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Title: Central venous-to-arterial carbon dioxide difference (CO2 GAP) in patients with arterial pulmonary hypertension: A pilot study

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Body: Pulmonary arterial hypertension (PAH) is characterized by increased pulmonary vascular resistance that can lead to right failure and death. Right ventricular (RV) function is a major determinant of functional capacity and prognosis in PAH, with a reduced survival in patients with decreased cardiac index. Several studies have already shown that venous-to-arterial CO2 difference (CO2 GAP: PvCO2 minus PaCO2) is inversely correlated to cardiac index (CI) in septic and non-septic circulatory failure. Objectives: To analyze the value of the CO2 GAP in PAH patients and its relationship with the cardiac index. Methods: The right heart catheterization was performed using the Seldinger technique with a 8F sheath inserted via the basilica vein. Cardiac output was measured using thermodilution technique. Results: We analyzed 26 patients with PAH (80% women and 20% men). 86% were classified as WHO group 1(34% had idiopathic PAH) and 7% were WHO group 4 (chronic thromboembolic pulmonary hypertension). Most patients were in NYHA functional class II (50%) and the mean 6-min walk distance was 451 meters. At the time of enrollment, 78% were treated with pulmonary vasodilators (39% sildenafil alone and 39% sildenafil + bosentana). CI, CO2 GAP and central venous oxygen saturation (ScvO2) were compared by Pearson correlation. We found a negative correlation between CI and CO2 GAP (R square 0,15 and p: 0,04) and a positive correlation between CI and venous O2 saturation (R square 0,44 and p: 0,0002). Conclusion: In PAH patients, the CO2 GAP may be a useful tool to analyze right ventricular function. Future research should analyze its value in the prognosis of PAH patients.