J Inherit Metab Dis (2007) 30:100
DOI 10.1007/s10545-006-0478-2

SHORT REPORT

Guanidinoacetate methyltransferase deficiency masquerading as a mitochondrial encephalopathy

A. A. M. Morris · R. E. Appleton · B. Power · D. M. Isherwood · L. J. Abernethy · R. W. Taylor · D. M. Turnbull · N. M. Verhoeven · G. S. Salomons · C. Jakobs

Received: 19 September 2006 / Submitted in revised form: 26 October 2006 / Accepted: 13 November 2006 / Published online: 14 December 2006

Online citation: JIMD Short Report #033 (2006) Online

Summary Guanidinoacetate methyltransferase (GAMT) deficiency is a rare disorder of creatine synthesis. We report a patient who presented at 10 months of age with hypotonia and global developmental delay. Subsequently, she developed seizures and choreoathetosis. Magnetic resonance imaging showed high signal bilaterally in the globus pallidus on T2-weighted images. Mitochondrial respiratory chain studies revealed low complex I activity (in muscle 0.052 nmol NADH oxidized per min per unit citrate synthase, controls 0.166 ± 0.047; in fibroblasts 0.080 nmol NADH oxidized per min per unit citrate synthase, controls 0.197 ± 0.034). The true diagnosis was suspected at 21 months of age because of persistent low plasma and urine creatinine concentrations. GAMT activity was undetectable in fibroblasts and compound heterozygous mutations were found in the *GAMT* gene (c.327G>A and c.522G>A). The patient was treated with creatine, dietary arginine restriction and ornithine supplements. Her movement disorder and seizures resolved but she still has severe cognitive impairment and no expressive language. The occurrence of secondary respiratory chain abnormalities in GAMT deficiency may lead to misdiagnosis, particularly as the clinical and radiological features resemble those seen in mitochondrial encephalopathies. It is important to establish the correct diagnosis because specific treatment is available.

Communicating editor: Sylvia Stockler-Ipsiroglu

A. A. M. Morris (✉)
Willink Unit, Royal Manchester Children's Hospital, Manchester,
e-mail: Andrew.morris@cmmc.nhs.uk

R. E. Appleton · B. Power
Department of Neurology, Royal Liverpool Children's Hospital, Liverpool, UK

D. M. Isherwood
Department of Biochemistry, Royal Liverpool Children's Hospital, Liverpool, UK

L. J. Abernethy
Department of Radiology, Royal Liverpool Children's Hospital, Liverpool, UK

R. W. Taylor · D. M. Turnbull
Mitochondrial Research Group, School of Neurology, Neurobiology and Psychiatry, University of Newcastle upon Tyne, Newcastle upon Tyne, UK

N. M. Verhoeven · G. S. Salomons · C. Jakobs
Department of Clinical Chemistry, Metabolic Unit, VU University Medical Center, Amsterdam, The Netherlands

Electronic Supplementary Material
Supplementary material is available for this article at http://dx.doi.org/10.1007/s10545-006-0478-2