Severe Hypertension in a Girl: Cushing Syndrome or Apparent Mineralocorticoid Excess Syndrome? Utility of Molecular Study

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Introduction

Apparent mineralocorticoids excess syndrome (AME) is an unusual cause of hypertension in childhood, caused by genetic mutation of type 2- 11β-hidroxysteroid deshydrogenase (11BHSD2) enzime, which metabolizes cortisol to cortisone.

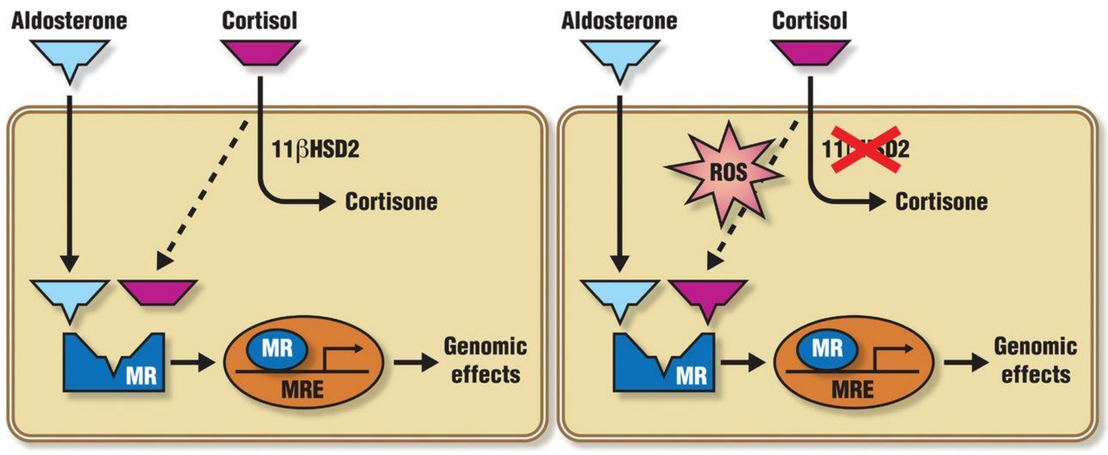

Figure 1: Mechanism for the activation of MR by glucocorticoids (Ref.3)

Patients with AME usually born from consanguineous parents and could have some special clinical and laboratory characteristics that suggest the diagnosis such as:

- Severe hypertension.
- Small for gestational age (SGA)
- Nephrocalcinosis
- Persistent hypokalemia
- High plasma cortisol/cortisone relation (F/E).

Molecular study of 11B-HSD2 is a useful tool, since it helps in the diagnosis of AME and this allows to use a specific treatment for this clinical entity.

Different mutations have been described in families in different countries as case reports.

Objective

To tell the clinical and laboratory presentation of a girl with hypertension because of AME.

Clinical Case

A 2-years old girl was admitted to hospital for mild head trauma. During her hospitalization she showed severe hypertension, requiring 4 drugs to control partially her blood pressure.

Clinical background: Fullterm Small for gestational age newborn. Second daughter of normotensive parents who are first degree cousins; she has a normotensive sister.

Past medical history: recurrent pneumonia and viral hypertrophic myocardiopathy.

Physical exam: No characteristic facium; no Cushing signs were noted.

Hypertension study

Renal US: bilateral Nephrocalcinosis, mild pyelectasia, no arterial stenosis; normal renal function.
Urine sample : High calcium/creatinine index.
Urinary catecholamines, urinary metanephrines; androstenedione; 17OH progesterone, prolactine and thyroid hormones resulted normal.
Head and abdominal MRI were normal.

Exam	Result	Reference value
Aldosterone (ng/dL)	< 1	5-80
Plasmatic renin activity (ng/mL/hr)	< 0,2	1,1-3,8
Free urinary cortisol (FUC) (ug/gr Creat- 24h urine) **FUC 1st sample** **FUC 2d sample**	 **1.413** **262**	 **7-26**
Plasmatic Cortisol 8:00 hrs (ug/dL) 16:00 hrs	13,4 5,2	0,3-26 Not determined
ACTH (pg/mL)	**33**	10-60
Night salival cortisol (11 pm) (ug/dL) **Day 1** **Day 2**	 **0,132** **0,146**	 **< 0,1**
Night plasmatic Cortisol (ug/dL)	3,8	
Cortisol after 0,3 mg dexa (ug/dL)	**2,3**	**Supressed -> <1,8**
K (without suplementation)	2,9	3,5 – 5,5
Cortisol /cortisone relation (F/E)	**175,57 ↑↑↑**	Children : 1,7 – 5,6

Table 1. Relevant laboratory results of the patient with AME.

11BHSD2 genetic study was performed and showed the mutation R213C on exon 3, confirming AME.

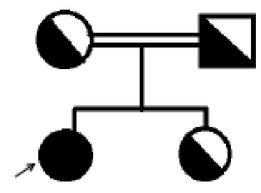

Figure 2: Pedigree of the f **D2**

Conclusion

Although AME is a really unusual disease it must be considered in the differencial diagnosis of severe hypertension in childhood when the clinical record is compatible. AME has normal levels of cortisol, therefore the biochemical hypercortisolism difficulted the diagnosis in this patient, but molecular study helped to do the correct diagnosis.

References:

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