

DETERMINANTS OF CARDIOVASCULAR DISEASE RISK IN OBESE YOUTH WITH NON-ALCOHOLIC FATTY LIVER DISEASE

Ishita Jindal¹, Maurice R Puyau², Anne L Adolph², Nancy Butte², Fida Bacha³

¹ Baylor College of Medicine, Department of Pediatrics, Endocrinology & Metabolism

² Baylor College of Medicine, Pediatrics, Nutrition

³ Baylor College of Medicine, Pediatrics, Endocrinology & Metabolism

Background: Higher resting heart rate (RHR) is an independent predictor of cardiovascular disease (CVD) and mortality. Non-alcoholic Fatty Liver Disease (NAFLD) is linked to subclinical atherosclerosis in children. To understand the determinants of CVD risk in obese Hispanic children with NAFLD, we evaluated RHR and its relationship to cardiorespiratory fitness (CRF), inflammatory markers, and urinary catecholamines in youth with and without NAFLD.

Materials/Methods: Hispanic obese children (n=413), divided into two age-groups (6-11 and 12-19 years) underwent measurements of RHR (resting supine position) and CRF (VO₂ max determination during treadmill exercise test). Inflammatory markers (high sensitivity C-reactive protein [hs-CRP] and interleukin-6 [IL6]) and urinary catecholamines (epinephrine, norepinephrine and dopamine) were obtained. NAFLD status was defined by high ALT levels (>26 U/L in males and >22 U/L in females).

Results: Children with NAFLD (n=184, ALT=52±36 U/L) compared with similarly obese children without NAFLD (n=229, ALT=16±5 U/L), have higher RHR (p=0.001) in the younger (80± 9 vs. 77± 9 bpm) and older age group (72± 8 vs. 69± 10 bpm), lower VO₂ max (28.9±4.9 vs. 30.3±6.0 mL/kg/min, p=0.03) and higher hs-CRP (p=0.02). RHR correlated positively with urinary catecholamines (r=0.20-0.22, p<0.001), hs-CRP (r=0.24, p<0.001) and IL-6 (r=0.25, p<0.001) and inversely with VO₂max (r=-0.32, p<0.001). In regression analyses with RHR as the dependent variable, younger age group (β=8.1, p<0.001), female sex (β=4.6, p<0.001), NAFLD status (β=1.9, p=0.035), VO₂ max (β=-0.4, p<0.001), epinephrine (β=0.4, p=0.016), and IL-6 (β=0.7, p=0.011) contributed to the variance in RHR (R²=0.42, p<0.001) independent of BMI z-score.

Conclusions: Youth with NAFLD manifest adverse CVD risk markers including higher RHR, hs-CRP, and lower CRF compared with obese peers without NAFLD. CRF, sympathoadrenal function and inflammation contribute to the adverse CVD profile in these youth.