FALSELY ELEVATED SERUM SEX STEROID HORMONES IN A GIRL WITH PREMATURE ADRENARCHE

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Background: Laboratory evaluation is crucial for accurate assessment of patients with endocrine disorders. When clinical picture is in obvious contradiction with laboratory results, one should suspect and prove analytical interference.

Case presentation: **A** 6.7-year-old girl presented with sexual and axillary hair accompanied by adult-type body odor. She was tall (height SDS 2.6), with no other signs of virilisation and no breast development. Her bone age was slightly advanced (7.5 years), and laboratory workup showed markedly elevated levels of dehydroepiandrosterone sulphate (DHEAS) and elevated testosteron (testo) measured by electrochemical luminescence immunoassay (ECLIA) along with appropriate level of 17-hydroxyprogesterone (17-OHP) measured by radioimmunoassay (RIA). Subsequent investigations confirmed previous laboratory results, but also revealed elevated serum estradiol (E2) with no evidence of estrogen effect on uterus and no adrenal or adnexal mass. Cortisol level was unremarkable.
During one year follow up, there were no changes in girl's clinical appearance, while levels of her sex steroids determined by ECLIA fluctuated from undetectable or slightly elevated to markedly elevated. There were no apparent risk factors for analytic interference (no biotin supplementation or drugs, negative rheumatoid factor, no hypergammaglobulinemia).
When samples were reanalyzed with the addition of a blocking agent, significantly lower levels of serum sex steroids were obtained, while liquid chromatography-tandem mass spectrometry (LC-MS/MS) revealed sex steroids appropriate for age.

Table 1. Summary of the laboratory findings

Hormone (serum)	02/2018.	03/2018.	06/2018.	02/2019.	Age adjusted reference range	Method
DHEA-S, µmol/l	13.98	10.45	5.01	4.99 3.02 3.57	0.08-2.31 <2,5	ECLIA ECLIA+blocking agent LC-MS/MS
testo, nmol/L	1.5	0.8	<0.4	3.7 0.7 0.36	<0.4 <1,214	ECLIA ECLIA+blocking agent LC-MS/MS
E2, pmol/L nmol/l	/	323	97	941 215 0.128	<92 <0,239	ECLIA ECLIA+blocking agent LC-MS/MS

Conclusion: Laboratory interference is a drawback in hormonal testing that can lead to costly investigations, misdiagnosis and unnecessary treatments. Clinicians should have that in mind when faced with laboratory results discordant with patient's clinical presentation. According to our knowledge, elevation of multiple sex steroid hormones due to laboratory interference in immunoassay has never been reported in a prepubertal girl. In our patient the interference was finally unmasked by LC-MS/MS.

References:

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