The impact of growth hormone/insulin-like growth factor-I axis and nocturnal breathing disorders on cardiovascular features of adult patients with Prader-Willi syndrome

P. Marzullo, C. Marcassa, R. Campini, E. Eleuteri, A. Minocci, L. Priano, P. Temporelli, A. Sartorio, R. Vettor, A. Liuzzi, G. Grugni

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Context: adult patients with Prader-Willi syndrome (PWS) are prone to develop obesity, GH deficiency (GHD), and their related complications, with cardiopulmonary failure explaining more than half of PWS fatalities.

Objective and study participants: this study was undertaken to examine the effect of GHD and sleep breathing disorders on cardiovascular risk factors and heart features of 13 PWS (age 26.9±1.2 yr) and 13 age-, gender-, and body mass index-matched obese individuals (age 26.2±0.8 yr).

Results: compared with controls, PWS patients had lower GH response to arginine + GHRH, IGF-I levels, triglycerides, total and LDL-cholesterol, insulin, and insulin resistance measured by a homeostatic model approach. Dual-energy x-ray absorptiometry, abdominal computed tomography scans, and polysomnography revealed a greater fat mass, similar abdominal fat, but greater sleep breathing disorders in PWS than obese subjects. Echocardiography showed no systolic or diastolic alteration, although PWS had lower left ventricle (LV) mass (135.7±7.7 *vs.* 163.5±8.4 g, $P<0.05$) and near significantly lower values of LV end-diastole diameter ($P=0.08$), compared with obese controls. Baseline radionuclide angiography documented comparable values of systolic and diastolic values between groups. However, adrenergic stimulation with dobutamine caused a lower increase of LV ejection fraction (71.9±1.9 *vs.* 76.3±1.2%, $P<0.05$) and heart rate (103±6.9 *vs.* 128±2.8 beats/min, $P<0.05$) in PWS than obese individuals. By multivariate analysis, nocturnal oxygen desaturation and IGF-I levels were main significant predictors of LV mass and heart rate in PWS patients.

Conclusions. PWS differs from simple obesity by a healthier metabolic profile, impaired nocturnal breathing, decreased heart geometry, and systolic and chronotropic performance. GHD and the predictive role of IGF-I on structural and functional heart parameters suggest a GH/IGF-I-mediated control of cardiac risk in PWS.