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Research Article

Transient Myeloproliferative Disorder: A Case Report of a Newborn with Down Syndrome

Zübeyr ARICI[*1], Halil Barış İLETMİŞ[2]

[1]*Department of Child Health and Diseases, Kütahya City Hospital, Turkey*
[2]*Department of Child Health and Diseases, Kütahya City Hospital, Turkey*

[*]*drzubeyrarici@gmail.com*

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Abstract – This paper presents a case of transient myeloproliferative disorder (TMD) diagnosed in a newborn with Down syndrome. The patient, born at 37+3 weeks of gestation, was diagnosed with Down syndrome and transient myeloproliferative disorder (TMD). TMD is a hematological condition characterized by an increase in myeloid blasts in peripheral blood, observed in approximately 10% of newborns with Down syndrome. This article presents the clinical, laboratory, and imaging findings of the case, discusses the natural course of TMD, and addresses current treatment approaches in its management.

Keywords – Neonatal İntensive Care Unit, Transient Myeloproliferative Disorder, Down Syndrome, Leukocytosis, Thrombocytopenia.

I. INTRODUCTION

Transient myeloproliferative disorder (TMD) is a condition that occurs in approximately 10% of newborns with Down syndrome, characterized by an increase in myeloid blasts in peripheral blood. Approximately 30% of cases present with leukocytosis, and nearly 40% show thrombocytopenia. TMD is strongly associated with somatic mutations in the GATA1 gene, which disrupt normal hematopoiesis. Although TMD often undergoes spontaneous remission, about 30% of cases are at risk of developing acute leukemia in later years [1].

Recent studies have provided critical insights into the molecular pathways underlying TMD, aiding in its diagnosis, prognosis, and management. This paper outlines the diagnostic process and management of TMD in a newborn with Down syndrome.

II. CASE PRESENTATION

A. Patient Demographics

A 37-year-old father and a 33-year-old mother with hypothyroidism and gestational diabetes mellitus (GDM) delivered a female infant via cesarean section at 37+3 weeks of gestation. The birth weight was 3270 grams, with Apgar scores of 8 at 1 minute and 9 at 5 minutes. Prenatal history indicated that the mother's GDM was regulated by diet and that she had not used tobacco or alcohol during pregnancy. Postnatal history revealed that the infant required admission to the neonatal intensive care unit (NICU) due to transient tachypnea and later exhibited the phenotypic features of Down syndrome.

B. Physical Examination and Tests

Upon admission to the NICU, the infant's general condition was moderately stable. Distinct Down syndrome features were noted, nasal root flatness, hypertelorism, extra epicanthal folds, short neck, and a simian crease in the palm. On physical examination, the infant exhibited tachypnea and a 2/6 systolic murmur, along with mild hepatosplenomegaly. Chest radiography showed a normal posteroanterior view. Complete blood count revealed significant leukocytosis (164,000/mm³) and severe thrombocytopenia (20,000/mm³). Direct Coombs test was positive (+++). Peripheral blood smear showed a marked increase in atypical, activated lymphocytes and myeloid blasts. No significant hemolysis was observed, and erythrocyte morphology was normal, with relatively few platelets that were clumped. Cardiac echocardiography revealed a patent ductus arteriosus (PDA) and patent foramen ovale (PFO). Genetic testing confirmed trisomy 21. The patient was referred to a tertiary center specializing in pediatric hematology and oncology on the fourth day of life. Due to the worsening cytopenia, cytotoxic treatment with ARA-C was initiated, but it was discontinued on day 4 after dramatic clinical improvement and resolution of cytopenia. Spontaneous remission was observed.

III. DISCUSSION

The pathogenesis of TMD is strongly associated with somatic mutations in the GATA1 gene, a transcription factor located on the X chromosome. These mutations lead to the transformation of fetal hematopoietic cells and an expansion of abnormal megakaryoblasts, which is characteristic of TMD [2].

While most cases resolve spontaneously within the first three to six months of life, cytotoxic treatment may be considered if cytopenia or organ dysfunction occurs [3],[4].

In cases of hepatic dysfunction or coagulopathy, supportive care is necessary. As in the present case, close monitoring is recommended when myeloblasts are detected [5].

Recent studies highlight the importance of early molecular diagnosis. Furthermore, next-generation sequencing may help identify high-risk cases that are more likely to progress to leukemia [6],[7].

Clinical trials are investigating targeted therapies aimed at reducing the risk of progression by focusing on the biological properties of TMD cells [8].

IV. CONCLUSION

Transient Myeloproliferative Disorder (TMD) is a unique hematological disorder with a variable clinical course in newborns with Down syndrome. In newborns with Down syndrome who present with hepatosplenomegaly, leukocytosis, thrombocytopenia, and myeloblasts in peripheral blood smears, TMD should be considered. This condition requires close monitoring due to the potential risk of developing acute leukemia. Early diagnosis supported by genetic and molecular testing is crucial for appropriate management and follow-up. Ongoing research into the molecular biology of TMD offers hope for developing targeted interventions and improving outcomes for these patients.

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