THE MIRACLE OF NUCLEOSIDE TREATMENT İN THYMIDINE KİNASE 2 DEFICIENCY

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Mitochondria is the primary energy factory of the cells. Any disorder that occurs in this factory creates chaos in the cell and endangers life. In addition, mitochondria are unique organelle with their DNA. Mitochondrial DNA proliferation occurs throughout life in all cells. Proteins necessary for the continuity of mitochondrial DNA are synthesized in the nucleus and take part in the mitochondria. More than 100 mutations that cause mitochondrial diseases have been identified in recent years. The criterion determining the disease's onset and severity is the multiple mitochondrial genomes in each cell and heteroplasmy. In this way, the repair and recombination mechanism of DNA varies. The most common molecular defects are mitochondrial DNA depletion syndromes, which occur with regression in mitochondrial DNA copy number to 30% and affect the muscles, brain, and liver. Mutations in the gene encoding the Thymidine Kinase 2 enzyme, which plays a role in maintaining and repairing mitochondria, affect all cells' energy production, primarily skeletal muscle cells. Because without the TK2 enzyme, recycling of nucleosides, which are the building blocks of mitochondrial DNA, and as a result, mtDNA repair and production cannot be achieved.

In this report, we will present a critical case that we followed in our clinic and managed to survive with treatment.

- ✓ The 11-month-old girl had a complaint of losing her head control.
- ✓ On the physical examination, the neck muscles are weak. She was able to sit with support for a short time and had a mild myopathic face.
- ✓ CK result was 4653mg/dL. Tandem MS was normal and hypomyelination was detected on brain MRI.
- ✓ Genetic tests for congenital muscular dystrophy were normal.
- ✓ Muscle biopsy was consistent with mitochondrial disease and the genetic test result was c.323C>T compound heterozygous in the TK2 gene.
- ✓ This girl developed respiratory failure at the age of 1.5 years, a tracheostomy was opened.
- ✓ At this stage, nucleoside therapy was started.

- ✓ 14 months after the treatment started, her tracheostomy was closed.

- ✓ Our patient is now 4 years old and does not need any respiratory support.
- ✓ She is fed by mouth.
- ✓ Her maximal motor capacity is walking with assistance.
- ✓ She is still hypotonic and there appears facial weakness.

CONCLUSION

The gene encoding TK2 is located in the region of 16Q22.1, and the mutations in this gene are autosomal recessive. The disease starts with symptoms such as hypotonia, muscle weakness and nutritional difficulties in infancy and results in early death. Mitochondrial diseases may be similar to other childhood muscle diseases such as congenital myopathies, dystrophies, myasthenic syndromes, or metabolic myopathies, and muscle biopsy and genetic testing are essential for differential diagnosis. Although there is no known effective treatment for all mitochondrial diseases, deoxynucleoside therapy is life-saving in TK2-related disease, as in our patient.

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