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Background and aims: Metabolic Syndrome (MetS) is defined by multiple risk factors that predict type 2 diabetes and cardiovascular complications, such as myocardial infarction, especially in women. Consequently the aim of this study was to investigate *in vivo* and *ex vivo* the effects of a high-fat-high-sucrose diet (HFHSD) on the development of metabolic syndrome (MetS), cardiac morphology and sensitivity to ischemia-reperfusion injury of female Wistar rat.

Materials and methods: Female Wistar rats, subjected to HFHSD (FHFD) or Normal Diet (FND) during 5 months, were explored *in vivo* every month with multimodal cardiovascular magnetic resonance (CMR). Cine-MRI (Magnetic Resonance Imaging) and arterial spin labeling (ASL-FAIR) techniques were used to determine cardiac morphology, function and perfusion. Triglyceride (TG) content in heart and liver was also evaluated with ¹H Magnetic Resonance Spectroscopy (MRS). ¹H Sub-cutaneous and visceral adipose tissues were measured with ¹H MRI. Then, rats underwent an intraperitoneal glucose tolerance test (IPGTT) to determine glycemic status. Finally, isolated heart were perfused with a physiological buffer containing 0.4 mM palmitate for 24 minutes before switching to 1.2 mM palmitate during 32 minutes low-flow (0.5 mL/min/g wet wt) ischemia. Next, flow was restored with 0.4 mM palmitate buffer for 32 minutes. High-energy phosphates and intracellular pH were measured during the experimental course by ³¹P magnetic resonance spectroscopy with simultaneous measurement of contractile function. Coronary flow was measured before and after ischemia. At the end of experiments, hearts were freeze-clamped for biochemical assays.

Results: In FHFD vs. FND, CMR showed an increase of systolic wall thickness over time ($p < 0.05$) and diastolic wall thickness at 3 and 5 months ($p < 0.01$); ¹H MRS showed that hepatic TG content was increased ($p < 0.01$) at 5 month but myocardial TG content was not different. IPGTT showed a significant glucose intolerance ($p < 0.001$) and plasma free fatty acids were increased ($p < 0.05$) in FHFD vs. FND. At 5 months, weight was not different between groups but FHFD exhibited an abdominal obesity with increased visceral adipose tissue ($p < 0.05$), % fat ($p < 0.05$) and % visceral fat ($p < 0.05$) compared with FND. *Ex vivo* myocardial function was impaired in FHFD vs. FND before ($p < 0.01$) and after ischemia ($p < 0.05$).

Conclusion: HFHSD-induced MetS was characterized by glucose intolerance, abdominal obesity, hepatic fat deposit which were associated with modification

of cardiac morphology and higher myocardial sensitivity to ischemia-reperfusion injury. These results may be related to higher risk of cardiovascular complications among type 2 diabetic obese women. Supported by: Aix-Marseille Univ, CNRS, France Life Imaging Disclosure: N. Fourny: None.