Pakistan Journal of Neurological Sciences (PJNS)

Volume 19 | Issue 1 Article 3

3-2024

Severe Ataxia with Cognitive Impairment in A Young Child: A Case Report of Pontocerebellar Hypoplasia

Soban Khan
Pakistan Institute of Medical Sciences, Islamabad, Pakistan

Zeeshan Munawar
Pakistan Institute of Medical Sciences, Islamabad, Pakistan

Zaid Waqar
Pakistan Institute of Medical Sciences, Islamabad

Saad Ali
Pakistan Institute of Medical Sciences, Islamabad, Pakistan

Bushra Khalid
Pakistan Institute of Medical Sciences, Islamabad, Pakistan

See next page for additional authors

Recommended Citation

Khan, Soban; Munawar, Zeeshan; Waqar, Zaid; Ali, Saad; Khalid, Bushra; Sadiqa, Amina; and Badshah, Mazhar (2024) "Severe Ataxia with Cognitive Impairment in A Young Child: A Case Report of Pontocerebellar Hypoplasia," *Pakistan Journal of Neurological Sciences (PJNS)*: Vol. 19: Iss. 1, Article 3.
Available at: https://ecommons.aku.edu/pjns/vol19/iss1/3

Severe Ataxia with Cognitive Impairment in A Young Child: A Case Report of Pontocerebellar Hypoplasia

Authors

Soban Khan, Zeeshan Munawar, Zaid Waqar, Saad Ali, Bushra Khalid, Amina Sadiqa, and Mazhar Badshah

https://doi.org/10.56310/pjns.v19i01.256

SEVERE ATAXIA WITH COGNITIVE IMPAIRMENT IN A YOUNG CHILD: A CASE REPORT OF PONTOCEREBELLAR HYPOPLASIA

Soban Khan[1], Zeeshan Munawar[1], Zaid Waqar[1], Saad Ali[1], Bushra Khalid[1], Amina Sadiqa[1], Mazhar Badshah[1]
[1]Pakistan Institute of Medical Sciences, Islamabad

Corresponding Author: Zaid Waqar *Department of Neurology, Pakistan Institute of Medical Sciences, Islamabad* ***Email:*** *chikky789@gmail.com*

Date of submission: *July 25, 2023* ***Date of revision:*** *January 23, 2024* ***Date of acceptance:*** *February 22, 2024*

ABSTRACT
Adolescence is a period of rapid development and a variety of genetic disorders present during this time due to difficulties with motor and cognitive skills. A very rare group of diseases is genetic Pontocerebellar Hypoplasia, characterized by a developmentally small cerebellum that leads to ataxia and movement abnormalities. Here, we present a case of a young boy who presented with ataxia and falls.

KEYWORDS: Ataxia, Falls, Cognitive impairment, Autosomal recessive, Pontocerebellar ataxia

INTRODUCTION
Pontocerebellar Hypoplasia is a rare and heterogeneous group of diseases involving the maldevelopment of the cerebellum and brainstem during the perinatal period.[1] This results in severe ataxia and cerebellar signs, often accompanied by variable psychomotor retardation and profound intellectual disability. There are six clinical subtypes of Pontocerebellar Hypoplasia, with even more rare variants.[2] Most cases are fatal during the early perinatal period, although some cases of subtype 2 live to about 20-25 years of age. In type 2 Pontocerebellar Hypoplasia, survival is better than in the other subtypes. Although pregnancy is usually normal, motor weakness is often observed soon after birth, along with feeding and sucking difficulties.[3] As the child grows, abnormal movements and delayed milestones with intellectual disability become evident. Most children never achieve the milestone of independent walking.

CASE PRESENTATION
A 12-year-old boy presented to the neurology outpatient department of Pakistan Institute of Medical Sciences, Islamabad, referred from pediatrics for balance problems. The patient's birth history showed a full-term birth via spontaneous vaginal delivery and immediate cry after birth with no infections or trauma during the perinatal period. The patient's parents were first cousins. He had mild neonatal jaundice lasting 3 days, which self-resolved. On examination, he had marked truncal and limb ataxia, with all cerebellar signs including nystagmus, past pointing, and coordination issues. He had difficulty walking without support and performing manual tasks such as taking off or putting on shoes. His extraocular movement and sensory exams were normal, and plantar responses were bilaterally down-going with normal deep tendon reflexes. The patient exhibited several psycho-behavioral issues and, on formal assessment, showed comprehension and language problems with speech and oculomotor apraxia. The patient had marked intellectual impairment with an IQ of 55 and also exhibited behavioral and aggression issues. MRI of the brain showed a large posterior fossa with "diffuse cerebellar atrophy inappropriate for the patient's age," as shown in Figures 1 and 2.

