On-line Table 1: Demographic data and MR imaging findings in association with EEG findings

Case	Sex	Age	Clinical History	EEG Findings	Days in Relation to MR Imaging	*POLG* Pathogenic Variant[a]
1	Female[b]	9 mo	Hepatopathy Intractable seizures Jerking movements of left arm and leg concerning for EPC Regression	Frequent sharp waves at the vertex and right centroparietal regions Left arm and leg rhythmic twitching (EPC) did not correlate with ictal change on scalp EEG	10	c.1399G>A:p.A467T; c.2554C>T:pb.R852C and c.32G>A:p.G11D[c]
2	Female[b]	8 mo	Irritability Jerking movements of right arm and leg concerning for EPC	Multiple events of twitching that had no definitive ictal correlate on scalp EEG Severe diffuse background slowing	7	c.698dup:p.Y233X; c.2243G>C:p.W748S[c]
3	Female	8 mo	Lactic acidosis Right arm myoclonic jerks concerning for EPC	Left central intermittent slowing and interictal sharp waves Three seizures with left central onset correlating with right arm myoclonus	2	c.2383A>C:p.N795H[d]
4	Male	1 yr	Developmental delay Hepatopathy Hypotonia Jerking movements of left arm and leg concerning for EPC Tonic extension of the left arm and right leg Tonic flexion of the right arm and left leg	Clinically correlated with left arm (including shoulder) and left leg jerking in synchrony Diffuse Δ slowing Right central spike slow wave, persistent, rhythmic	0	c.3158_3159del:p.T1053RfsX7; c.1399G>A:p.A467T[c]
5	Female	9 mo	Developmental regression Hepatopathy Lethargy/altered mental status Rhythmic jerking of the left side Vomiting	Episodes of twitching do not have an ictal correlate on scalp EEG Right hemispheric Δ slowing (1–2 Hz) Left hemisphere slowing (3–4 Hz) as well as θ frequencies	11	c.2243G>C:p.W748S; .2419C>T:p.R807C[c]
6	Male	3 yr	Hemiparesis on right Prolonged focal seizure on the right side → EPC Regression	Epileptiform activity (left occipital) PLEDS on left Slowing (diffuse and right) 22 Electrographic seizures of left-hemispheric onset were captured, lasting 15–28 seconds, no clinical events captured	0	c.2740A>C:p.T914P; c.1399G>A:p.A467T[c]
7	Female	16 yr	Acute psychiatric symptoms, including aggression, irritability, bipolar disorder Cognitive deficit Generalized tonic-clonic seizure followed by left lower extremity (EPC) Stroke-like episode with left homonymous hemianopia and left leg numbness	Generalized background slowing Nonconvulsive status epilepticus Right posterior temporal and posterior quadrant slowing with polymorphic rhythmic Δ and sharp waves in the right temporal region	0	c.1399G>A:p.A467T; c.2243G>C:p.W748S[c]

