



THE HIDDEN LIQUORICE

APPARENT MINERALOCORTICOID EXCESS (AME) CAUSED BY INADVERTENT EXPOSURE TO LIQUORICE ROOT EXTRACT*

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Case: A 21-year-old patient exhibited severe symptoms of AME (oedema, spells of dizziness, headaches and peripheral paraesthesia as well as general and muscular fatigue). Blood samples showed low serum potassium (2.3-3.1 mmol/L, ref (3.5-4.6)) requiring potassium supplementation (40 mmol x 2 daily) and high normal sodium (142-147 mmol/L, ref (137-145)).

Measurement of 24h urinary steroid metabolite excretion raised the suspicion of apparent mineralocorticoid excess (AME). Additional blood tests showed undetectable serum concentrations of aldosterone (<38 pmol/L, ref (50-360)) and renin (<2 *10⁻³ IU/L, ref (6-60)). Pituitary function (thyroid hormones, prolactin, IGF-1, IGFBP-3) was normal.

No obvious endocrine cause of AME could be established and the patient re-evaluated all personal dietary products. Licorice root was present in several herbal teas and sugar-free chewing gum that had been consumed daily in large amounts. Cessation of usage of these products resulted in complete recovery of AME-related symptoms.

Objective: To raise awareness that licorice derivatives are added to many dietary and personal care products without being explicitly declared. Consumers are at risk to develop AME due to inadvertent intake.

Conclusion: Clinicians should extend their medical history to a broader range of consumer products than licorice sweets when suspecting licorice-induced AME.

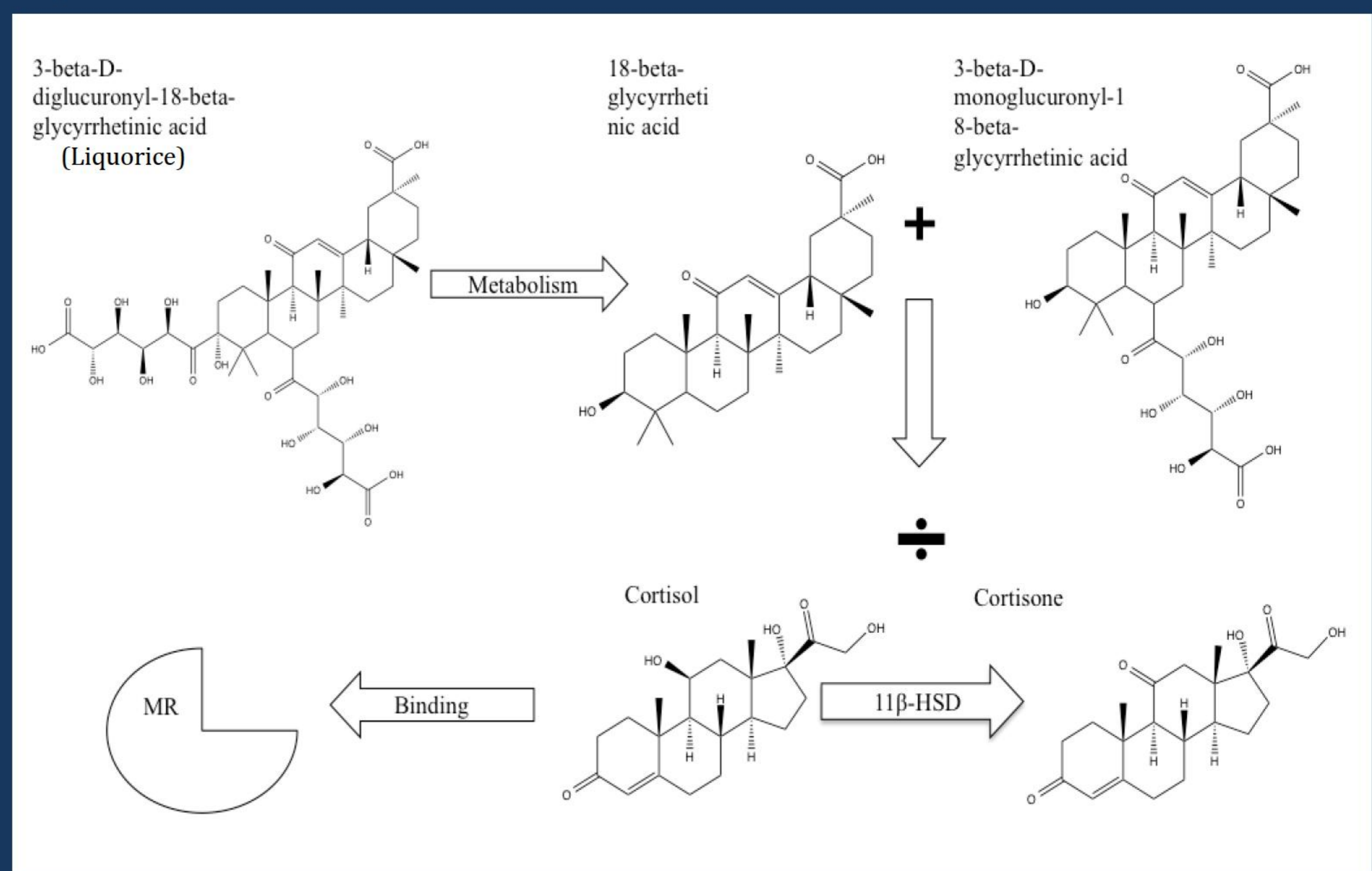


Figure: Mechanism by which the active ingredient in licorice root extract is metabolised in the human body. The metabolites inhibit the enzyme 11β-HSD and excess cortisol binds the mineralocorticoid receptor (MR). This causes water retention and other AME-related symptoms

Factors that increase AME risk with licorice intake	Common sources of 'hidden' licorice
Differences in toxicokinetics and/or 11β-HSD2 levels and activity	Treatments for peptic ulcers, coughs, constipation, wounds, tuberculosis, and diabetes
Female sex and oral contraceptives	Vitamins, dietary supplements, and plant protein products
Prolonged gastrointestinal transit time, gastrointestinal/renal losses	Additives in drugs (masks bitter taste/enhances absorption)
Cushing's/Conn's syndrome	Baked goods, sweets, beverages, teas, chewing gum, and chewing tobacco (added sweetener and taste enhancer)
Anorexia nervosa, inflammation, and stress	Herbs and seasonings

*AAE Journals, 2015, in press.

Picture: http://www.google.dk/url?sa=i&ict=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&uact=8&ved=OCAUQjhw&url=http%3A%2F%2Fwww.demeterwholefoods.co.uk%2Fp54556%2FClipper-Organic-Licorice-Infusion%2Fb0-4663-4663&ei=xPRAVfCoK87swH14oDwBQ&psig=AFQjCNGabiW_eUK7zXcb_9jc0V-dmL8GQw&ust=1430406651862597