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Case Report

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Hematological Characteristics in Neonates With Twin-Twin Blood Transfusion

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Abstract

We encountered a case of subacute twin-twin transfusion syndrome (TTTS) with the increased inter-twin reticulocyte count-ratio (calculated by dividing the reticulocyte count of the donor by the reticulocyte count of the recipient). In the current case, inter-twin reticulocyte count-ratio was increased to 1.91 (normal < 1.7); however, we diagnosed the case as subacute TTTS because a myocardial hypertrophy indicating the presence of chronic heart load was not recognized in the twins.

Keywords: Twin-twin transfusion syndrome; Twin anemia-polycythemia sequence; Reticulocyte

Introduction

Twin anemia-polycythemia sequence (TAPS) is a rare form of twin-twin transfusion syndrome (TTTS), which is characterized by the presence of large inter-twin hemoglobin difference without signs of twin oligo-polyhydramnios sequence [1, 2]. Postnatal diagnosis of TAPS is based on the presence of chronic anemia with reticulocytosis (as a sign of chronic anemia) in the donor twin and polycythemia in the recipient [1, 2]. Usually, TAPS has been diagnosed based on the postnatal criteria defined as inter-twin hemoglobin difference > 8 g/dL and inter-twin reticulocyte count-ratio (calculated by dividing the reticulocyte count of the donor by the reticulocyte count of the recipient) > 1.7 [3, 4]. The criterion concerning the increased inter-twin reticulocyte count-ratio is based on a previous case-control study (sensitivity and specificity of 100%) by Lopriore et al [5]. However, we encountered a case of subacute TTTS with the increased inter-twin reticulocyte count-ratio.

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Case Report

A 32-year-old woman, gravida 1, para 0 was referred to our hospital at 29 weeks of gestation for a high-risk obstetric consultation due to monochorionic-diamniotic twin pregnancy with premature labor and selective intrauterine fetal growth restriction. At this time, the estimated fetal weights of twin A and B were 1,277 g (-0.45 SD) and 1,039 g (-0.181 SD), respectively. The amniotic fluid pockets of twin A and B were 6.2 and 4.1 cm, respectively. The Doppler evaluations of umbilical and cerebral arteries of both twins were normal.

At 33 weeks and 6 days of gestation, the fetal cardiotocograms showed reassuring status of both twins. At this time, the Doppler evaluations of both twins were normal. The amniotic fluid pockets of twin A and B were 4.2 and 2.4 cm, respectively. The middle cerebral artery peak systolic velocity (MCA-PSV) in twin A was 39.6 cm/s (normal: < 70 cm/s). At 34 weeks and 1 day of gestation, however, the fetal cardiotocograms showed sinusoidal pattern in twin A. The MCA-PSV of twin A was increased to 90.4 cm/s. An emergency cesarean section was performed. Twin A was a male baby weighing 1,932 g (appropriate for gestational age) with Apgar score of 8 (1 min) and 9 (5 min), respectively, while twin B was a male baby weighing 1,680 g (light for gestational age; 13.0% growth discordance between the twins) with Apgar score of 8 (1 min) and 9 (5 min), respectively. The umbilical artery pH values in twin A and B were 7.315 and 7.295, respectively. The hemoglobin concentration of twin A was 26.8 g/dL (normal: 13 - 22 g/dL) with reticulocyte counts of 3.2% (normal: < 7%), while it was 3.4 g/dL with reticulocyte counts of 6.5% in twin B. The placenta was confirmed as monochorionic with two superficial arterio-venous anastomoses without color difference in placentas.

Discussion

In the current case, anemia was recognized in the larger twin with more amniotic fluid, and polycythemia was recognized in the smaller twin with less amniotic fluid. In addition, a myocardial hypertrophy indicating the presence of chronic heart load was not recognized in the twins with polycythemia. The findings are contrary to those of slow process of transfusion; therefore, we diagnosed the case as subacute TTTS despite the increased inter-twin reticulocyte count-ratio of 1.91 (> 1.7).

The placenta without color difference will also support our postnatal diagnosis, because color difference in placenta has been reported to be an additional diagnostic criterion of TAPS [6, 7]. Whether or not the reticulocyte level exceeds the normal range may be corresponded to the pathognomonic for TAPS with slowly developed anemia more than inter-twin reticulocyte count-ratio. The hematological characteristics of TAPS can be clarified by the accumulation of similar case reports.

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