This is a peer-reviewed, author's accepted manuscript of the following meeting abstract: Jenkinson, M., Meek, D., MacMillan, S., Tate, R., Grant, M., & Currie, S. (2023). Cardiac function is compromised in patients with elevated blood cobalt levels secondary to metal-on-metal hip implants. *Heart* , *109*(Supplement 2), [A4]. https://doi.org/10.1136/heartjnl-SCF-2023.11

Elevated blood cobalt secondary to metal-on-metal (MoM) hip arthroplasties has been shown to be a risk factor for developing cardiovascular complications including cardiomyopathy. Published case reports document cardiomyopathy in patients with blood cobalt levels as low as 13µg/l. Clinical studies have found conflicting evidence of cobalt-induced cardiomyopathy in patients with MoM hips. The extent of cardiovascular injury, measured by global longitudinal strain (GLS), in patients with elevated blood cobalt levels has not previously been examined.

Sixteen patients with documented blood cobalt ion levels above 13µg/l were identified and matched with eight patients awaiting hip arthroplasty with no history of cobalt implants. Patients underwent echocardiogram assessment including GLS.

Patients with MoM hip arthroplasties had a mean blood cobalt level of 29µg/l compared to 0.01µg/l in the control group. There was no difference or correlation in EF, left ventricular (LV) end systolic dimension, LV end diastolic dimension, fractional shortening, ventricular wall thickness or E/e' ratio. However, GLS was significantly reduced in patients with MoM hip arthroplasties compared to those without (-15.2% v -18%, (MoM v control) p= 0.0125). Pearson correlation demonstrated that GLS is significantly correlated with blood cobalt level (r= 0.8742, p=0.0009).

This study has demonstrated reduced cardiac function in the presence of normal EF as assessed by GLS in patients with elevated cobalt above 13µg/l. As GLS is a more sensitive measure of systolic function than EF, routine echocardiogram assessment including GLS should be performed in all patients with MoM hip arthroplasties and elevated blood cobalt.