GENETICS AND GENODERMATOSES

TRANSIENT NEONATAL ZINC DEFICIENCY CAUSED BY A HOMOZYGOUS E88K MUTATION IN THE MATERNAL SLC30A2 GENE

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Introduction: Transient neonatal zinc deficiency (TNZD; OMIM 608118) is caused by a mutation in the maternal SLC30A2 gene resulting in reduced milk zinc level. The infant with TNZD has a clinical presentation similar to that of acrodermatitis enteropathica (AE; OMIM 201100) which is due to mutations in the SLC39A4 gene leading to impaired intestinal zinc absorption. However, the prognosis of TNZD and AE has a big difference. To date, all the reported cases of TNZD were heterozygous SLC30A2 mutations, exhibiting an autosomal dominant.

Objective: We analysed the molecular basis of TNZD in a Chinese family.

Materials and Methods: The infant with AE-like lesions and his mother with a significantly low milk zinc level were subjected to mutation detection in the SLC39A4 and SLC30A2 genes, respectively. All exons of the two genes and adjacent exon–intron border sequences were amplified using polymerase chain reaction and directly sequenced. Flow cytometry and confocal laser scanning microscope were used to assess the impact of the mutation on its zinc transport activity.

Results: We only identified a homozygous Glutamic acid-to-Lysine transition (c.262 G>A; p.E88K) at the exon 2 of the maternal SLC30A2 gene. The functional assay showed a marked reduction of zinc secretion by the mutation.

Conclusions: To our knowledge, we report the first homozygous mutation in the maternal SLC30A2 gene which resulted in TNZD. Our case highlights the importance of distinguishing TNZD from AE by the means of detection of maternal breast milk level and SLC30A2 gene. Furthermore, our data shows that the homozygous mutation of the SLC30A2 gene would result in a greater decrease in zinc secretion relative to the heterozygous condition and lead to a more rapid onset of TNZD. Therefore, a mode of autosomal incomplete dominant inheritance in the TNZD couldn't be ruled out.