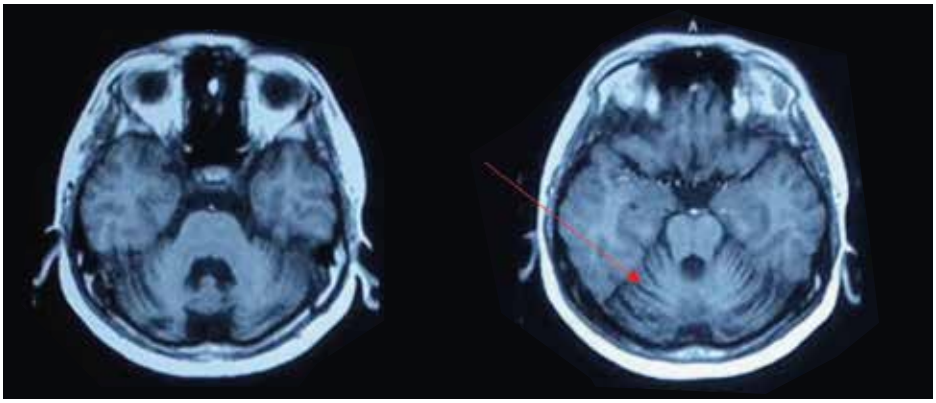

Figure 1: MRI brain T1-weighted axial images showing cerebellar atrophy with prominent folia(arrow).

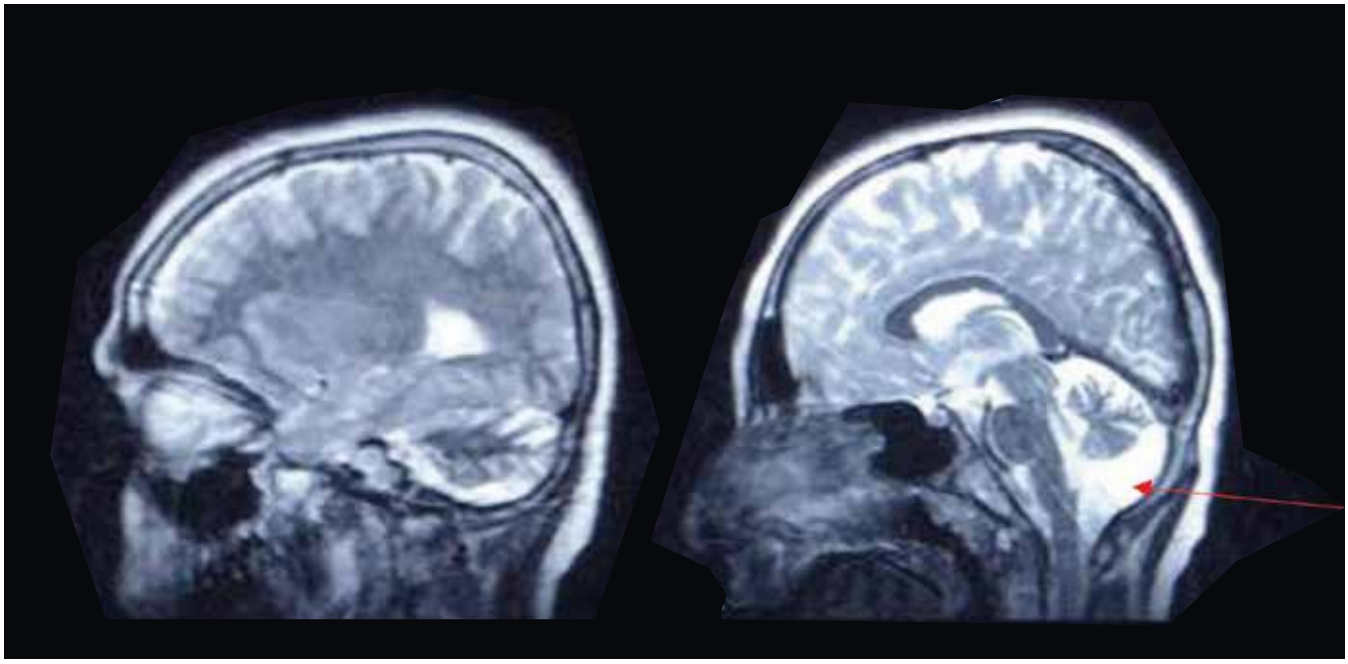

Figure 2: MRI brain T2-weighted sagittal images showing cerebellar atrophy with prominent CSF space (arrow).

