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CHARGE syndrome with de novo frameshift mutation in a patient with total retinal detachment and large choroidal coloboma

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1. Case report

The 6-year-old girl, who had a diagnosis of mosaic Turner syndrome (45, X/46, XX) at birth, was found with poor visual development. She has undergone surgeries for patent ductus arteriosus, pulmonary stenosis, and tracheal stenosis at birth. The patient also received a cochlear implant at 1-year-old for profound hearing loss, but the response of the treatment was poor, and surgical removal of the implant was suggested. The patient had barely light perception vision, and the external eye examination demonstrated iris coloboma (Fig. 1). Fundus examinations showed retinal detachment in the right eye and large choroidal coloboma in the left eye (Fig. 2). External ears anomalies were found (Fig. 3), and the magnetic resonance imaging demonstrated an absence of bilateral vestibulocochlear nerve (Fig. 4). The diagnostic criteria of CHARGE syndrome were fulfilled,[1] and the whole exome sequencing provided by 3billion Inc. (Seoul, Korea)[2] showed a de novo variant, NM_017780.4:c.6928dup and p.(Trp2310Leufs*3), causing a frameshift mutation of the CHD7 gene, which has not been reported in the ClinVar database The variant was classified as likely pathogenic based on the recommendation of ACMG/AMP guidelines.[3]

2. Discussion

CHARGE syndrome is a rare congenital disease with multiple anomalies in several organs.[4] An early diagnosis is challenging and crucial. The diagnosis is based on clinical characteristics and examinations in different organ systems. Therefore, multidisciplinary team care is essential for the evaluation and management of patients with CHARGE syndrome. In our case, the patient was diagnosed with mosaic Turner syndrome at birth by chromosome tests, and the pre-existed diagnosis might affect some of the clinical judgments in her early disease management. Although co-existed genetic or chromosomal abnormality with CHARGE syndrome is rare, other developmental anomalies may mimic CHARGE syndrome and share similar clinical features.[5]

3. Conclusion

The diagnosis of CHARGE syndrome is based on clinical presentations. Early identification of the features associated with the syndrome is vital.

Conflict of interest

No conflict of interest exists.

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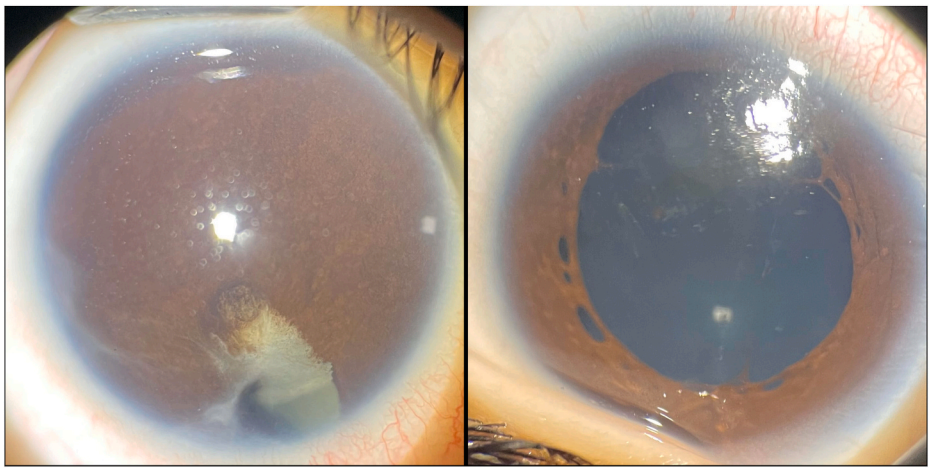

Fig. 1. The external eye images show the inferior iris coloboma, the opacified lens in the right eye (left image), and iris defects with synechia in the left eye (right image).

