Sugar Induced Pulmonary Hypertension and the Role of Mast Cells

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BACKGROUND

Sugar Consumption, Ostial Vessels, Inflammation and Cardiac Function. 

Overconsumption of sugar can increase inflammation and oxidative stress, which may contribute to the development of cardiovascular disease. 

OBJECTIVE

Objective: This study looks at if high sugar diets can induce PH and if mast cells play a role in causing the inflammation that induces the vessel damage and comorbidities seen in PH.

METHODS

Methods: 

- Male Sprague-Dawley rats were fed a standard chow diet and randomized to drink ad libitum water, 15% fructose, or 30% sucrose (n = 8 per treatment for 6 weeks).

- Pulmonary artery pressures and right ventricular pressures were higher in the 15% fructose treatment group than both the 30% sucrose treatment group and the control group.

RESULTS

Figure 1 shows that all treatment groups had similar measurements for systemic blood pressures. All treatment groups had a very similar amount of weight gain at the end of the study period (Figure 5).

Figure 7 shows that the 15% fructose treatment group had a significantly higher average systemic pressure of 109.3mmHg (p<0.0054).

Figure 5 shows the 15% fructose treatment group had a significantly higher average systemic pressure of 109.3mmHg (p<0.0054).

Pulmonary artery pressures and right ventricular pressures were higher in the 15% fructose treatment group than both the 30% sucrose treatment group and the control group (also seen in Figure 5).

Figure 6. A: Histology: Lung blood vessels stained with Elastic Blue, show (A) the control group, (B) 15% fructose, (C) 30% sucrose, (D) bar graph of Pulmonary Vessels vs. Pulmonary Wedge.

Figure 8. Body Weight Comparisons, - average body weight gain at the end of treatment period.

CONCLUSION

- Data trends toward supporting that high sugar diets, especially fructose, can lead to PH.

- Data trends toward being more male rats present in the lungs of fructose diet treatment.

- Not necessarily significant gain in weight of the individual to begin to see signs of PH.

- Further analysis is needed to make a stronger conclusion in the study period (Figure 8).

REFERENCES


