Ormseth: None declared, Marcella Palumbo: None declared, Elizabeth Hernandez: None declared, Cinzia Marchi: None declared, Francesca Zimetti: None declared, Matthew Budoff Consultant of: Pfizer, Nicoletta Ronda: None declared.