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On-line Table 1: Continued

Case	Sex	Age	Clinical History	EEG Findings	Days in Relation to MR Imaging	*POLG* Pathogenic Variant[a]
8	Male	3 yr	Developmental delay EPC of left arm and leg Hypotonia Somnolence Vomiting	Poor organization for age Right centro-temporoparietal high-voltage near-continuous polyspike and slow activity with the clinical correlation of jerking Ongoing frequent epileptiform discharges	12	c.2243G>C:p.W748S; c.2554C>T:p.R852C and c.32G>A:p.G11D[c]
9	Female[b]	3 yr	Generalized seizure (initial EEG nonconvulsive status) Headache Lethargy Rhinovirus-positive Vomiting	Diffuse, chaotic paroxysmal abnormalities occurring in all leads, but with high voltage Δ 1 Hz seen occipitally	1	c.1399G>A:p.A467T; c.2867G>A:p.G956D[c]
10	Female	8 yr	Adrenal insufficiency Hepatopathy (due to VPA) Pancreatitis Seizures: rhythmic head jerking to the right, trunk jerking, and facial grimacing	Clinical events were captured and did not correlate with any ictal pattern on scalp EEG Diffusely slow and disorganized background	15	c.1399G>A:p.A467T (homozygous)[e]
11	Female	7 yr	Altered mental status Confusion Developmental delay Hypotonia Right hemiparesis Seizures with febrile illness: altered mental status, lips twitch, right arm EPC Vomiting	Asymmetric slowing in right posterior quadrant Frequent focal polyspike discharges, right occipital 2 Seizures captured electrographically, originate from right occipital with spread to right temporal No clinical events captured	0	c.32G>A:p.G11D and c.2554C>T:p.R852C; c.2243G>C:p.W748S[c]
12	Male[b]	7 mo	Abnormal coagulation Dehydration due to vomiting Elevated liver enzymes Fatigue Hepatosplenomegaly Seizures Somnolence Steatosis	Extremely low voltage; featureless No discernible cerebral electrical activity is seen on scalp EEG	8	c.2542G>A:p.G848S; c.1399G>A:p.A467T

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On-line Table 1: Continued

Case	Sex	Age	Clinical History	EEG Findings	Days in Relation to MR Imaging	*POLG* Pathogenic Variant[a]
13	Female	10 yr	1st seizure at 6 months of age Diabetes mellitus History of epilepsy Migraine Paresthesias Presented after prolonged generalized convulsive seizure with prolonged post-ictal recovery and altered mental status (concerns for nonconvulsive status) Recurrent episodes of "numb attacks Vomiting	Generalized background slowing (0.5–1 Hz) No epileptiform discharges Superimposed frontal predominant fast frequency activity (12–14 Hz)	-1	c.752C>T:p.T251I and c.1760C>T:p.P587L;[f] c.1880G>A:p.R627Q

Note:—NA indicates not available; VPA, valproic acid; PLEDS, periodic lateralized epileptiform discharges.

[a] NM_002693.2; variants in clinically isolated syndrome are separated by "and"; variants in trans are separated by ";."

[b] Deceased patient.

[c] Parental testing confirmed the biparental inheritance.

[d] Confirmed de novo; no second variant identified on *POLG* sequencing, deletion, or duplication analysis.

[e] Mother confirmed heterozygous; father unavailable for testing.

[f] Confirmed variants in clinically isolated syndrome (maternally inherited); father unavailable for testing.

On-line Table 2: Brain MR imaging findings at Diagnosis and follow-up examinations

MR Imaging Findings at Diagnosis						
Case	**Age**	**Perirolandic Sign**	**Pre-/Postcentral Gyrus**	**Thalamus**	**Additional Findings**	**Pooled Follow-Up Imaging**
1	9 mo	Right	Pre- and postcentral (DWI)	Right (DWI)	None	2 Follow-up examinations (7 and 45 days after initial imaging) Volume loss Signal changes: dentate nuclei/cerebellar vermis/dorsal pons
2	8 mo	Left	Precentral (DWI/T2)	Left (T2)	None	1 Follow-up examination (30 days after initial imaging) Volume loss Signal changes bithalamic ASL findings: ↑flow in the left perirolandic and bilateral hippocampi MR spectroscopy findings ↑ lactate peak
3	8 mo	Left	Precentral (DWI/T2)	Left (T2)	Signal changes: left subinsular region/left posterior putamen MR spectroscopy findings: ↑ lactate peak	2 Follow-up examinations (30 and 45 days after initial imaging) Volume loss Bilateral perirolandic sign Signal changes: bithalamic/bioccipital (encephalomalacia)/bilateral posterior putamina/bilateral subinsular ASL findings: ↑ flow in the left occipital lobe
4	1 yr	Right	Pre- and postcentral (DWI/T2)	None	None	2 Follow-up examinations (5 and 30 days after initial imaging), volume loss, signal changes: cerebellar vermis/dentate nuclei
5	9 mo	Bilateral	Pre- and postcentral (DWI)	Right (DWI)	None	5 Follow-up examinations (3, 8, 11, 30, and 40 days after initial imaging) Volume loss Signal changes: bioccipital/right occipital MR spectroscopy findings: ↑ lactate peak
6	3 yr	Left	Pre- and postcentral (DWI/T2/FLAIR)	Bilateral (DWI/T2/FLAIR)	None	5 Follow-up examinations (4, 7, 11, 60, and 80 days after initial imaging) Signal changes: bithalamic/cerebellar vermis/bilateral caudate nuclei, and putamina/right occipital/right hippocampus
7	16 yr	Bilateral	Pre- and postcentral (DWI/T2/FLAIR)	Right (DWI/T2/FLAIR)		

