—Case Reports—

A Case of Monochorionic-Diamniotic Twin Pregnancy with Polyhydramnios-Polyhydramnios Sequence

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Abstract

We present a case of monochorionic-diamniotic (MD) twin pregnancy with polyhydramnios-polyhydramnios sequence. A 20-year-old woman, gravida 1, para 0, was referred to our hospital at 31 weeks and 6 days' gestation for consultation about a high-risk pregnancy due to the presence of discordant fetal growth pattern (26% of fetal growth discordance) with polyhydramnios in MD twin pregnancy. Ultrasound examination at admission showed a maximal vertical pocket (MVP) of 11.4 cm in twin A and an MVP of 4.7 cm in twin B. At 33 weeks' gestation, the MVPs had increased to 22.2 cm and 10.2 cm, respectively. At 33 weeks and 2 days' gestation, Cesarean section was performed because of uncontrolled uterine contractions associated with polyhydramnios. Twin A was a female weighing 2,280 g, and twin B was a female weighing 1,782 g (22% growth discordance). The estimated amniotic fluid volumes of twins A and B were 5,000 and 1,000 mL, respectively.
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Key words: monochorionic-diamniotic twin pregnancy, polyhydramnios-polyhydramnios sequence, twin-twin transfusion syndrome

Introduction

Amniotic fluid volume is controlled by a dynamic interaction between the maternal, fetal, and placental compartments. Polyhydramnios is the presence of excessive amniotic fluid in the uterus[1]. In Japan, polyhydramnion is diagnosed when amniotic fluid volume exceeds 800 mL (Japan Society of Obstetrics and Gynecology: Glossary of Obstetrics and Gynecology 2005). In singleton pregnancies, the main causes of polyhydramnios are fetal malformations, fetal pseudohypoaldosteronism, maternal diabetes mellitus, systemic maternal cardiac or kidney diseases, and placental tumor, such as chorioangioma[1]. In multiple pregnancies, on the other hand, the main cause of polyhydramnios is twin-twin transfusion syndrome (TTTS).

In multiple pregnancies, the fetuses have both a common environment and a common circulation through vascular communications in the placenta[2–5]. Therefore, each fetus often represents various volumes of amniotic fluid as a result of a disproportion of bloodstream translocation between the fetuses. The presentation of an oligohydramnios-polyhydramnios sequence in the second trimester, i.e., a maximal vertical pocket (MVP) in the donor sac <2 cm and >8 cm in the recipient sac, is recognized as TTTS[4,5]. However, there may be some atypical patterns of amniotic fluid volume which do

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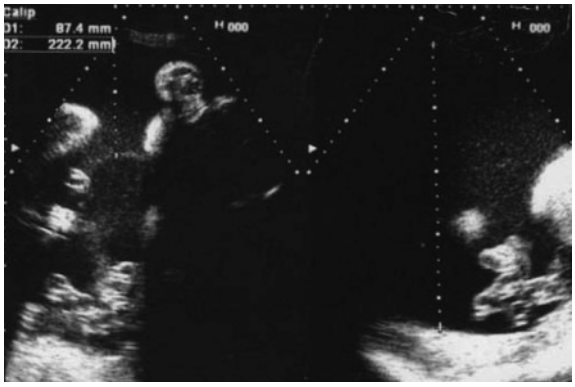

Fig. 1a Ultrasonographic findings: The MVP of twin A is 22.2 cm.

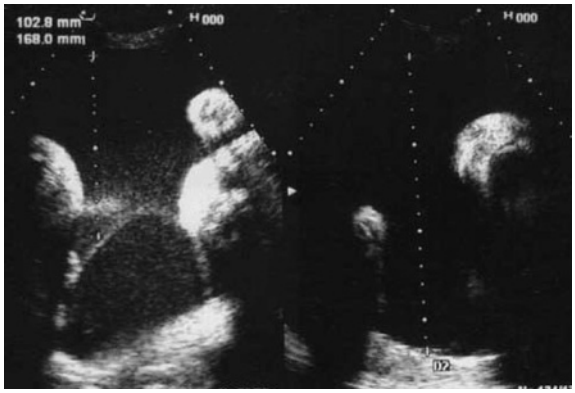

Fig. 1b Ultrasonographic findings: Teh MVP of twin B is 10.2 cm.

not fulfill these diagnostic criteria for TTTS. We present here a case of monochorionic-diamniotic (MD) twin pregnancy with polyhydramnios-polyhydramnios sequence.

Case Report

A 20-year-old woman, gravida 1, para 0, was referred to our hospital at 31 weeks and 6 days' gestation for consultation regarding a high-risk pregnancy due to the presence of a discordant fetal growth pattern (26% fetal growth discordance: twin A, 2,421 g; twin B, 1,789 g) and polyhydramnios in an MD twin pregnancy. At admission, the height of the uterine fundus was 35 cm. The external uterine os was closed. An ultrasound examination revealed polyhydramnios of twin A (MVP: 11.4 cm) and normohydramnios of twin B (MVP: 4.7 cm). A thin dividing membrane between the fetuses was visualized. Mild cardiomegaly was suggested in twin A but not in twin B (cardiothoracic area ratio: 33.1% in twin A and 23.1% in twin B; normal: ≤35%). No morphological anomalies were detected in either fetus. In addition, no abnormal findings were observed in the fetuses with Doppler studies of the umbilical arteries or with nonstress testing.

