http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v9i8.21

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

A Rare Case of Biotinidase Deficiancy

Authors
Dr Sunil Kumar Agarwalla[1], Dr Soumya Ranjan Samal[2], Dr Rajesh Kumar Rout[3,] Swastikranjan Jena[4]
[1]Asso. Prof. Dept of Paediatrics, M.K.C.G. Medical College
[2]SR Dept. of Pediatrics, M.K.C.G. Medical College
[3,4]JR Dept. of Pediatrics, M.K.C.G. Medical College

Abstract
Biotinidase is an autosomal recessive disorder caused due to deficiency of enzyme Biotinidase. Most of the patients presented in infancy with neurodevelopmental regression, hypotonia, alopecia, dermatological and neurological manifestations. The clinical response to biotin is dramatic with seizure control in all most all patients .Biotinidase deficiency is a treatable condition, should be thought of any child presenting with neuro-regression , seizure and with dermatological manifestations such as alopecia and skin rashes.
Here we are present a 11 month old male infant who presented to the paediatrics emergency with multifocal seizure , neuro – regression , who on examination found to have alopecia and loss of eye brow and eye lashes without any neuro-cutanous manifestation . This on investigation found out to be Biotinidase deficiency. We are reporting this case because of its rarity where strong clinical suspicion and investigation tools helped in timely diagnosis and intervention.
Keywords: *Biotinidse deficiency, Seizure, Alopecia, Infancy.*

Introduction

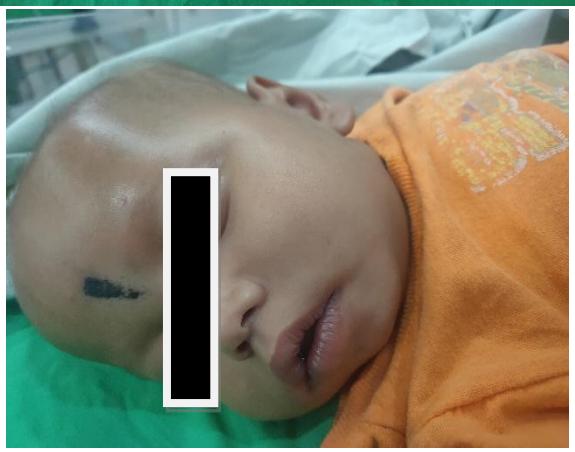
Biotinidadse is the enzyme that cleaves the vitamin biotin from biocytin and from dietary protein sources(1). Free biotin used by four carboxylase enzymes to convert their active form(2). Biotinidase deficiency categorised into two forms, (i) Profound Biotinidase deficiency – Those with <10 % mean normal serum enzyme activity. (ii) Partial Biotinidase deficiency – Those with 10-30 % mean normal serum enzyme activity. Both forms of biotinidase deficiency can be treated with biotin supplement(3,4).

ENZYME ACTIVITY	BIOTINIDASE DEFICIANCY
<10 %	PROFOUND DEFICIANCY
10-30 %	PARTIAL DEFICIANCY
➢ 30%	NORMAL

Case Study

A 11 month male child product of non – consanguineous marriage from lower socio – economic status presented with chief complaints of abnormal tremulous like movements involving both upper and lower limb for 14 days and unable to sit without support. Child was attained all milestones as per age up to 6 month, after that neuro-regression occurred. On examination chid was afebrile with active seizure involving both upper and lower limb (R >L) . Vitals are HR- 123 /min, RR- 52 /min, SPO2- 98% in room air, no pallor , icterus ,cyanosis , clubbing , oedema and lymphadenopathy . HC-44.5 cm, wt – 7.6 kg, Bwt -2.5kg. On head to toe examination child have sparse short hair on his head with absence of eyebrow and eye lashes.

On systemic examination liver palpable upto 3cm below right costal margin with liver span 8.5cm and other systems were normal .On investigation ABG showing pH -7.43 , pCo2 -47.2mm hg , pO2 -152 mm hg, Na -138 mmol/ l, K- 4.86mmol/l, Hco3- 31 mmol/l, wbc- 13000, Hb -8.6 gm/dl, Plt- 5lakhs, s. bilirubin-0.6mg/dl, sgot-148 U/L, sgpt-143 U/L, S.AlkPo4- 278U/L, S.protein-6.1 gm/dl, S.Biotinidase – 7.13 mmol/mn/ml. MRI of brains shows diffuse prominence of cortical sulci, cistern spaces and ventricular system , diffuse cerebral atrophy. EEG shows no abnormal epileptiform discharge.



