

Case Report

Congenital Adrenal Hyperplasia and Pseudodiphallia, New Association

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Abstract:

We are presenting and to the best of our knowledge a new neonatal presentation of congenital adrenal hyperplasia, where a male newborn was born with pseudodiphallia and proved to have congenital adrenal hyperplasia. The metabolic derangement end product of congenital adrenal hyperplasia may have affected the fetus external genitalia leading to development of this anomaly. We therefore, presented this case because of this rare association.

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A Case Report:

A full term newborn baby, a product of normal vaginal delivery presented because during routine physical examination was found to be an abnormally looking genitalia in the form of a penis like structure attached to the scrotum with a scrotum like structure lies ventral to it (Fig 1). The genitalia were noticed to be darker in color than other part of the body; otherwise, he looks generally normal. Ultrasound examination of abdomen and pelvis revealed no abnormality involving urinary system or abdominal viscera and karyotype resulted in a normal male phenotype.



Figure 1.

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At the age of 3 weeks, the result of serum 17-Hydroxy-progesterone was high (> 200 ng/ml), but with a normal total cortisol serum level. One week, later he was admitted to SCBU because of circulatory collapse resulting from severe attack of vomiting and dehydration.

A tentative diagnosis of adrenocortical insufficiency was made as his blood tests showed elevated 17-Hydroxyprogesterone serum level together with hyponatraemia, hyperkalaemia, hyperbilirubinaemia and an elevated blood urea nitrogen level with a normal blood sugar.

Management at SCBU includes steroid replacement therapy and other supportive measures leading to recovery of the baby clinically and biochemically. Discharged home two weeks later on a maintenance therapy of glucocorticoids and mineralocorticoids.

Two months later and under cover of steroids cystourethroscopy done and was reported normal. The rudimentary phallus together with the scrotum like structure were excised successfully with uneventful Postoperative recovery (Fig 2).



Figure 2.

Discussion

Congenital Adrenal Hyperplasia (CAH) is an autosomal recessive disorder of adrenal steroidogenesis leading to a deficiency of cortisol. The deficiency of cortisol results in increased secretion of corticotrophin, which, in turn, leads to adrenocortical hyperplasia and overproduction of intermediary metabolites.¹

Diphallia or duplication of penis is a rare congenital anomaly. This anomaly is classified into two, a complete diphallus and a partial diphallus. Vilanova and Raventos added a third type called pseudodiphallia, that is, a normal or almost normal penis associated with an indication or rudiment of an atrophic penis existing independently of the normal penis.²

The severity of particular enzymatic deficiency in Congenital Adrenal Hyperplasia (CAH) is variable and likely depends on the nature of the mutation in the gene for that particular enzyme.

This variation in severity accounts for the marked ambiguity and severe salt wasting found in some children with 21-hydroxylase deficiency, whereas others have the nonclassic form of CAH manifested by subfertility, precocious puberty, hirsutism, and slight clitoromegaly. CAH is just as common in male patients.^{3, 4}

Neonatal screening programs using capillary heel blood have been developed to detect early 21-hydroxylase deficiency in developed countries. Previous data indicated that the disorder occurs in 1: 10,000-16,000 newborns in Europe and North America. About 75 % of affected infants have the salt-losing, virilizing form, and 25 % have the simple virilizing form of the disorder.⁵

Having a congenital adrenal hyperplasia in one infant should alert attending doctor to the diagnosis in other siblings. The salt-losing form of the disorder may be listed in the differential diagnosis of any infant who fails to thrive and in any female infant with ambiguous external genitalia.

Scrotal hyperpigmentation may indicate high melanocyte- stimulating hormone levels, which results from maximum stimulation of adrenocorticotrophic hormone. This is often seen in a more severe form of CAH, which may first present with life threatening crisis. This crisis may occur anywhere from the 4th day of life to the 4th year of age. The prelude consists of poor feeding, vomiting, diarrhea and weight loss. If we miss the diagnosis this may lead to fatal outcome.⁶

The adrenal cortex produces glucocorticoids as well as small amounts of sex hormones especially androgenic hormones. Under normal physiological conditions, these adrenal androgens have almost insignificant effect, though in certain abnormalities of the adrenal cortices extreme quantities can be secreted and can then result in masculinizing effects.⁷

In fetuses with defect in steroidogenesis, there is an accumulation of steroid precursor 17-Hydroxyprogesterone which is shunted into the pathway for androgen biosynthesis leading to high levels of androstenedione which is converted outside the adrenal glands to testosterone.

This derangement may start to affect the fetuses by 8-10 weeks of gestation and lead to abnormal genital development.⁸

In our patient, we believe that the antenatal exposure of external genitalia to large quantities of androgenic hormones of adrenal origin has resulted into the development of pseudodiphallia.

As this anomaly can be diagnosed antenatally.⁹ DNA analysis of chorionic villus cells can be used for the prenatal diagnosis of all forms of CAH. Prenatal diagnosis of 21-hydroxylase deficiency is possible in the first trimester by DNA analysis and HLA genotyping of chorionic villus cells. In the 2nd and 3rd trimester the diagnosis can be established by measuring 17-hydroxyprogesterone and androstenedione in amniotic fluid as well as by HLA typing and DNA analysis of amniotic fluid cells.

Prenatal treatment by maternal dexamethasone administration is currently being used. However, there is insufficient information to determine the most effective regimen and whether there are long-term risks to the treatment.¹⁰

In males with CAH, the tests are small for the degree of virilization. However, testicular enlargement may present with adrenal rest tumors or when true precocious puberty occurs. In females, CAH due to 21- hydroxylase deficiency results in female pseudohermaphroditism. Females with this condition must be differentiated from those with other causes of ambiguous external genitalia. Only in this condition are adrenal cortical steroid levels elevated.

Urinary 17-ketosteroid excretion increases and plasma levels of 17-hydroxyprogesterone and Dehydroepiandrosterone Sulfate (DHEAS) are elevated in infants with CAH. However, the most definitive test for adrenal insufficiency is measurement of serum level of cortisol before and after administration of ACTH. Plasma renin may be elevated in the face of mineralocorticoids deficiency. Blood glucose, urea and serum electrolytes are helpful to the diagnosis. Treatment of CAH is by oral hydrocortisone (glucocorticoids), and 9 α -fluorohydrocortisone (mineralocorticoids), together with high sodium chloride intake.

Pseudodiphallia is treated by excision of the rudimentary or atrophic penile structure. It is essential that complete genitourinary evaluation should precede any treatment.

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