Hassan A. Malik
Medical Student (L2)
LSU Health Sciences Center, New Orleans, Louisiana

Mentors: Jason D. Gardner, Ph.D. and Stefany D. Primeaux, Ph.D.
LSUHSC; Department of Physiology

"Cardiac Function Improvement in Alcohol-Related Cardiomyopathy Following Discontinuation of Alcohol Diet"

Alcohol-related cardiomyopathy (ACM) as a result of chronic alcohol intake and binge drinking is known to be associated with negative effects on cardiomyocyte contractility, worsened systolic and vascular indices, and cardiac fibrosis, among other parameters. However, the effects of abstinence following cessation of alcohol intake are unclear.

To observe the effects of alcohol abstinence on cardiac function we used an established mouse model for inducing ACM. This ACM model causes impaired systolic function in the mice after a 30-day regimen of alcohol diet, after which functional data can be obtained from the mice by means of echocardiography and catheterization of the left ventricle (LV). Our aim was to determine if alcohol abstinence could restore cardiac function in mice with established ACM.

Using the ACM model, mice were initially given liquid diet (Lieber-DiCarli) for 5 days, after which mice were placed on either a 5% ethanol liquid diet *ad libitum* or on control liquid diet for 30 days. Mice were given oral binges via gavage on days 10 and 30, where they were fed ethanol at 5g/kg body weight or maltose dextrin isocaloric control solution. After day 30, mice in the alcohol group were placed back on the control diet without ethanol for another 30 days (until day 60). Cardiac function data was obtained from the mice at days 30 and 60 using echocardiography and LV catheterization.

Our data indicated improvements in both stroke work and LV dP/dt in the alcohol group following cessation of alcohol intake. At day 30, control mice had a stroke work of 1622 ± 129 mmHg*uL and mice on the alcohol diet had a stroke work of 1119 ± 89 mmHg*uL ($p<0.05$). At day 60, stroke work for the alcohol into abstinence group was 2032 ± 129 mmHg*uL ($p<0.05$ vs alcohol 30 day). LV dP/dt for the control group at 30 days was 11188 ± 724 mmHg/s and 8054 ± 665 mmHg/s for the alcohol group ($p<0.05$). At 60 days, the alcohol into abstinence group had a LV dP/dt of 11967 ± 449 mmHg/s ($p<0.05$ vs alcohol 30 day).

These findings indicate that abstinence following chronic alcohol intake and binge drinking can improve cardiac function, with our data indicating a pronounced improvement in cardiac contractility.

Funding: R21AA029747(JG)