Discussion

The incidence of biotinidase deficiency varies from 1 : 40,000 to 1 : 60,000 births in the world . In some countries such as Turkey and Saudi Arabia the prevalence is higher due to high consanguinity marriage rates[5]. Biotinidase deficiency presented with varied neurological presentation such as seizure, neuro – regression. The cutaneous abnormalities include alopecia, dermatitis and skin rashes. Symptoms of biotinidase deficiency usually appears after 1st week or months of life[6]. The seizure may not respond to anticonvulsant therapy .some infant may have weak muscles and hypotonia. infant with biotinidase deficiency may have problems in vision and hearing . These issues can be prevented if biotin therapy started early[7].

Our patient had uncontrolled multifocal seizure not responded to anticonvulsant therapy. The patient had sparse hair on his head with absence of eye brow and eye lashes. On day 3 of admission after getting biotin (10mg/day) seizure gradually decreased.

Venkatarman et al reported seizure as the presenting symptom of their case series and clonic seizure was predominant.[8]

Canda et al detected seizure in three of twelve symptomatic patients with BD, however most of their patients were diagnosed by newborn screening.[9]

Salbert et al found ophthalmic abnormalities in 51% of 78 symptomatic patients with BTD. These findings included 30% infections, 13% optic neuropathies, 13% motility disturbances, 4% retinal pigment changes, and 1% pupillary findings.[10]

Hayati et al summarized ocular signs of patients published form 1997 to 2011 in PubMed and reported that 6 patients presented with optic atrophy in both eyes.

Conclusion

Biotinidase deficiency is an excellent example of early diagnosis and successful treatment of an inherited metabolic disorder. Most patients respond to early Biotin therapy. Newborn screening for biotinidase deficiency should be done for early management of this disorder. Biotinidase deficiency is a very rare disorder because of rarity of this case we thought to report this case.

References

1. Wolf B, Grier RE, Allen RJ, Goodman SI, Kien CL. Biotinidase deficiency: the

enzymatic defect in late-onset multiple carboxylase deficiency. Clin Chim Acta. 1983;131(3):273–281. doi:10.1016/0009-8981(83)90096-7

2. Wolf B. Biotinidase deficiency: "if you have to have an inherited metabolic disease, this is the one to have". Genet Med 2012;14:565-75. [PUBMED]
3. Mastrangelo M. Actual insights into treatable inborn errors of metabolism causing epilepsy. J Pediatr Neurosci. 2018; 13(1):13–23. doi:10.4103/JPN.JPN_160_16
4. Haagerup A, Andersen JB, Blichfeldt S, Christensen MF. Biotinidase deficiency: Two cases of very early presentation. Dev Med Child Neurol 1997;39:832-5. [PUBMED]
5. Karaca M, Özgül RK, Ö Ü, et al. Detection of biotinidase gene mutations in Turkish patients ascertained by newborn and family screening. Eur J Pediatr. 2015;174(8):1077–1084. doi:10.1007/s00431-015-2509-5
6. Weber P, Scholl S, Baumgartner ER. Outcome in patients with profound biotinidase deficiency: Relevance of newborn screening. Dev Med Child Neurol 2004;46:481-4. [PUBMED]
7. Micó SI, Jiménez RD, Salcedo EM, Martínez HA, Mira AP, Fernández CC. Epilepsy in Biotinidase deficiency after biotin treatment. JIMD Rep 2012;4:75-8.
8. Venkataraman V, Balaji P, Panigrahi D, Jamal R. Biotinidase deficiency in childhood. Neurol India. 2013;61(4):411–413. doi:10.4103/0028-3886.117614
9. Canda E, Yazici H, Er E, et al. Single center experience of biotinidase deficiency: 259 patients and six novel mutations. J Pediatr Endocrinol Metab. 2018; 31(8):917–926. doi:10.1515/jpem-2018-0148.
10. Salbert BA, Astruc J, Wolf B. Ophthalmologic findings in biotinidase deficiency. Ophthalmologica. 1993;206 (4):177–181. doi:10.1159/000310387