

[Print this Page for Your Records](#)[Close Window](#)**Control/Tracking Number:** A-18-1453-EASD**Activity:** Abstract**Current Date/Time:** 4/3/2018 10:16:58 AM**Does sex influence the tolerance to ischemia-reperfusion injury in a metabolic syndrome model?****Author Block:** N. Fourny, C. Lan, M. Bernard, M. Desrois;
Aix Marseille Univ, CNRS, CRMBM, Marseille, France.**Abstract:**

Background and aims: Worldwide prevalence of Metabolic Syndrome (MetS) keeps increasing and becomes a real public healthcare problem. MetS is based on the presence of at least 3 risk factors including abdominal obesity, glucose intolerance, dyslipidemia and hypertension. MetS is a well-known risk factor of type 2 diabetes and cardiovascular (CV) complications such as myocardial infarction. Epidemic studies showed a higher prevalence and CV risk in men. However, few studies explore sex differences in this context. Consequently, the aim of this study was to compare the effects of a high-fat high-sucrose diet (HFHSD) on the sensitivity to ischemia-reperfusion injury of male and female Wistar rat hearts.

Materials and methods: Male and female Wistar rats were subjected to HFHSD (12 MHFSD and 10 FHFSD) or Normal Diet (12 MND and 10 FND) for 5 months. Then, rats underwent an intraperitoneal glucose tolerance test (IPGTT) to determine glycemic status, and *ex vivo* experiments on the isolated perfused heart were performed to study the tolerance to ischemia-reperfusion injury. Isolated hearts were perfused with a physiological buffer containing 0.4 mM palmitate for 24 minutes before switching to 1.2 mM palmitate for 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: After 5 months of HFHSD, body weight was increased in males ($p < 0.001$ vs. MND) but not in females and fat percent was higher in both HFHSD groups (respectively $p < 0.01$ and $p < 0.05$ vs. controls). IPGTT showed a significant glucose intolerance in male and female HFHSD ($p < 0.001$ vs. controls) which was more pronounced in females ($p < 0.05$ vs. MND at T15min). HFHSD increased fasting blood glucose in both males and females compared with controls ($p < 0.05$) but increased plasma free fatty acids only in females ($p < 0.05$ vs. FND). Heart weight to tibia length ratio was higher with HFHSD only in males ($p < 0.001$ vs. MND). Interestingly, in male and female HFHSD, we found impaired myocardial function (respectively $p < 0.001$ and $p < 0.05$ vs. controls) and coronary flow (respectively $p < 0.01$ and $p < 0.05$ vs. controls) during reperfusion, with no difference between males and females. Energy metabolism was significantly altered in male and female HFHSD compared with controls. ATP was decreased only in MND during reperfusion ($p < 0.01$ vs. MND). PCr was impaired during reperfusion in male and female HFHSD groups compared with their respective controls ($p < 0.01$ and $p < 0.05$) and in FND compared with MND ($p < 0.05$). Finally, intracellular pH was similar between groups during the whole protocol.

Conclusion: Five months of HFHSD induced metabolic syndrome in both male and female with sex differences in tolerance to glucose, body weight and heart weight to tibia length ratio. HFHSD also decreased the tolerance to ischemia-reperfusion in both sex, characterized by impaired energy metabolism, cardiac and endothelial function during reperfusion. In conclusion we found no effect of sex on the tolerance to ischemia-reperfusion in our model of MetS.

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Keyword (Complete): 58 Cardiac complications

Study information (Complete):

*Human studies: No

*Animal Studies: Yes

Grant Acknowledgement (Complete):

Please select Yes or No: Yes

Support: : Aix-Marseille Univ, CNRS, FLI

Clinical Trial Registration Number (Complete):

: No

: N/A

Status: Complete

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European Association for the Study of Diabetes (EASD)

Rheindorfer Weg 3

D-40591 Düsseldorf - Germany

Tel: +49-211-758 469 0 - Fax: +49-211-758 469 29

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03/04/2018 Fourny Natacha