An examination of the previous doctor's chart suggested no measurable growth discordance between the fetuses during the first trimester. The medical histories, genetic family histories, and past histories of the mother and her husband were unremarkable. The mother was not received any infertility treatment. The result of 50-g, 1-hour glucose challenge test at 26 weeks' gestation was 106 mg/dL (normal: <140 mg/dL; Japan Society of Obstetrics and Gynecology: Guideline for Obstetrical Practice in Japan 2008).

At admission, we diagnosed this case as an MD twin pregnancy with normohydramnios-polyhydramnios sequence. The uterine contractions were not strong, but we started continuous maternal intravenous infusion of magnesium sulfate (1 g/hour) for tocolysis as a prophylactic treatment. Daily ultrasonic examinations, including Doppler studies, were performed, and the fetuses were monitored daily by cardiotocograms.

At 33 weeks' gestation, the height of uterine fundus had increased to 40 cm. An ultrasound examination revealed severe polyhydramnios of both fetuses. The MVP of twin A and twin B were 22.2 and 10.2 cm, respectively **(Fig. 1a, 1b)**.

At 33 weeks and 2 days' gestation, Cesarean section was performed because of uncontrolled uterine contractions associated with polyhydramnios. Twin A was a female weighing 2,280 g (appropriate for gestational age) with Apgar scores of 7 and 8 at 1 and 5 minutes, respectively. The umbilical arterial pH and hemoglobin level were 7.259 and 14.7 g/dL, respectively. Twin B was a female weighing 1,782 g (appropriate for gestational age; 22% growth discordance) with Apgar scores of 9 and 10 at 1 and 5 minutes, respectively. The umbilical arterial pH and hemoglobin level were 7.262 and 14.8 g/dL, respectively. No morphological anomalies were recognized in either infant. The estimated amniotic fluid volumes of twin A and B were 5,000 and 1,000 mL, respectively. Both infants showed normal cardiac function. There was no significant difference in cardiothoracic ratio between the two infants (61% in twin A and 58% in twin B; normal: ≤60). The MD placenta weighed 1,380 g and showed no tumors, such as chorioangioma. One arterial-arterial and 1

arterial-venous anastomosis (twin B-A) between the twins were confirmed postnatally.

Discussion

In the present case, a normohydramnios-polyhydramnios sequence in MD twin pregnancy was observed at 31 weeks' gestation. At this time, we selected a noninterventional approach, although the fetal growth discordance was 26%, because Taylor et al.[6] had reported that estimated fetal weight discordancy is not an antenatal factor for predicting outcome in TTTS. This is an atypical pattern of the combination of amniotic fluid volume in MD twin pregnancies. This sequence does not meet with the criteria for diagnosing TTTS of oligohydramnios-polyhydramnios sequence [4,5] ; however, a risk of progression exists. In 2008, for example, Hayashi et al.[7] have reported that 14 of 24 cases (58%) with this sequence progressed to TTTS. In 2008, Takahashi et al.[8] reported a perinatal mortality rate of 20% and a beneficial effect of tocolysis for preventing severe polyhydramnis in this sequence. At 33 weeks' gestation, however the present case showed a severe polyhydramnios-polyhydramnios sequence in spite of prophylactic tocolysis.

The mechanism of the polyhydramnios-polyhydramnios sequence in the present case is not clear. In this case, neither of the infants showed structural abnormalities, such as atresia of digestive tract and spina bifida, or other functional failures, such as amyosthenia associated with dysphagia. There was no placental tumor such as chorioangioma. The mother was a healthy 20-year-old woman, and the laboratory examinations ruled out maternal gestational diabetes mellitus. In addition, there were no typical symptoms suggesting TTTS, such as abnormal cardiac function and cardiomegaly. Therefore, the present case may not be consistent with the typical mechanisms leading to polyhydramnios reported previously[1–5].

Only one hypothesis leading to the polyhydramnios-polyhydramnios sequence in this case can be proposed. At 31 weeks' gestation, the cardiothoracic area ratio in twin A with polyhydramnios was significantly higher than that in twin B with normohydramnios. At this time, the cardiothoracic area ratio in twin A was at the upper limit of the normal range, whereas that of twin B was almost the mean. At delivery at 33 weeks' gestation, however, there was no significant difference in cardiothoracic ratio between the infants. At this time, these ratios were almost at the upper limit of the normal range. In this case, unfortunately, we could not evaluate the fetal cardiac functions *in utero*. However, these findings may indicate the presence of compensation in twin B for the circulatory overload volume in twin A.

The present case may be a rare form of twin-twin transfusion. The mechanism of the polyhydramnios-polyhydramnios sequence in twin pregnancies can be clarified by the accumulation of similar case reports.

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