Can Genetic counseling and Preimplantation Genetic Diagnosis prevent fatal infantile-onset Pompe disease?

Stipe Dumančić, can. med.[a] , Ana Smajo, can. med.[a], Mario Ćuk, MD, PhD[a,b]

[a]*School of Medicine, University of Zagreb, Zagreb, Croatia*
[b]*Department of Pediatrics, Division for Genetics and Metabolic diseases, University Hospital Centre Zagreb, Zagreb, Croatia; Assistant Professor of Pediatrics, Consultant in Pediatric Endocrinology and Metabolic Medicine, Research Associate, Senior authorship and mentor*

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INTRODUCTION Pompe disease (Glycogen Storage Disease Type II) is a rare, inherited, autosomal recessive disorder due to acid alpha-glucosidase (GAA) deficiency and consequent intralysosomal accumulation of glycogen in many tissues. The most severe form, classic infantile-onset Pompe disease (IOPD) is diagnosed in early infancy during the assessment of a cardiomegaly, hypotonia or both respiratory infection and failure. Without Alglucosidase-alfa enzyme replacement therapy (ERT), these patients die before two years of age. Regarding reproductive options and potential risks to offspring, it is appropriate to offer genetic counseling to adults who are carriers for Pompe disease to help them make informed medical and personal decisions.
CASE PRESENTATION A 4-month-old infant was admitted to hospital because of feeding difficulties and deterioration of general status. Patient presented early with hypertrophic cardiomyopathy, hypotonia, generalized muscle weakness, failure to thrive and respiratory distress. Complete deficiency of GAA enzyme activity caused by biallelic pathogenic homozygous GAA gene mutation (c.2269C>T) proved the IOPD diagnosis with no cross reactive immunologic material (CRIM-negative status). Alglucosidase-alfa ERT and immunomodulation were introduced at age of 4 months. However, heart and skeletal muscles were severly affected and the disease progressed rapidly as might be expected with these findings. Unfortunately, the child died at the age of one year.
CONCLUSION In terms of the inheritance, genetic risk, rapid progression and implications of this severe form of Pompe disease it is reasonable to try with prenatal testing and preimplantation genetic diagnosis in expert Center if both parents are fully informed and consent.