translational modifications (ox-PTMs) which can regulate intracellular signalling by either potentiating or inhibiting protein activity. One of these, S-glutathionylation is a common oxPTM reversed by glutaredoxin (Glrx). We aimed to investigate the role of Glrx in a murine model of pregnancy combining physiological in vivo cardiac dynamics with histological assessment of maternal organs, to identify how perturbation of redox signalling can lead to cause pregnancy-induced cardiovascular complications.

Mice overexpressing Glrx (Glrx-TG) and littermate controls (WT) underwent timed pregnancy. Left-ventricle (LV) pressure-volume (PV) loops was measured on day 18.5 by catheter inserted into LV. Pregnancy outcome and maternal organ pathology was conducted.

At day 18.5 of pregnancy Glrx-TG mice had higher aortic blood pressure, with more incidents of fetal reabsorptions compared to WT. End-systolic pressure assessed from PV-loops showed a trend for increase in TG vs WT, although there was no overall effect on cardiac ejection fraction or strokevolume. Interestingly, TG LV appeared to have higher contractility (End-systolic PV relationship), TG mice had an increase in cardiomyocyte size with no change in capillary density. Moreover, there was a significant increase in cardiac and renal fibrosis in Glrx-TG mothers.

Further studies will be needed to identify the redox sensitive molecular pathways, that are altered by Glrx overexpression in the maternal cardiovascular system.

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.