Considering a diagnosis of hereditary ataxia, genetic analysis was planned and revealed a point mutation from proline to leucine in the VPS53 gene, which is associated with Autosomal Recessive Pontocerebellar Hypoplasia type 2E. The parents were counseled on the nature of the disease and prognosis and provided guidelines for rehabilitation and supportive therapy for problems associated with the disease, along with physical and speech/swallowing therapy.

DISCUSSION

Genetic and hereditary diseases often present during childhood and adolescence, requiring careful history-taking, including family history and detailed clinical examination. Genetic testing is the only way to confirm a diagnosis in many cases.[4] Pontocerebellar Hypoplasia is a rare entity with autosomal recessive inheritance, leading to a higher risk of expression in consanguineous marriages. A review of the literature indicates that this is the first case report of Pontocerebellar Hypoplasia published in Pakistan.

Due to the involvement of the ventral pons, Barth separated PCH from cerebellar hypoplasia in general. He differentiated two distinct neurogenetic entities, which he named type 1 (PCH1) and type 2 (PCH2), based on clinical and neuropathological data.[5] Spinal anterior horn degeneration resembling Werdnig-Hoffmann disease is a defining feature of PCH1. The defining characteristics of PCH2 include severe chorea/dystonia, absence of damaged spinal anterior horn cells, microcephaly, and significantly delayed mental and motor development. Individuals with PCH2 commonly pass away while still young.[6] Neuroradiological signs, such as pontine atrophy and hypoplasia of the vermis and cerebellar hemispheres, are present in both disorders and are insufficient to distinguish between PCH1 and PCH2.

CONCLUSION

Pontocerebellar Hypoplasia leads to developmental delays, motor and psychomotor abnormalities, and behavioral issues from early childhood to adolescence. Awareness of such diseases is essential to help with early diagnosis, management, and genetic counseling.

REFERENCES

1. Rudnik-Schöneborn S, Barth PG, Zerres K. Pontocerebellar hypoplasia. Am J Med Genet C Semin Med Genet. 2014;166c(2):173-83.
2. Maricich SM, Aqeeb KA, Moayedi Y, Mathes EL, Patel MS, Chitayat D, et al. Pontocerebellar hypoplasia: review of classifcation and genetics, and exclusion of several genes known to be important for cerebellar development. J Child Neurol. 2011;26(3):288–94
3. Bierhals T, Korenke GC, Uyanik G, Kutsche K. Pontocerebellar hypoplasia type 2 and TSEN2: review of the literature and two novel mutations. Eur J Med Genet. 2013;56(6):325-30.
4. Cassandrini D, Biancheri R, Tessa A, Di Rocco M, Di Capua M, Bruno C, et al. Pontocerebellar hypoplasia: clinical, pathologic, and genetic studies. Neurology. 2010;75(16):1459-64.
5. Barth PG. Pontocerebellar hypoplasias: An overview of a group of inherited neurodegenerative disorders with fetal onset. Brain Development. 1993;15(6):411-22.
6. Coppola G, Muras I, Pascotto A. Pontocerebellar hypoplasia type 2 (PCH2): report of two siblings. Brain Dev. 2000;22(3):188-92.

Conflict of interest: Author declares no conflict of interest.
Funding disclosure: Nil

Authors' contribution:
Soban Khan; concept, case management, manuscript writing
Zeeshan Munawar; case management, manuscript writing
Zaid Waqar; case management, manuscript writing
Saad Ali; case management, manuscript writing
Bushra Khalid; case management, manuscript revision
Amina Sadiqa; case management, manuscript revision
Mazhar Badshah; case management, manuscript revision
All the authors have approved the final version of the article and agree to be accountable for all aspects of the work.