Congenital adrenal hyperplasia of a neonate presented as Neonatal sepsis- A Case Report

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Abstract

Congenital adrenal hyperplasia (CAH) is a disorder of Adrenal steroid synthesis. Classic congenital adrenal hyperplasia (CAH) due to 21 hydroxylase deficiency results in one of two clinical syndromes: a salt-losing form or a simple virilizing form. Girls of either forms, present with ambiguous genitalia. Newborn males show no overt signs of CAH. So a high index of suspicion is needed to diagnose them. We reported a case of 17 days old female newborn who presented with the complaints of recurrent vomiting. CAH was suspected and diagnosis was confirmed by high level of serum 17 OH progesterone level.

Key words: Congenital Adrenal hyperplasia (CAH), 17 hydroxyprogesterone, Cortisol, Androstenedione and Dihydroepiandosterone (DHEA)

J Cox Med coll 2019;5(1): 32-34

Introduction

Defective conversion of 17- hydroxyprogesterone to 11-deoxycortisol account for more than 90 percent of cases of congenital adrenal hyperplasia (CAH)[1]. This conversion is mediated by 21 hydroxylase, the enzyme encoded by the CYP21A2 gene. As a result, there is decreased cortisol synthesis and therefore increased adrenocorticotropic hormone (ACTH) secretion. The resulting adrenal stimulation leads to increased production of androgen, which leads to virilization of female babies[2].

Patients with "classic" or the most severe form of CAH due to 21-hydroxylase deficiency present during the neonatal period and early infancy with adrenal insufficiency with or without salt-losing. On the other hand toddlers present with virilization. Females usually have genital ambiguity[1].

"Nonclassic," or late-onset 21-hydroxylase deficiency, presents later in life with signs of androgen excess and without neonatal genital ambiguity. Clinical features in childhood may include premature pubarche, and accelerated bone age . Adolescent and adult females may present with hirsutism, menstrual irregularity, infertility, and acne. Some patients with nonclassic CAH may remain asymptomatic for life long[2].

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Case report:

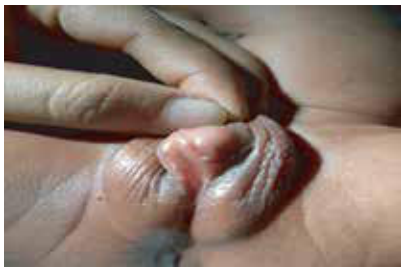
A 17 days old female baby weighing 3200 gm of nonconsanguinous parents presented to us with the complaints of recurrent vomiting for last 1 day. Her mother a 35 years old lady, 8th gravida was on regular antenatal check up having uneventful pregnancy. The baby delivered by Normal Vaginal Delivary(NVD) at term, without any adverse perinatal events. She was given breast feeding soon after birth. After the initial 17 uneventful postnatal days the baby admitted with the complaints of repeated vomiting. On query , mother told that four of her sons died within one month of age with the complaints of vomiting for several times.

At the time of admission to our hospital, baby's vitals were within normal limit except moderate dehydration, Reflexes were moderate. The baby had ambiguous genitalia in the form of clitoromegaly with rugosity of fused labia majora. Testes were not palpable. Other systemic examination revealed no abnormality[3].

Her investigations showed ,normal CBC & blood sugar, hyponatremia (S Na^+ 115 mmol/), Hyperkalemia (S K^+ 8.1 mmol/l). Hyperkalemia was corrected with the administration of Calcium gluconate and nebulized salbutamol. Initially we started treatment of Late onset sepsis.

After getting S Electrolyte report , considering the presentation and initial investigations we suspected Congenital adrenal hyperplasia but 17-OH progesterone level could not be done due to lack of facility in our center . We started glucocorticoid and mineralocorticoid supplementation. Next day the

baby was in shock due to adrenal crisis and we managed the baby with stress dose of injectable hydrocortisione , Normal saline bolus and the 0.45 % NaCl solution. We sent blood for S OHP to



BIRDEM, Dhaka and the child's 17-OH progesterone level was 1800 ng/ml which was remarkably elevated as normal level in neonatal age is 100-200 ng/ml . So supplementation of steroids was continued. Other investigations like complete blood count , CRP was normal . USG of whole abdomen revealed both adrenal glands not enlarged with presence of uterus. Gradually baby was improved and put on direct breast feeding and was shifted to mother side. On discharge her S electrolytes were within normal limit .

