

Distinctive Structural Brain Abnormalities in Chudley-McCullough Syndrome

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Author affiliations, funding, and conflicts of interest are listed at the end of this article.

Radiology 2025; 316(3):e251109 • <https://doi.org/10.1148/radiol.251109> • © RSNA, 2025

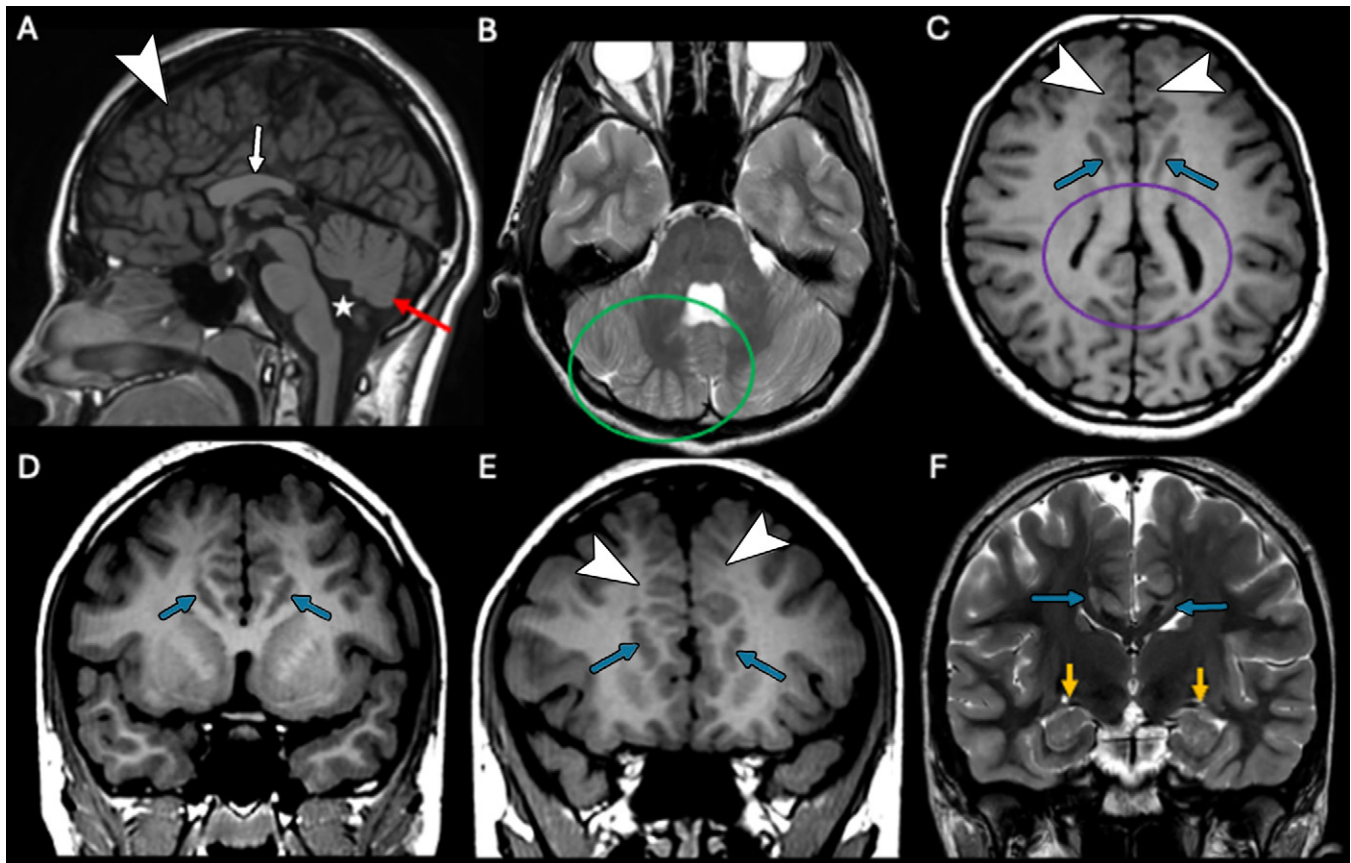


Figure 1: Brain MRI shows various findings suggestive of Chudley-McCullough syndrome. **(A)** Sagittal midline T1-weighted image shows hypoplasia and dysgenesis of the corpus callosum (white arrow), which is short and dysmorphic, with no identifiable splenium or genu, as well as hypoplasia of the inferior vermis (red arrow) with an elevated 38° tectovermian angle (star). **(B)** Axial T2-weighted image of the posterior fossa depicts right cerebellar dysplasia (green circle). **(C–E)** Extensive areas of frontal mesial polymicrogyria (arrowheads) are observed on T1-weighted axial **(C)** and coronal **(D, E)** images, as well as bilateral and symmetrical frontal subcortical heterotopias, with a distinctive comma-like appearance (blue arrows). The lateral ventricles are asymmetrically enlarged with a colpocephalic shape **(C, purple circle)**. **(F)** Coronal T2-weighted image shows bilateral malrotated hippocampi (yellow arrows).

A 13-year-old female patient, a child of first-cousin parents, presented with congenital sensorineural deafness. Neurodevelopment was mostly normal, with only minor learning difficulties and no history of seizures, raising suspicion of syndromic mutations—namely in *SLC26A4*, *WFS1*, *GJB2*, *STRC*, and *YARS* genes—as well as possible congenital infections. Temporal bone CT findings showed no abnormalities. Brain MRI (Figs 1, 2) revealed a constellation of malformations suggestive of Chudley-McCullough syndrome (CMS; MIM604213), including corpus callosum dysgenesis, bilateral polymicrogyria and gray matter heterotopia, and cerebellar dysplasia. Genetic testing results confirmed the diagnosis with homozygous mutation in *GPSM2*, a gene crucial for regulating cytoskeletal dynamics and cell polarity during stereocilia, corpus callosum, and neuronal development (1).

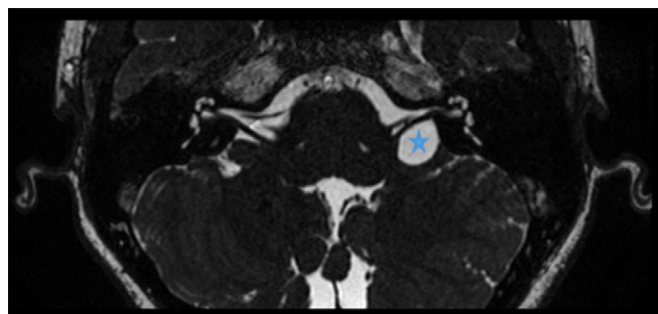


Figure 2: Axial T2-weighted driven equilibrium radio frequency reset pulse images of the ears reveal an arachnoid cyst on the left cerebellopontine angle (star), deviating the vestibulocochlear nerve complex anterior and inferiorly, resulting in asymmetry of the internal auditory canals, both of which are permeable. Evaluation of the brainstem and cranial nerves VII and VIII was unremarkable.

Bilateral hearing aids were placed, with satisfactory audiometry results.

CMS is an autosomal-recessive disorder characterized by sensorineural hearing loss without significant neurologic impairment, despite marked structural brain abnormalities, with fewer than 30 reported cases (1,2). Prompt diagnosis is key to providing appropriate interventions to prevent speech delay and allow informed reproductive choices (3).

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Received April 10, 2025; revision requested May 28; revision received June 3; accepted June 20.

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Funding: Authors declared no funding for this work.

Disclosures of conflicts of interest: R.C. No relevant relationships. M.C.D. No relevant relationships.

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