



A Rare Leukoencephalopathy: Succinate Dehydrogenase Deficiency

Nadir Bir Lökoensefalopati: Süksinat Dehidrogenaz Eksikliği

Özdem Ertürk Çetin¹, Tanyel Zübarioğlu², Cengiz Yalçınkaya¹

¹Istanbul University Cerrahpaşa Faculty of Medicine, Department of Neurology, Istanbul, Turkey

²Istanbul University Cerrahpaşa Faculty of Medicine, Department of Pediatrics, Division of Nutrition and Metabolism, Istanbul, Turkey

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Dear Editor,

A male patient was admitted with delay in motor development. He was born from healthy consanguineous parents after a normal pregnancy and birth as the third son of the family. There were no features in his family history. It was reported that the delay in motor development became obvious after he had an infection with high fever when he was 10 months old. He still could not sit or walk without help. There was a decrease in tonus, his deep tendon reflexes were hypoactive, he could not speak and could only follow objects with his eyes.

Biochemical tests including total blood count, electrolyte levels, liver enzyme levels, kidney function tests, levels of muscle enzymes, blood glucose count, and lipid profile were normal. Metabolic tests including plasma ammonia levels, quantitative amino acid analysis, acylcarnitine profile with tandem mass spectrometry, organic acid analysis in urine, and very long chain fatty acid levels were normal. Lactate levels were slightly elevated (35.5 ug/dL). The enzyme activities of arylsulfatase A and beta galactosidase were normal. The nerve conduction study and electroencephalogram results were normal.

T2-weighted brain magnetic resonance imaging (MRI) showed widespread white matter hyperintensities including the corpus callosum (Figure 1a). Corticospinal tracts seemed hyperintense in capsula interna crus posterior, mesencephalon and pons (Figure 1a,

1b). Cranial MRI revealed hyperintensity of the middle cerebellar peduncles (Figure 1c) and nuclei of the thalamus (Figure 1a).

Mitochondrial DNA analyses performed on a peripheral blood sample and muscle biopsy showed no pathology.

Genetic testing performed on the patient's blood sample revealed a mutation in the *SDHB* gene, which diminishes the activity of complex 2 of the mitochondrial respiratory chain (c.143A>T p.Asp48Val).

Rehabilitation partially improved the motor development of the patient and he could sit with support, but he could not walk in his examination when he was aged 6 years. He had spastic tetraparesis predominantly in the lower extremities. He could understand spoken words and build sentences containing a few words. He was started on coenzyme q10, vitamin B12, and baclofen, and his clinical status was stable.

Complex 2 enzyme 'succinate dehydrogenase (SDH)' defects of mitochondrial respiratory chain and oxidative phosphorylation system are very rare (2%), which is why succinate dehydrogenase deficiency is a rare cause of leukoencephalopathy. The SDH complex is coded by the nuclear genome. It has 4 subunits including *SDHA*, *SDHB*, *SDHC*, and *SDHD* and 4 assembly factor proteins (1). The clinical presentation is variable and infantile-onset leukoencephalopathy is a frequent clinical feature (2,3). MR spectroscopy shows a succinate peak, which is a specific

Address for Correspondence/Yazışma Adresi: Özdem Ertürk Çetin MD, Istanbul University Cerrahpaşa Faculty of Medicine, Department of Neurology, Istanbul, Turkey
Phone: +90 506 912 47 06 E-mail: ozdemerturk@yahoo.com

