IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 20, Issue 12 Ser.3 (December. 2021), PP 06-09
www.iosrjournals.org

A Case of Seizures in a Child with Congenital Adrenal Hyperplasia

Dr. Mallavarapu Varsha, Dr. Mythily Srinivas
Department of Pediatrics, Vinayaka Mission's Medical College and Hospital,
Vinayaka Mission's Research Foundation (Deemed to be University), Karaikal

Abstract:
Congenital Adrenal Hyperplasia (CAH) is a group of inherited autosomal recessive disorders characterized by a defect in one of the five enzymes responsible for cortisol biosynthesis.
Seizures is one of the rare complications encountered in cases of CAH. Seizures in CAH have been ascribed to fever(febrile seizures), hypoglycemia and hyponatremia. Recent studies have shown excess secretion of Corticotropin-releasing-factor(CRF) under stress may also lead to seizure activity.
Case Report: *A 6-year-old female child presented with complaints of fever, vomiting and one episode of seizure activity. First episode of seizure occurred at the age of 1.5 years followed by recurrent episodes of seizures at 2.5 yrs, 3 yrs, 4.5 yrs and now at 6 yrs. During physical examination, clitoromegaly was noticed along with hyperpigmentation of external genitalia. CNS examination showed hypotonia and sluggish reflexes.The initial laboratory investigations done at the time of presentation each time the child was admitted pointed to different causes of seizures. The child was diagnosed with Congenital Adrenal Hyperplasia with 46 XX DSD with multi faceted aetiology of seizures*
Key Word: *Seizures, Congenital adrenal hyperplasia, Clitoromegaly, DSD(Disorders of Sex Development)*

Date of Submission: 20-11-2021 Date of Acceptance: 04-12-2021

I. Introduction

Congenital Adrenal Hyperplasia (CAH) is a group of inherited autosomal recessive disorders characterized by a defect in one of the five enzymes responsible for cortisol biosynthesis.

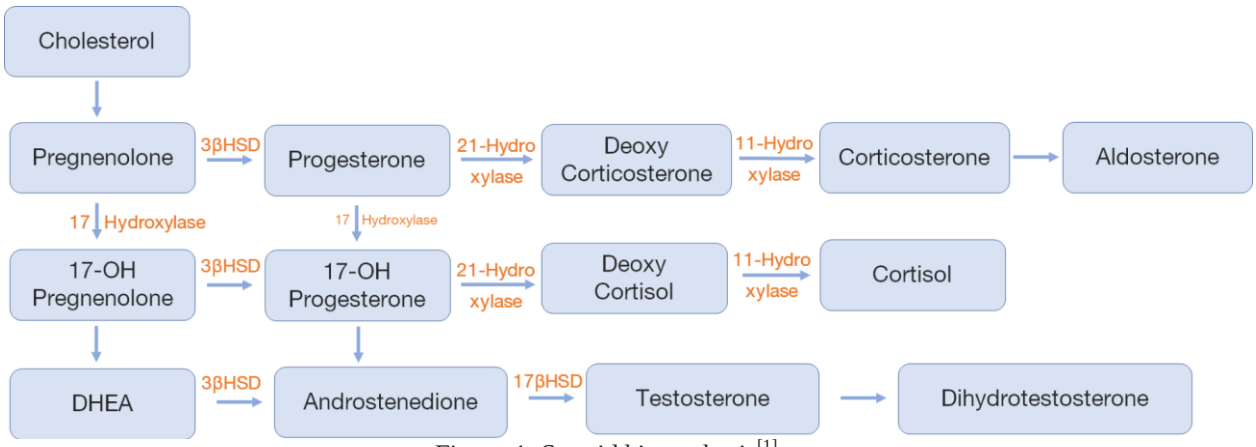


Figure-1: Steroid biosynthesis[1]

In CAH, cortisol synthesis from cholesterol is affected due to deficiency of enzymes in the adrenal cortex. ACTH elevation is secondary to plasma cortisol deficiency via the negative feedback mechanism

II. Case History

A 6-year-old female child presented with complaints of fever for one day, one episode of vomiting and one episode of seizure, in the morning. Fever was sudden in onset, high grade, continuous and not associated with diurnal variation.