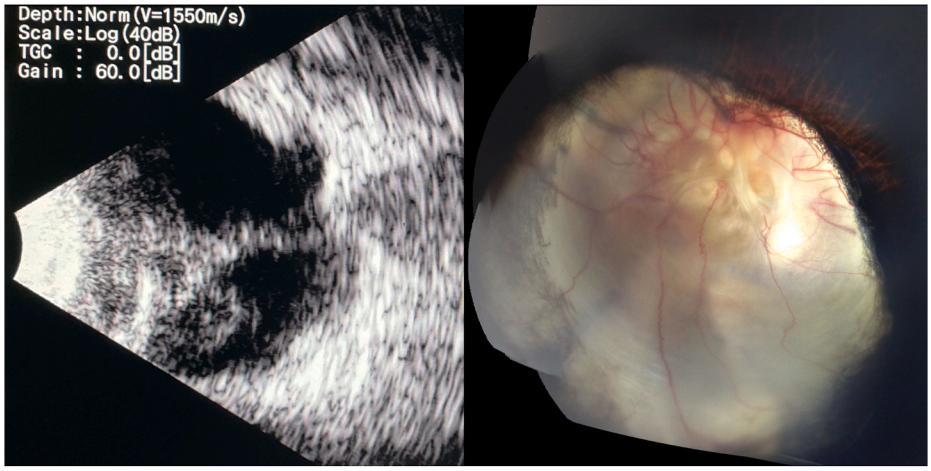

Fig. 2. The echography of the right eye shows a total retinal detachment (left image). The retinal fundus image of the left eye show a large choroidal coloboma (right image).

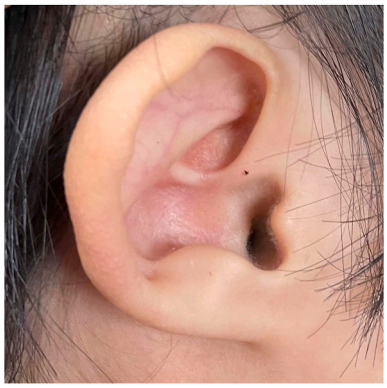

Fig. 3. The external ear demonstrates a cup shape and small lobules.

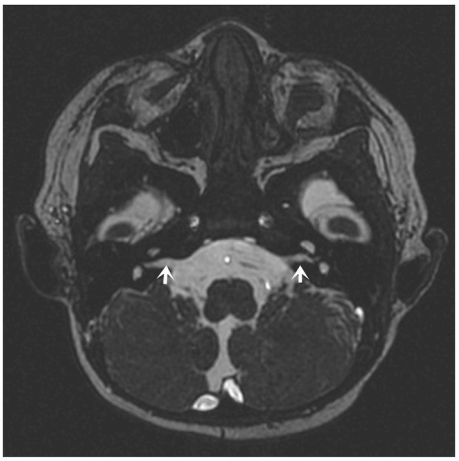

Fig. 4. The axial section magnetic resonance image shows the absence of bilateral vestibulocochlear nerves (arrows).

Intellectual property

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have

followed the regulations of our institutions concerning intellectual property.

Research ethics

We further confirm that any aspect of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

IRB approval was obtained (required for studies and series of 3 or more cases).

Written consent to publish potentially identifying information, such as details or the case and photographs, was obtained from the patient(s) or their legal guardian(s).

Authorship

All listed authors meet the ICMJE criteria.
We attest that all authors contributed significantly to the creation of this manuscript, each having fulfilled criteria as established by the ICMJE.

We confirm that the manuscript has been read and approved by all named authors.

We confirm that the order of authors listed in the manuscript has been approved by all named authors.

Disclosures

The authors have no financial disclosures and all meet current ICMJE criteria for authorship.

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References

1. Chetty M, Roberts TS, Elmubarak M, Bezuidenhout H, Smit L, Urban M. CHARGE syndrome: genetic aspects and dental challenges, a review and case presentation. *Head Face Med*. 2020;16:10.
2. Seo GH, Kim T, Choi IH, et al. Diagnostic yield and clinical utility of whole exome sequencing using an automated variant prioritization system, EVIDENCE. *Clin Genet*. 2020;98:562–570.
3. Richards S, Aziz N, Bale S, et al. Standards and guidelines for the interpretation of sequence variants: a joint consensus recommendation of the American college of medical genetics and genomics and the association for molecular pathology. *Genet Med*. 2015;17:405–424.
4. Sanlaville D, Verloes A. CHARGE syndrome: an update. *Eur J Hum Genet*. 2007;15: 389–399.
5. Wen J, Pan L, Xu X, Wang J, Hu C. Clinical data and genetic mutation in Kallmann syndrome with CHARGE syndrome: case report and pedigree analysis. *Medicine*. 2018;97, e11284.