Case Report
Volume 8:4, 2022

Epilepsy Journal

ISSN: 2472-0895 **Open Access**

Development of West Syndrome Linked to Gene Mutation: A Case Report

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Abstract

The Sec1/Munc18-1 protein family, which includes significant regulators of the secretory and synaptic vesicle fusion machinery governing hormonal and neuronal transmission, respectively, includes syntaxin-binding protein 1 (STXBP1). Numerous neurological illnesses are linked to STXBP1 pathogenic mutations. Here, we describe the case of a Japanese girl who was born at 40 weeks gestation without experiencing neonatal hypoxia and who had a STXBP1 gene mutation. She experienced generalised seizures and epilepsy at the age of 15 days. She first displayed a series of nodding spasms around the age of 88 days, with the frequency of the seizures rapidly rising. She appeared with developmental regression and the interictal EEG revealed hypsarrhythmia. Genetic testing was carried out at the age of 1.5 years, and mutational analysis identified a STXBP1 gene mutation. She was subsequently determined to have developmental and epileptic encephalopathy, exhibiting the clinical traits of West syndrome brought on by the STXBP1 gene mutation. Her development has remained regressive despite the fact that medication therapy has decreased the frequency of epileptic seizures. It is still unclear how the phenotypic and the type and location of genetic aberration relate to one another. Future research should look at the link between genotype and phenotype as well as the pathophysiology that underlies it in order to clarify the causes of the various phenotype-determining factors.

Keywords: ACTH therapy • Severe intellectual disability • STXBP1

Introduction

It is important to focus on genetic, congenital metabolic, structural, and neurological abnormalities as well as a hypoxic-ischemic condition when evaluating the cause of early-onset infantile seizures that follow newborn seizures. Self-limited neonatal epilepsy and early infantile developmental and epileptic encephalopathy (formerly known as early myoclonic epilepsy and early infantile epileptic encephalopathy are the two main neonatal-onset epilepsy syndromes [1]. Atypical symptoms of the standard EIEE or EME may appear in some neonatal seizures. These seizures impact interictal brain activity, which causes developmental delay and impairments in cognitive-motor function. In the International League Against Epilepsy's 2017 revision, this disorder was renamed developing epileptic encephalopathy [2]. Syntaxin-binding protein 1 (STXBP1) is one of more than 60 genes that have been linked to DEE.

Case presentation

Our patient was a girl who was delivered naturally by vaginal birth at 40 weeks gestation as the first child of a Japanese couple. Her birth measurements were 3244 g (+0.67 standard deviation [SD]), 46.8 cm (0.77 SD), and normal for height and head circumference. At birth, there was no evidence of neonatal asphyxia. There was no consanguineous marriage, epilepsy, or neuromuscular disease in her family history. She first displayed bilateral tonic-clonic seizures at the age of 15 days, which began in the left or right upper extremities and lasted for a few minutes. Her prior doctor admitted the patient to the hospital when the patient's seizure frequency rose to about 10 per day. Electroencephalography (EEG) during interictal periods showed multifocal spontaneous spikes. The right frontal, central, and occipital regions of the right EEG displayed discrete spike waves that did not propagate broadly. No suppression-burst or hypsarrhythmia pattern was present. No anomalies were found in the general spinal fluid testing, general blood tests, plasma amino acid analysis, general spinal fluid tests, spinal fluid virus isolation, or urine organic acid analysis. No evident anatomical anomalies that could cause epilepsy were seen on a brain MRI. She was put on phenobarbital for an unclassified neonatal-onset epilepsy, but she exhibited no improvement. She was 75 days old when she was brought to our hospital [3].

There were no noticeable facial defects or deformities found during a physical examination or general neurological symptoms. When someone touched or held her, she would track their eyes and smile in a developmentally appropriate manner. Normal sleep waves were visible on the interictal EEG, but there were also numerous localised spike waves and spike-slow wave complexes. Treatment was started once a provisional epilepsy diagnosis related to symptomatic localization was made. She continued to have seizures about ten times per day, so at 78 days old, phenobarbital was stopped and carbamazepine was started. But after a few days, it was stopped because the frequency of the seizures had increased. At 81 and 88 days old, oral sodium valproate and zonisamide, respectively, were started. Although vitamin B6 was given, it was stopped after it showed no results. The frequency of seizures gradually decreased after commencing sodium valproate and zonisamide, but even at the highest dose, seizures were still seen 3-4 times per day. Generalized tonic convulsions that began in the left upper extremities were the initial form of the seizures. No structural anomalies, including localised cortical dysplasia, that were presenting as apparent epileptic foci were seen on brain MRI. At 114 days old, the patient began receiving daily doses of adrenocorticotropic hormone (ACTH) therapy for two weeks [4].

The patient is 2.1 years old at this time. She no longer has as many epileptic seizures, but her development has continued to decline, and she is severely intellectually disabled. The patient had no other symptoms at the time of writing, such as metabolic disease, primary immunodeficiency, or hyper inflammatory condition, except from the neurological phenotype. She is still getting medical attention. In the event that the seizures get worse, we will review the medication selection based on the kind of seizure and take into account palliative epilepsy surgical treatment to lessen seizure frequency.