Discussion

A very high serum concentration of 17-hydroxyprogesterone, the normal substrate for 21-hydroxylase, is diagnostic of classic 21-hydroxylase deficiency .

Adrenal ultrasonography is another potential adjunctive test for congenital adrenal hyperplasia in neonates when the diagnosis is equivocal based upon other testing[4].

In many countries, including the United States, neonatal screening for 21-hydroxylase deficiency is an approved part of the neonatal screening program. The screening test for 17OHP is measured using a filter paper blood sample obtained by a heel puncture preferably between two and four days after birth. The assay used in most programs is a fluoroimmunoassay [5].

The goals of classic CAH newborn screening are firstly early detection of the severe, salt-wasting form, therefore prevention of adrenal crisis or death[6]. Secondly early detection of the simple virilizing form, and prevention or shortening of the period of incorrect gender assignment in females[7].

Prenatal diagnosis should be considered when a fetus is known to be at risk because of an affected sibling, thus predicting one in eight chance of female genital ambiguity. Measurements of amniotic fluid 17-hydroxyprogesterone has been used as screening method[8]. For this case as there is history of sib death due to same type of presentations prenatal diagnosis could be done.

A typical starting dose of hydrocortisone is 20 to 30 mg/m2/day divided thrice daily , fludrocortisone 100 mcg twice daily, and one gram or 4 mEq/kg/day of sodium chloride divided in several feedings. But it is important to very rapidly reduce the dose when target hormone levels are achieved. Once results are available, medication dose titration should be performed with repeat blood sampling and blood pressure monitoring at least monthly[2].

The clinical course in patients with classic CAH and 21-hydroxylase defect depends on early diagnosis of the disease. Positive findings of screening for CAH need to be verified quickly by clinical and endocrinological evidence.

Clinical presentation and laboratory findings of the baby correlate to CAH of 'salt losing type'. The infant presented earlier than many other cases with vomiting, dehydration and virilized external genitalia. The baby responded well with recommended medical treatment.

Conclusion

The goal of the present article is to enlighten others about usefulness of newborn screening and to keep CAH as a differential in any neonate who presents with unexplained vomiting, shock and unresponsive sepsis.

References

1. Merke DP, Bornstein SR. Congenital adrenal hyperplasia. Lancet. 2005 Jun 18-24;365(9477):2125-36. [PubMed]

2. Speiser PW, Azziz R, Baskin LS, Ghizzoni L, Hensle TW, Merke DP, Meyer-Bahlburg HF, Miller WL, Montori VM, Oberfield SE, Ritzen M, White PC; Endocrine Society. Congenital adrenal hyperplasia due to steroid 21-hydroxylase deficiency: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2010 Sep;95(9):4133-60. doi: 10.1210/jc.2009-2631.

3. Witchel SF, Nayak S, Suda-Hartman M, Lee PA. Newborn screening for 21-hydroxylase deficiency: results of CYP21 molecular genetic analysis. J Pediatr. 1997 Aug;131(2):328-31. [PubMed]

4. Al-Alwan I, Navarro O, Daneman D, Daneman

A. Clinical utility of adrenal ultrasonography in the diagnosis of congenital adrenal hyperplasia. J Pediatr. 1999 Jul;135(1):71-5. [PubMed]
5. Gonzalez RR, Mäentausta O, Solyom J, Vihko R. Direct solid-phase time-resolved fluoroimmunoassay of 17 alpha-hydroxyprogesterone in serum and dried blood spots on filter paper. Clin Chem 1990; 36:1667.
6. Minutti CZ, Lacey JM, Magera MJ, et al. Steroid profiling by tandem mass spectrometry improves the positive predictive value of newborn screening for congenital adrenal hyperplasia. J Clin Endocrinol Metab 2004; 89:3687.
7. Nordenström A, Thilén A, Hagenfeldt L, Larsson A, Wedell A. Genotyping is a valuable diagnostic complement to neonatal screening for congenital adrenal hyperplasia due to steroid 21-hydroxylase deficiency. J Clin Endocrinol Metab. 1999 May;84(5):1505-9.
8. Mornet E, Boue J, Raux-Demay M, et al. First trimester prenatal diagnosis of 21-hydroxylase deficiency by linkage analysis to HLA-DNA probes and by 17-hydroxyprogesterone determination. Hum Genet 1986; 73:358.