

CASE REPORT

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Placental rupture after fetoscopic SOLOMON technique for twin-twin transfusion syndrome: 2 cases report

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Abstract

Objective To present 2 cases of placental rupture at delivery after fetoscopic SOLOMON technique for twin-twin transfusion syndrome.

Methods 2 cases diagnosed with TTTS in the second trimester. Fetoscopic SOLOMON procedure was performed successfully subsequently.

Results Placental rupture was confirmed by cesarean section in the third trimester. All fetuses were survived. No severe maternal complications but postpartum haemorrhage (PPH) was detected in one of the 2 cases.

Conclusion The SOLOMON technique may further result in placental rupture which may lead to the risk of fetal demise and postpartum haemorrhage, should pay close attention.

Keywords Twin-twin transfusion syndrome, SOLOMON technique, Placental rupture, Fetoscopic laser surgery

Introduction

Twin-twin transfusion syndrome (TTTS) is one of the most serious complications of monochorionic twin pregnancies, with an average incidence of 10–15% [1]. Fetoscopic laser coagulations (FLC) is the classic surgical treatment for TTTS [2]. Among them, the SOLOMON technique can significantly reduce the morbidity of twin anemia polycythemia sequence (TAPS) owing to residual anastomosis [3], however, it may increase the risk of placental abruption from literature findings [4]. There have been no reported cases of placental rupture associated

with this technique. In this paper, we report 2 cases of placental rupture in the third trimester of pregnancy after the fetoscopic SOLOMON technique for the treatment of twin transfusion syndrome.

Cases presentation

Two cases, conceived naturally, they underwent regular prenatal care in the local hospitals. Monochorionic diamniotic twin pregnancies were confirmed in the first trimester. Nuchal translucency (NT) were normal and Non-invasive prenatal testing (NIPT) showed low risk for both, and twin-twin transfusion syndrome were diagnosed during the second trimester of pregnancy. Fetoscopic SOLOMON procedure (Trocars: STORZ, 26161U and fetoscope: STORZ, 26008BUA) were performed successfully with 25 W laser power settings (Continuous mode, Dornier MediLas D60, Diode 940 nm, Fiber optic diameter 600 μ m), and the fetuses have recovered very well. And they were hospitalized due to “the preterm

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Fig. 1 Placental rupture. Case1: Partial. Case2: complete

Table 1 Detailed case information

Items	Case1	Case2
Age	30	36
BMI (kg/m ²)	27.9	29.8
GA@ diagnosis of TTTS	22 ⁺²	24 ⁺³
Quintero TTTS stage	4	2
Hydramnios/poly-hydramnios (cm)	10.1/1.0	15.2/0
GA@ fetoscopic SOLOMON procedure	22 ⁺³	24 ⁺³
Position of placenta	Posterior	Posterior
Placental thickness before fetoscopy(cm)	2.3	2.5
GA@ pPROM	34 ⁺²	32 ⁺⁴
GA@ LSCS	34 ⁺³	32 ⁺⁵
Placental abruption	No	Yes
Placental rupture	Partial	Complete
Haemorrhage in LSCS (ml)	500	400
Vaginal bleeding in 24 h(ml)	1087	910
Birth weight	2200/2270	1730/1760
Apgar score	10-10-10	10-10-10

GA: gestational age; LSCS: lower segment cesarean section

premature rupture of membrane (pPROM) and uterine contractions". Both cases were characterized by paroxysmal lower abdominal pain, vaginal bleeding, bloody amniotic fluid, and palpable regular uterine contractions. Although fetal heart rate monitoring remained reassuring and bedside ultrasonography failed to demonstrate a definitive retroplacental hematoma, the clinical suspicion of placental abruption prompted an immediate lower segment cesarean section (LSCS). Placental rupture were confirmed (Fig. 1) and PPH was occurred in one of the 2 cases. All the neonates had good outcome. (The detailed information of the cases is shown in Table 1)

Discussion

Twin-twin transfusion syndrome is one of the serious complications of monochorionic twin pregnancies due to inter-twin vascular anastomosis on the placenta. The classic surgical procedure for TTTS is FLC including selective technique and SOLOMON procedure [5].

Although the SOLOMON technique can reduce the risk of TAPS caused by residual vascular anastomoses, the incidence of placental abruption is much higher compared with selective FLC [6–9]. Between 2020 and 2024, a total of 140 Solomon procedures were performed at our center, with an incidence of placental rupture of 1.4% (2/140). In the 2 cases, the therapeutic effect was significant. However, both pregnancies were terminated by emergency LCSC because of "suspected placental abruption" which was confirmed in one case. Partial and complete placental rupture were found in the 2 cases. The haemorrhage in the LSCS procedure and 24 h postpartum were both beyond 800 ml which need the close attention of obstetrician. However, the mechanism of this phenomena is not well understood, and it may related to the placental tissue damage after coagulations, which may associated with the maximum laser power settings and total energy output: more energy leading to more damage and higher power settings leading to less damage [10]. The optimization of the laser power settings needs further investigation. It is hypothesized that the risk of placental rupture correlates inversely with local placental thickness. Given the inherently diminished tissue integrity at the placental margin, we propose implementing a standardized safety margin (e.g., 1–2 cm) for initiating laser coagulation in the absence of discernible vascular anastomoses, which may reduce laser energy damage on

thinned regions. Further large-scale multicenter studies are warranted to validate these preliminary findings and establish evidence-based safety protocols. Notwithstanding the potential for placental rupture, optimal perinatal management secured favorable outcomes in our series. Consistent with international guidelines, we advocate for the FLC technique as the classic intervention for advanced-stage TTTS, however, in complex scenarios featuring high-risk placental morphology, a tailored approach and optimized laser settings is strongly recommended to reduce the related risk.

We reported 2 placental rupture cases after SOLOMON procedure firstly and concluded that the SOLOMON technique may further result in placental rupture which may lead to the risk of fetal demise and postpartum haemorrhage, which needs to be paid sufficient attention in the obstetrical management, and the specific mechanism needs to be further studied.

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Author contributions

XC XU and XB TIAN: followed up the patient and data collection, figure collection and processing; F QIN and LL LI: manuscript writing/editing. GL CHEN: project development and revised the manuscript, review and editing.

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Data availability

All data generated or analyzed during this study are included in this published article.

Declarations

Ethics approval and consent to participate

All individuals provided informed consent to participate in this study and approval was provided by the Medical Ethics Committee of Women's and children's hospital of Chongqing Medical University.

Consent for publication

Written informed consent was obtained from the patients for publication of the case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

The authors declare no competing interests.

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