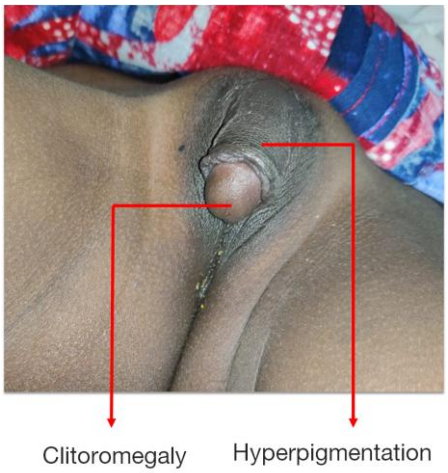
She had one episode of vomiting which was non-projectile, non-bilious, not blood stained and mostly comprising of undigested food particles. The child then developed one episode of seizure that lasted for about 10 seconds. Seizure activity was tonic-clonic type and was associated with uprolling of eyeballs and there was

loss of consciousness as well.

She was born to 2nd degree consanguineous marriage. Clitoromegaly was noticed at birth. The child was evaluated at 2 years of age and was diagnosed with CAH – 21 hydroxylase deficiency (17-OHP was 620.21 nmol/L).

First episode of seizure associated with fever occurred at the age of 1.5 years.later the child had recurrent seizure episodes at ages 2.5yrs, 3yrs, and 4.5yrs respectively. Her vaccination history was complete. She was developmentally normal. She is a 2nd order child and her first sibling was normal.

Physical Examination:



- Clitoromegaly
- Hyperpigmentation of external genitalia

Systemic Examination:

- CNS examination showed hypotonia and sluggish reflexes.

Investigation:

- Hyponatremia (Sr.Na+: 125.5 mmol/L)
- CRP:9.6mg/L
- EEG normal.

Diagnosis & Management:
Congenital Adrenal Hyperplasia (salt wasting type) with GTCS and was managed with IV antibiotics, antiepileptics and Hydrocortisone.

Summary of all the seizure episodes of the child

Age	1 ½ years	2 ½ years	3 years	4 ½ years	6years
Type of Seizure	Simple febrile seizure	Not known	Not recorded	GTCS	GTCS
Duration	Ard 35sec			15 secs	20 secs
Associated Fever	Yes	-	-	No	Yes
Place of Rx	Kadaloor GH	Rajiv Gandhi Women and Children's Hospital, Pondicherry	Rajiv Gandhi Women and Children's Hospital, Pondicherry	VMMCH, Karaikal	VMMCH, Karaikal

Blood glucose	Not Recorded	Not Recorded	Normal	48 mg/dl	54 mg/dl
Serum ElectrolyteS		Na+(143)	Na+(137)	Na+(138)	(125.5)
CSF analysis			Protein:6+		
Neuro Imaging	-	-	Normal	Normal	Normal
EEG	Normal	Normal	Normal	Normal	Normal
Diagnosis	Simple febrile seizure (CAH)	-	Meningo-encephalitis	CAH (GTCS with hypoglycemia)	CAH (GTCS with hyponatremia)
Rx given	T.Hydrocortisone started (ICH)	Report UA	Inj.piptaz Inj.phenytoin	IVF10%D Inj.hydroco-rtisone Inj.taxim	Inj.calcium gluconate Inj.phenytoin Inj.meropenem Inj.hydrocortisone
Recovery	Yes	Yes	Yes	Yes	Yes

Final Diagnosis:
Congenital Adrenal Hyperplasia with 46 XX DSD with multi faceted aetiology of seizures

III. Discussion

21-Hydroxylase Deficiency: This is the most common enzyme deficiency in CAH. 17-OHP accumulates in serum, as it is not converted to 11-Deoxycortisol. Similarly, Progesterone accumulates following lack of conversion to 11-Deoxycortisone.

