Teaching NeurolImages: Neuroimaging Findings in Inosine Triphosphate Pyrophosphohydrolase Deficiency

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Figure MRI Brain at Age 4 Months

T2 (A–C) and T1-weighted (D) images depict lack of myelination in cerebellar white matter, posterior limb of internal capsule, and perirolandic regions (arrows). Diffusion-weighted imaging (E–H) shows diffusion restriction involving optic radiations (E), red nucleus and cerebral peduncle region (F), globus pallidus, and along corticospinal tract (G and H).

A 9-month-old girl presented with global developmental delay and refractory generalized seizures. Microcephaly, poor visual fixation, and intermittent dystonic posturing were observed on clinical examination. MRI brain (figure) revealed delayed myelination and restricted diffusion involving optic radiations, cerebral peduncles, red nuclei, globus pallidi, and corticospinal tract. EEG showed background slowing and multifocal epileptiform discharges. Workup revealed a homozygous, likely pathogenic variant in *ITPA* (c.124+1 G>A) and reduced inosine triphosphate pyrophosphohydrolase (ITPase) activity in skin fibroblasts (0.19 nmol/mg protein × h, controls 6.86 ± 2.51). Imaging pattern of delayed myelination and restricted diffusion is suggestive of ITPase deficiency in a child presenting with early infantile epileptic encephalopathy.^{1,2}

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Disclosure

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Appendix Authors

Name	Location	Contribution
Karthik Muthusamy, MD	Clinical Genomics, Mayo Clinic, Rochester, MN	Designed and conceptualized study, analyzed the data, drafted the manuscript for intellectual content
Suzanne Boyer, RDN, LD	Clinical Genomics, Mayo Clinic, Rochester, MN	Revised the manuscript for intellectual content
Marc Patterson, MD	Neurology, Pediatrics and Clinical Genomics, Mayo Clinic, Rochester, MN	Interpreted the data, revised the manuscript for intellectual content
Jorgen Bierau, PhD	Laboratory Medicine, Maastricht University, the Netherlands	Interpreted the data, revised the manuscript for intellectual content

Appendix *(continued)*

Name	Location	Contribution
Saskia Wortmann, MD, PhD	University Children's Hospital, Paracelsus Medical University (PMU), Salzburg, Austria; Amalia Children's Hospital, Radboud UMC, Nijmegen, the Netherlands	Interpreted the data, revised the manuscript for intellectual content
Eva Morava, MD, PhD	Clinical Genomics and Laboratory Medicine and Pathology, Mayo Clinic, Rochester, MN	Analyzed the data, revised the manuscript for intellectual content

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