RESEARCH LETTER

Autoimmune Adrenalitis in a Child

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Adrenal insufficiency is defined by impaired synthesis and release of adrenocortical hormones. It is classified based upon whether the etiology is primary or secondary. Primary adrenal insufficiency, also known as Addison's disease, results from disease intrinsic to the adrenal cortex. Secondary adrenal insufficiency is caused by impaired release of adrenocorticotropic hormone / corticotropin releasing factor from the pituitary gland/ hypothalamus.

A 10 year old boy presented with a 2 week history of having been unwell. He complained of generalised cramping, intermittent abdominal pain of moderate intensity. He was nauseated with poor oral intake with small amounts of non bilious vomits few times a day. Urine output was normal. He was lethargic and fatigued. There was no history of fever, rash, diarrhoea or any respiratory symptoms. He was admitted in another hospital with similar symptoms 4 days back where he was given intravenous fluids and discharged after 2 days. Abdominal X-ray, ultrasound, urine and blood tests done were said to be normal. He was an otherwise well child not on any medications, vaccinated to date, attending regular school with no major concerns. He had a supportive family and there was no significant family or travel history.

On examination, he was conscious and oriented but lethargic. He was afebrile with low volume peripheral pulses. He had cold hands with poor perfusion. He had signs of significant dehydration with poor skin turgor, sunken eyes and dry mucosa. BP was 82/38 mm of Hg. Abdominal examination revealed minimal tenderness in the left hypochondrium with no organomegaly and normal bowel sounds. The rest of the examination was normal. Skin, spine, joints were normal. He was a well grown child with weight on the 50th percentile and height on the 75th percentile.

He received a bolus of 20 ml/kg of normal saline to improve his circulatory status. Preliminary investigations done revealed significant hyponatremia Na 117 mEq/l , K 5.6 mEq/l, Bicarbonate 17mEq/l, pH of 7.28 and blood glucose of 52 mg/dl. His full blood count, CRP and urine examination were normal. Following the fluid bolus, his circulation improved. He was maintained on Normal saline with 5% glucose fluid.

He had vague symptoms prior to admission with no evidence of infection or inflammation with laboratory evidence of hyponatremia, hyperkalemia, hypoglycaemia and hypotension pointing to an endocrine or metabolic cause. Adrenal pathology was strongly suspected. He was given IV hydrocortisone 100mg and was continued on maintenance doses.

Synacthen stimulation test was performed. Baseline ACTH was sky high at 1270 pmol/l. Cortisol levels were 113,120,107 nmol/l at baseline, 30minutes and 60 minutes following ACTH injection indicating a poor adrenal response. Mineralocorticoid deficiency was confirmed with the finding of relatively low aldosterone levels in the face of hyperreninemia. 17 OH progesterone levels were normal excluding congenital adrenal hyperplasia. Thyroid function tests were normal. Very long chain fatty acids were normal ruling out adrenoleukodystrophy. CT scan abdomen with contrast was done which showed both adrenals were present but very thin. Antiadrenal antibodies were strongly positive and a diagnosis of Autoimmune Addison's disease was made.

He was subsequently switched to oral hydrocortisone and fludrocortisone was commenced.

Adrenal insufficiency is relatively rare in childhood and adolescence. Signs and symptoms may be nonspecific; therefore, the diagnosis may not be suspected early in the course. If unrecognized, adrenal insufficiency may present with life-threatening cardiovascular collapse

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(1,2). The need to be able to suspect and diagnose adrenal insufficiency is required to prevent mortality from a treatable cause.

In primary adrenal insufficiency, glucocorticoid and mineralocorticoid hormones are lost due to the involvement of the adrenal gland . In secondary adrenal insufficiency, mineralocorticoid function is preserved(2).

Tuberculosis, fulminant infections, HIV are important causes in the developing world. In the developed countries, the most common cause of primary adrenal insufficiency is congenital adrenal hyperplasia (72%), most often caused by deficiency of enzyme 21-hydroxylase followed by Autoimmune adrenal insufficiency (13%) and some rare syndromes (15%)(3). Secondary adrenal insufficiency is caused by an abrupt discontinuation of glucocorticoid therapy and is the most common cause.

Autoimmune adrenalitis is the result of an autoimmune process that destroys the adrenal cortex. Immune mechanisms are directed at the adrenal cortex, often associated with autoimmune destruction of other endocrine glands. Antibodies that react with steroidogenic enzymes (most often 21 hydroxylase) and all three zones of the adrenal cortex are present in the serum of 60 to 75% of patients. It is the most common cause of primary adrenal insufficiency in adults.

Acute adrenal insufficiency can manifest as crisis with shock while in chronic adrenal insufficiency, findings are non specific with abdominal pain, anorexia, weight loss, lethargy, postural hypotension, salt craving and hyperpigmentation. Hyperpigmentation is due to elevation of melanocyte-stimulating hormone, it may not always be clinically obvious as in our patient and with secondary adrenal insufficiency (3).

The child had non specific symptomatology coupled with the significant hyponatremia which provided as a red flag in this case. The relative dehydration and minimal gastro intestinal or integumentary losses pointed to the fact that he was losing sodium possibly from the kidneys. The normal renal parameters and absence of oliguria ruled out a renal pathology. The knowledge that adrenal pathology can manifest in this manner and should be included in the differentials is what we would like to highlight in this case. Our patient had primary adrenal pathology due to autoimmune adrenalitis resulting in glucocorticoid and mineralocorticoid deficiency. Lifelong replacement with hydrocortisone and fludrocortisone is vital.Timely and adequate hydrocortisone replacement in patients with acute adrenal insufficiency represents a lifesaving and effective solution in medical emergencies (4,5).

A high index of suspicion results in earlier detection and possible prevention of adrenal crisis with a reduction in associated morbidities. Definitive diagnosis is now possible for almost all cases of primary adrenal insufficiency using technologies for screening autoimmunity, adrenoleukodystrophy and genetic screening.

References

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