Effects:

- Cortisol deficiency and ACTH elevation giving rise to adrenocortical hyperplasia
- Mineralocorticoid deficiency causing salt loss, dehydration and shock.

Clinical Varieties:

1. **Salt Wasting Type**[2]**:** There is cortisol deficiency along with salt wasting and hypovolemia arising from aldosterone deficiency. There is virilization of external genitalia of female due to excessive androgens
2. **Simple Virilizing Type**[2] without salt loss
3. **Non Classic Type**[2]

Seizures is one of the rare complications encountered in cases of CAH. Seizures in CAH have been ascribed to fever(febrile seizures), hypoglycemia and hyponatremia. Recent studies have shown excess secretion of Corticotropin-releasing-factor(CRF) under stress may also lead to seizure activity.

H Kawawaki et al. have studied seizures in 22 children with CAH. In their study they have discovered certain unknown factors in the pathogenesis of seizures in CAH which included a.) Excess secretion of corticotropin releasing factor (CRF) under stress b.) Prolonged elevation of CRF during fetal life and c.) Linkage between CAH and febrile seizures on the chromosome 6[3].

Brigitte Odenwald et al. have studied 102 Bavarian children with classic CAH to evaluate adrenal crises upto the age of 6 years. According to them the overall rate of having atleast one episode of seizure in the first 6 years of life was 17.6%[4].

Yuichi Abe et al. in their study described that patients with CAH have increased risk of developing "CAH-associated encephalopathy"(CAHE). They further mentioned that not only serious events like status epilepticus

and deep coma but even minor symptoms like fever and nausea could also be the presenting complaints of CAHE[5].

IV. Summary

A child with Congenital Adrenal Hyperplasia(CAH) with 21-hydroxylase deficiency born to 2nd degree consanguineous marriage. The child was genotypically female with clitoromegaly and normal female gonads(karyotyping: 46 XX). She presented with recurrent episodes of seizure with various causes(fever, meningo-encephalitis, hypoglycemia, hyponatremia). Irregular dosing and non-compliance with hydrocortisone was noticed. Unawareness of stress dosing of steroids could also be one of the precipitating factors for recurrent seizure episodes.

References

[1]. Nelson Textbook of Pediatrics - 21st Edition, Volume-2, Chapter-592, Page-2955
[2]. IAP Textbook of Pediatrics - 7th Edition, Chapter-13.9, Page-1039
[3]. Kawawaki H, Kusuda S, Kurimasa H, Tomiwa K, Murata R. [Seizures associated with fever in children of congenital adrenal hyperplasia]. No To Hattatsu. 2001 Jan;33(1):27-30. Japanese. PMID: 11197891
[4]. Odenwald B, Nennstiel-Ratzel U, Dörr HG, Schmidt H, Wildner M, Bonfig W. Children with classic congenital adrenal hyperplasia experience salt loss and hypoglycemia: evaluation of adrenal crises during the first 6 years of life. Eur J Endocrinol. 2016 Feb;174(2):177-86. doi: 10.1530/EJE-15-0775. Epub 2015 Nov 12. PMID: 26563979
[5]. Abe Y, Sakai T, Okumura A, Akaboshi S, Fukuda M, Haginoya K, Hamano S, Hirano K, Kikuchi K, Kubota M, Lee S, Maegaki Y, Sanefuji M, Shimozato S, Suzuki M, Suzuki Y, Takahashi M, Watanabe K, Mizuguchi M, Yamanouchi H. Manifestations and characteristics of congenital adrenal hyperplasia-associated encephalopathy. Brain Dev. 2016 Aug;38(7):638-47. doi: 10.1016/j.braindev.2016.01.007. Epub 2016 Feb 15. PMID: 26898804.

Dr. Mallavarapu Varsha, et. al. "A Case of Seizures in a Child with Congenital Adrenal Hyperplasia." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(12), 2021, pp. 06-09.