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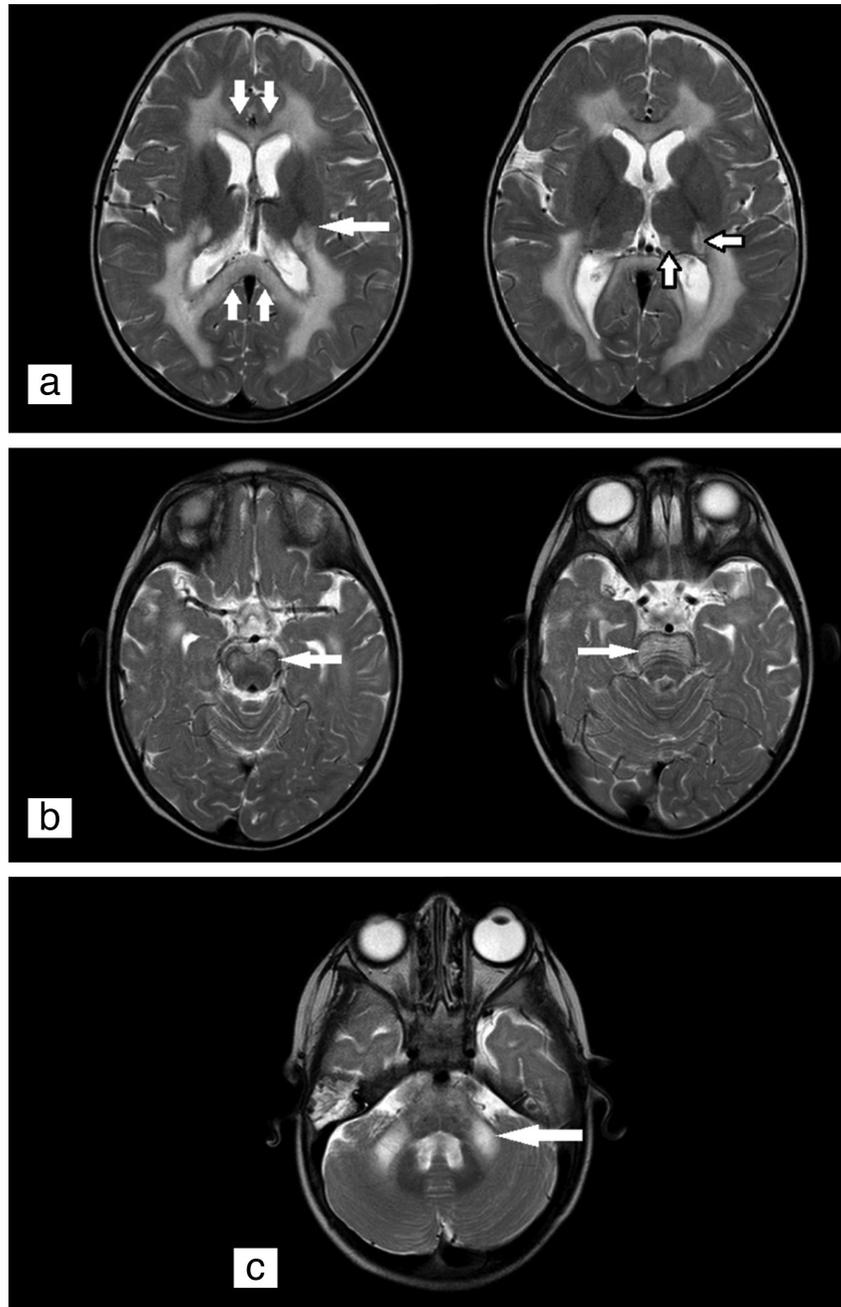


Figure 1. a) T2-weighted axial magnetic resonance imaging shows signal abnormalities in the cerebral white matter, involvement of corpus callosum (short white arrows), capsula interna crus posterior (long white arrow), thalamic nuclei (black framed arrows), b) T2-weighted axial magnetic resonance imaging shows corticospinal tracts hyperintensities in mesencephalon and pons. c) T2-weighted axial magnetic resonance imaging shows involvement of middle cerebellar peduncles

finding (2). Involvement of one of the corticospinal tracts parts involving capsula interna posterior crus, pons or medulla, middle cerebellar peduncles, specific thalamic nuclei, cerebral hemispheric white matter with sparing of the U fibers, corpus callosum, and medulla spinalis have been defined recently as the MRI findings of SDH deficiency-related leukoencephalopathy (2).

Ethics

Informed Consent: Consent form was filled out by all participants.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: C.Y., Ö.E.Ç., T.Z., Concept: C.Y., Design: Ö.E.Ç., T.Z., Data Collection or Processing: Ö.E.Ç.,

T.Z., Analysis or Interpretation: C.Y., Literature Search: Ö.E.Ç., Writing: Ö.E.Ç.

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