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Date of Submission: 23 September, 2022; Manuscript No: elj-22-75761; **Editor assigned:** 26 September, 2022, PreQC No: P-75761; **Reviewed:** 06 October, 2022, QC No: Q-75761; **Revised:** 11 October, 2022, Manuscript No: R-75761; **Published:** 17 October, 2022, DOI: 10.37421/2472-0895.2022.8.167

Discussion

In this article, a patient with West syndrome is described, along with the genetic cause, which is a mutation in the STXBP1 gene. West syndrome typically manifests as spasms with distinctive EEG alterations known as hypsarrhythmia in the first year of life; in addition, it is closely linked to developmental delay or regression [5-7]. One form of West syndrome that results in encephalopathy is STXBP1 encephalopathy. It is characterised by early-onset encephalopathy, with seizures occurring in around half of cases during the newborn stage. Epileptic spasms, focal seizures, and tonic seizures are among the common seizure forms. 65.3 percent of the time [8] over the course of the condition, epileptic spasms happen frequently. A pathogenic de novo STXBP1 gene mutation also results in mobility abnormalities, autism, and severe early-onset types of intellectual disability in addition to epilepsy [3].

In a report of 24 cases of epileptic patients with STXBP1 mutations, it was shown that 78% of the time, epileptic spasms were the first seizure. One child's initial EEG showed a hypsarrhythmic pattern even at the age of two months, while 78% and 27% of patients, respectively, had multifocal asynchronous spikes and slow waves without discontinuity. Even when an early EEG suppression burst pattern is not obvious, as it is in the present example, the possibility of a STXBP1 mutation should be taken into account. Although EIEE is the most prevalent epileptic syndrome subtype in STXBP1 encephalopathy (53%), 78% of patients (7 of 9 patients with EIEE) reported a transition from EIEE to West syndrome within a few to several months. The type of seizure and the diagnosis are two characteristics of this illness. Bilateral tonic-clonic, asymmetrical, epileptic spasms, and bilateral axial myoclonic seizures were among the seizure types identified in a prior study. It was also shown that 60% of those with the condition experienced many seizure types throughout the course of their lives. In our situation, the patient experienced three different types of seizures over the course of their therapeutic care, which is recognised as a manifestation of these symptoms. It is important to inform patients and their families that anti-epileptic drug therapy, such as ACTH therapy, has significant side effects and cannot be expected to improve developmental outcomes because STXBP1 encephalopathy may be characterised by a lack of improvement in developmental outcomes after seizures have stopped. Patients should carefully examine whether it should be implemented, along with their families.

Over 20% of patients with STXBP1 encephalopathy required the use of two or more antiseizure medications in order to treat their epilepsy, and over 25% of patients with STXBP1 encephalopathy were resistant to antiseizure medication (ASM). About 1% of individuals with STXBP1 encephalopathy tried the ketogenic diet to treat their seizures, but the patients' responses were either negligible or nonexistent. Surgery was the method of choice for treating epilepsy, including corpus callosotomy and, in cases of focal cortical dysplasia, excision of the patient's damaged brain.

Several case reports and case studies have been published, however the clinical course of STXBP1-related encephalopathy has not yet been determined. In order to better understand the clinical characteristics of STXBP1-related encephalopathy, more cases should be collected for additional research. By impairing native STXBP1 function and decreasing -synuclein chaperone activity, STXBP1 gene mutations or haploinsufficiency might result in pathogenic gain-of-function phenotypes, which delay brain development and aggregation-induced neurodegeneration [3]. Given the range of phenotypes, the final phenotype may be influenced by a number of variables, including genetics and the environment. It is possible that these factors could differ phenotypically.

Conclusion

It is necessary to do additional study to examine the genotype-phenotype association and underlying pathophysiology, which may help to clarify the causal connections between the many phenotype-determining factors.

Conflict of Interest

The authors declares that he has no conflict of interests.

References

1. Pressler, Ronit M., Maria Roberta Cilio, Eli M. Mizrahi, and Solomon L. Moshé, et al. "The ILAE classification of seizures and the epilepsies: Modification for seizures in the neonate. Position paper by the ILAE Task Force on Neonatal Seizures." *Epilepsia* 62 (2021): 615-628.
2. Scheffer, Ingrid E., Samuel Berkovic, Giuseppe Capovilla, and Mary B. Connolly, et al. "ILAE classification of the epilepsies: position paper of the ILAE Commission for Classification and Terminology." *Epilepsia* 58 (2017): 512-521.
3. Lanoue, Vanessa, Ye Jin Chai, Julie Z. Brouillet, and Sarah Weckhuysen, et al. "STXBP1 encephalopathy: Connecting neurodevelopmental disorders with œsynucleinopathies?." *Neurol* 93 (2019): 114-123.
4. Hussain, Shobbir. "Developing a PPI inhibitor-based therapy for STXBP1 haploinsufficiency-associated epileptic disorders." *Front Mol Neurosci* 7 (2014): 6.
5. Morrison-Levy, Nadine, Felippe Borlot, Puneet Jain, and Robyn Whitney. "Early-onset developmental and epileptic encephalopathies of infancy: an overview of the genetic basis and clinical features." *Pediat Neurol* 116 (2021): 85-94.
6. Pavone, Piero, Agata Polizzi, Simona Domenica Marino, and Giovanni Corsello, et al. "West syndrome: a comprehensive review." *Neurol Sci* 41 (2020): 3547-3562.
7. Wheless, James W., Patricia A. Gibson, Kari Luther Rosbeck, and Maria Hardin, et al. "Infantile spasms (West syndrome): update and resources for pediatricians and providers to share with parents." *BMC Pediat* 12 (2012): 1-9.
8. Stamberger, Hannah, Marina Nikanorova, Marjolein H. Willemsen, and Patrizia Accorsi, et al. "STXBP1 encephalopathy: a neurodevelopmental disorder including epilepsy." *Neurol* 86 (2016): 954-962.

How to cite this article: Takeda, Kanako. "Development of West Syndrome Linked to Gene Mutation: A Case Report." Epilepsy J 8 (2022): 167.