Teaching NeuroImages: Neuroimaging Findings in Inosine Triphosphate Pyrophosphohydrolase Deficiency

Karthik Muthusamy, MD, Suzanne Boyer, RDN, LD, Marc Patterson, MD, Jorgen Bierau, PhD, Saskia Wortmann, MD, PhD, and Eva Morava, MD, PhD

Neurology® 2021;97:e109-e110. doi:10.1212/WNL.0000000000011719

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

Study Funding
No targeted funding reported.

Correspondence
Dr. Morava
Morava-kozicz.Eva@mayo.edu

Figure MRI Brain at Age 4 Months

A 9–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 palidus, and along corticospinal tract (G and H).

From the Departments of Clinical Genomics (K.M., S.B., E.M.), Neurology, Pediatrics, Clinical Genomics (M.P.), and Laboratory Medicine and Pathology (E.M.), Mayo Clinic, Rochester, MN; Department of Laboratory Medicine (J.B.), Maastricht University, the Netherlands; University Children's Hospital (S.W.), Paracelsus Medical University (PMU), Salzburg, Austria; and Amalia Children's Hospital (S.W.), Radboud UMC, Nijmegen, the Netherlands.

Go to Neurology.org/N for full disclosures. Funding information and disclosures deemed relevant by the authors, if any, are provided at the end of the article.

Copyright © 2021 American Academy of Neurology

MORE ONLINE
Teaching slides
links.lww.com/WNL/B334
Disclosure
The authors report no disclosures relevant to the manuscript. Go to Neurology.org/N for full disclosures.

Appendix Authors

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karthik Muthusamy, MD</td>
<td>Clinical Genomics, Mayo Clinic, Rochester, MN</td>
<td>Designed and conceptualized study, analyzed the data, drafted the manuscript for intellectual content</td>
</tr>
<tr>
<td>Suzanne Boyer, RDN, LD</td>
<td>Clinical Genomics, Mayo Clinic, Rochester, MN</td>
<td>Revised the manuscript for intellectual content</td>
</tr>
<tr>
<td>Marc Patterson, MD</td>
<td>Neurology, Pediatrics and Clinical Genomics, Mayo Clinic, Rochester, MN</td>
<td>Interpreted the data, revised the manuscript for intellectual content</td>
</tr>
<tr>
<td>Jorgen Bierau, PhD</td>
<td>Laboratory Medicine, Maastricht University, the Netherlands</td>
<td>Interpreted the data, revised the manuscript for intellectual content</td>
</tr>
<tr>
<td>Saskia Wortmann, MD, PhD</td>
<td>University Children's Hospital, Paracelsus Medical University (PMU), Salzburg, Austria; Amalia Children's Hospital, Radboud UMC, Nijmegen, the Netherlands</td>
<td>Interpreted the data, revised the manuscript for intellectual content</td>
</tr>
<tr>
<td>Eva Morava, MD, PhD</td>
<td>Clinical Genomics and Laboratory Medicine and Pathology, Mayo Clinic, Rochester, MN</td>
<td>Analyzed the data, revised the manuscript for intellectual content</td>
</tr>
</tbody>
</table>

References
Teaching NeuroImages: Neuroimaging Findings in Inosine Triphosphate Pyrophosphohydrolase Deficiency
Karthik Muthusamy, Suzanne Boyer, Marc Patterson, et al.
*Neurology* 2021;97:e109-e110 Published Online before print February 16, 2021
DOI 10.1212/WNL.0000000000011719

This information is current as of February 16, 2021

Updated Information & Services

including high resolution figures, can be found at:

http://n.neurology.org/content/97/1/e109.full

References

This article cites 2 articles, 0 of which you can access for free at:

http://n.neurology.org/content/97/1/e109.full#ref-list-1

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):

All Epilepsy/Seizures
http://n.neurology.org/cgi/collection/all_epilepsy_seizures

All Genetics
http://n.neurology.org/cgi/collection/all_genetics

All Movement Disorders
http://n.neurology.org/cgi/collection/all_movement_disorders

Developmental disorders
http://n.neurology.org/cgi/collection/developmental_disorders

MRI
http://n.neurology.org/cgi/collection/mri

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:

http://www.neurology.org/about/about_the_journal#permissions

Reprints

Information about ordering reprints can be found online:

http://n.neurology.org/subscribers/advertise