Cortisol/cortisone ratio and matrix metalloproteinase-9 activity are associated with pediatric primary hypertension

Por: Martinez-Aguayo, A (Martinez-Aguayo, Alejandro)[1]; Campino, C (Campino, Carmen)[2,3]; Baudrand, R (Baudrand, Rene)[2]; Carvajal, CA (Carvajal, Cristian A.)[2,3]; Garcia, H (Garcia, Hernan)[1]; Aglony, M (Aglony, Marlene)[1]; Bancalari, R (Bancalari, Rodrigo)[1]; Garcia, L (Garcia, Lorena)[4]; Loureiro, C (Loureiro, Carolina)[1]; Vecchiola, A (Vecchiola, Andrea)[2,3] ...Más

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Resumen

Objective: To identify novel biomarkers associated with pediatric primary hypertension.

Methods: We recruited 350 participants (4-16 years). Anthropometric parameters and aldosterone, plasma renin activity, cortisol, cortisone, Homeostasis Model Assessment Insulin Resistance (HOMA-IR), high-sensitivity C-reactive protein, adiponectin, IL-6, plasminogen activator inhibitor type 1 levels and matrix metalloproteinase-9 and matrix metalloproteinase-2 (MMP-9 and MMP-2) activities were measured. Genomic DNA was isolated. Patients with altered glucose metabolism, severe obesity [BMI-SD score (BMI-SDS)> 2.51, renovascular disease, primary aldosteronism and apparent mineralocorticoid excess syndrome were excluded.

Results: In selected participants (n = 320), SBP was positively correlated with BMI-SDS (r = 0.382, P < 0.001), HOMA-IR (r = 0.211, P<0.001), MMP-9 activity (r = 0.215, P< 0.001) and the cortisol/cortisone ratio (r = 0.231, P< 0.001). DBP showed similar correlations with these variables. No correlation was observed with aldosterone or plasma renin activity. Participants were categorized as hypertensive (n = 59) or nonhypertensive (n = 261). In the univariate analysis, hypertensive patients had higher BMISDS (P<0.001), HOMA-IR (P<0.001), high-sensitivity C reactive protein (P < 0.001), MMP-9 activity (P< 0.001), plasminogen activator inhibitor type 1 (P<0.001) and cortisol/cortisone ratio (P < 0.001) than nonhypertensive patients. Multiple regression analysis showed that the variables that remained associated with hypertension were higher BMI-SDS [odds ratio (OR)=3.74; 95% confidence interval (CI)=1.84-7.581, a higher cortisol/cortisone ratio (OR=3.92; 95% Cl= 1.98-7.71) and increased MMP-9 activity (OR=4.23; 95% C1=2.15-8,32).

Conclusion: We report that MMP-9 activity and the cortisol/cortisone ratio were higher in pediatric primary hypertensive patients, and these associations were independent of the effect of obesity. The potential role of these novel biomarkers in predicting hypertension risk and blood pressure regulation warrants further investigation.

Palabras clave

Palabras clave de autor:biomarkers; cortisol/cortisone ratio; matrix; metalloproteinase-9; pediatric hypertension; primary; hypertension

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Información del autor

Dirección para petición de copias: Fardella, CE (autor para petición de copias)

+ Pontificia Univ Catolica Chile, Dept Endocrinol, Sch Med, Lira 85,Piso 5, Santiago, Chile.

Direcciones:

+ [1] Pontificia Univ Catolica Chile, Div Pediat, Santiago, Chile
+ [2] Pontificia Univ Catolica Chile, Dept Endocrinol, Santiago, Chile
+ [3] Pontificia Univ Catolica Chile, Millennium Inst Immunol & Immunotherapy, Dept Mol Genet & Microbiol, San Chile
+ [4] Univ Chile, Dept Biochem & Mol Biol, Fac Chem & Pharmaceut Sci, Adv Ctr Chron Dis ACCDiS, Santiago,
+ [5] Pontificia Univ Catolica Chile, Sch Med, Santiago, Chile

[6] Univ San Sebastian, Fac Ciencia, San Sebastian, Spain

+ [7] Pontificia Univ Catolica Chile, Dept Clin Labs, Fac Med, Santiago, Chile
+ [8] Pontificia Univ Catolica Chile, Fac Ciencias Biol, Dept Celular & Mol Biol, Santiago, Chile

Direcciones de correo electrónico:cfardella@med.puc.cl

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