J Endocrinol Invest. 2018 Jul;41(7):799-808. doi: 10.1007/s40618-017-0807-7. Epub 2017 Dec 12.

Copeptin and insulin resistance: effect modification by age and 11 β-HSD2 activity in a population-based study

S Canivell [1], M Mohaupt [2], D Ackermann [2], M Pruijm [3], I Guessous [4 5], G Ehret [6], G Escher [2], A Pechère-Bertschi [7], B Vogt [2], O Devuyst [8], M Burnier [9 10], P-Y Martin [11], B Ponte [11], M Bochud [12]

Affiliations + expand

PMID: 29235050 DOI: 10.1007/s40618-017-0807-7

Abstract

Purpose: Arginine vasopressin (AVP) may be involved in metabolic syndrome (MetS) by altering liver glycogenolysis, insulin and glucagon secretion, and pituitary ACTH release. Moreover, AVP stimulates the expression of 11β-hydroxysteroid-dehydrogenase-type 2 (11β-HSD2) in mineralocorticosteroid cells. We explored whether apparent 11β-HSD2 activity, estimated using urinary cortisol-to-cortisone ratio, modulates the association between plasma copeptin, as AVP surrogate, and insulin resistance/MetS in the general adult population.

Methods: This was a multicentric, family-based, cross-sectional sample of 1089 subjects, aged 18-90 years, 47% men, 13.4% MetS, in Switzerland. Mixed multivariable linear and logistic regression models were built to investigate the association of insulin resistance (HOMA-IR)/fasting glucose and MetS/Type 2 Diabetes with copeptin, while considering potential confounders or effect modifiers into account. Stratified results by age and 11β-HSD2 activity were presented as appropriate.

Results: Plasma copeptin was higher in men [median 5.2, IQR (3.7-7.8) pmol/L] than in women [median 3.0, IQR (2.2-4.3) pmol/L], $P < 0.0001$. HOMA-IR was positively associated with copeptin after full adjustment if 11β-HSD2 activity was high [β (95% CI) = 0.32 (0.17-0.46), $P < 0.001$] or if age was high [β (95% CI) = 0.34 (0.20-0.48), $P < 0.001$], but not if either 11β-HSD2 activity or age was low. There was a positive association of type 2 diabetes with copeptin [OR (95% CI) = 2.07 (1.10-3.89), $P = 0.024$), but not for MetS (OR (95% CI) = 1.12 (0.74-1.69), $P = 0.605$), after full adjustment.

Conclusions: Our data suggest that age and apparent 11β-HSD2 activity modulate the association of copeptin with insulin resistance at the population level but not MeTS or diabetes. Further research is needed to corroborate these results and to understand the mechanisms underlying these findings.