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On-line Table 2: Continued

MR Imaging Findings at Diagnosis						
Case	**Age**	**Perirolandic Sign**	**Pre-/Postcentral Gyrus**	**Thalamus**	**Additional Findings**	**Pooled Follow-Up Imaging**
					Signal changes: right frontal/right occipital	9 Follow-up examinations (6, 27, 28, 36, 370, 685, 1472, 1631, and 3323 days after initial imaging) Volume loss Signal changes: bioccipital (encephalomalacia)/bithalamic/ splenium of the CC MR spectroscopy findings: ↑ lactate peak
8	3 yr	No	–	Bilateral (T2/FLAIR)	MR spectroscopy findings: ↑ lactate peak	9 Follow-up examinations (388, 566, 873, 953, 1693, 1776, 1783, 2371, and 2558 days after initial imaging) Volume loss Signal changes: bithalamic/bioccipital/ right parietal ASL findings: bithalamic/bioccipital/left parietal ↑ flow MR spectroscopy findings: ↑ lactate peak
9	3 yr	No	–	Bilateral (T2/FLAIR)	None	3 Follow-up examinations (91, 169, and 193 days after initial imaging) Volume loss Perirolandic sign on the left side Signal changes**:** bithalamic/bioccipital/ bifrontal/left parietal/right cerebellum ASL findings: bioccpital/right cerebellum ↑ flow Mild enhancement: left frontal/left parietal
10	8 yr	No	–	Bilateral (DWI/T2/ FLAIR)	Atrophy Signal changes: diffuse white matter (deep and subcortical white matter, fornix)	3 Follow-up examinations (122, 143, and 186 days after initial imaging) Volume loss Bilateral perirolandic sign Signal changes: white matter/brain stem/ cerebellum/bifrontal/hippocampi/ bithalamic/bioccipital/bifrontal/ microhemorrhages ASL findings: bilateral perirolandic/ bilateral cerebellum/bioccipital ↑ flow

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On-line Table 2: Continued

MR Imaging Findings at Diagnosis						
Case	**Age**	**Perirolandic Sign**	**Pre-/Postcentral Gyrus**	**Thalamus**	**Additional Findings**	**Pooled Follow-Up Imaging**
11	7 yr	No	–	Bilateral (DWI/T2/FLAIR)	Signal changes: cerebellar vermis/caudate nuclei	6 Follow-up examinations (99, 698, 724, 831, 843, and 1214 days after initial imaging) Volume loss Bilateral perirolandic sign Signal changes: biparietal/bioccipital/bithalamic/right frontal/right temporal ASL findings: ↑ flow in the left occipital
12	7 mo	No	–	None	Signal changes: diffuse bilateral white matter (deep and subcortical)/fornix/hippocampi MR spectroscopy findings: ↑ lactate peak	1 Follow-up examination (8 days after initial imaging) Diffuse brain edema (brain death pattern)
13	10 yr	Unremarkable MR imaging of the brain				2 Follow-up examinations (132 and 212 days after initial imaging) Unremarkable MR imaging of the brain

Note:—CC indicates corpus callosum; ASL, arterial spin labeling; MRS, magnetic resonance spectroscopy; DWI, diffusion-weighted imaging; FLAIR, fluid-attenuated inversion recovery; CC, corpus callosum.