

# Intraoperative bleeding control during cesarean delivery of complete placenta previa with transient occlusion of uterine arteries

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There are few methods to control heavy intra-operative bleeding during cesarean delivery of placenta previa. Transient occlusion of uterine arteries (TOUA) during operation has previously been reported as a quick and safe method to control intra-operative uterine bleeding. We reported 2 cases of cesarean delivery with complete placenta previa in which TOUA was performed to safely reduce intra-operative complication, especially heavy intra-operative bleeding. In the 2 cases, cesarean deliveries were safe and without any complications under the TOUA method. TOUA can be a good method to control heavy intra-operative bleeding during cesarean delivery of complete placenta previa with risk of heavy bleeding.

**Keywords:** Heavy bleeding; Placenta previa; Transient occlusion of uterine arteries

## Introduction

Postpartum hemorrhage is a leading cause of maternal morbidity and mortality worldwide [1]. Placenta previa is one of the major causes of postpartum hemorrhage. Placenta previa is a complication of the third trimester that can cause catastrophic bleeding during cesarean delivery [2]. In a systematic review including 58 observational studies of placenta previa, the prevalence of placenta previa ranged from 3.5 to 4.6 per 1,000 births [3].

There are a few methods to prevent and treat placenta previa bleeding immediately after cesarean delivery and control intra-operative bleeding during cesarean operation. Because of heavy bleeding, additionally hysterectomy is performed immediately with high patient mortality due to delayed control of heavy bleeding immediately after cesarean delivery. A safe intra-operative method to control placenta previa bleeding is required. However, there is no gold standard treatment of placenta previa hemorrhage.

Our previous reports documented transient occlusion of uterine arteries (TOUA) as a new technique to reduce operative complication, especially intraoperative bleeding [4-6]. The peritoneum was incised using a monopolar electrode through the triangular area (round ligament, ovarian ligament and

infundibulopelvic ligament, psoas muscle). Using blunt-tip suction, both uterine arteries were isolated and transiently occluded by a vascular clip (Temporary Atraumatic Endo-Vessel Clips, B. Braun Korea, Seoul, Korea).

Approximate 95% of uterine blood flow was blocked under TOUA and furthermore, uterine manipulation and suturing of bleeding site could be safely and easily performed with preservation of the uterus and fertility.

We successfully applied the TOUA technique during cesarean delivery of placenta previa totalis in 2 cases with preservation of the uterus and fertility.

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## Case report

### 1. Case 1

A 31-year-old woman, gravida 4 (P2 A1) with 2 previous vaginal deliveries and 1 spontaneous abortion was transferred to our center due to complete placenta previa at 29+4 weeks of gestational age. The patient had no medical and surgical history. An ultrasound sonogram showed that the placenta had completely covered the internal cervical os. The main portion of the placenta was located in the posterior wall of the uterus. The patient was admitted to our center at 30+5 weeks of gestation age due to preterm labor and vaginal bleeding, where she was treated with tocolytic therapy until 34+0 weeks of gestational age. Elective cesarean delivery was performed under general anesthesia at 37+1 weeks of gestation age. A lower segment transverse incision was made and a live 2,570 g female baby was delivered. Just after cutting the umbilical cord and before detachment and expulsion of the placenta, TOUA with vascular clip was conducted bilaterally within 8 minutes. The placenta was subsequently removed by manual mode. Under TOUA, the uterine incision site and placenta previa bleeding site were sutured safely and operation field could be acquired clearly due to blocking uterine blood flow.

Through transient and sequential release of the vascular clip on each side, we confirmed any further bleeding on operation sites and placental bed site. Finally, after completion of low segment suturing, we removed both vascular clips that occluded uterine arteries transiently.

The 800 mL estimated blood loss was within normal range for routine cesarean delivery. Preoperative hemoglobin was 10.4 g/dL and the patient received 2 units of packed red blood cell intra-operatively. Routine postoperative care was conducted. The hemoglobin was 11.6 g/dL at 2 days after the operation. At 5 days after cesarean delivery, the patient was discharged without any complications.

### 2. Case 2

A 38-year-old woman, gravida 2, with one prior cesarean delivery visited our center at 31+2 weeks of gestational age after having been diagnosed as complete placenta previa at a primary local clinic. One year ago, she had surgical myomectomy under laparoscopy. In our hospital, an ultrasound sonogram showed complete placenta previa and suspicion of placenta accreta. The location of placenta was the anterior wall of uterus. At 34+4 weeks of gestational age, the patient was admitted to our hospital for 2 days with a history of vaginal bleed-

ing. Elective cesarean delivery was performed under general anesthesia. Because of the anterior position of placenta and pelvic adhesion on the low segment of uterus, a classical vertical incision was made to prevent placental tears. A live 2,390 g female baby was delivered. TOUA was conducted immediately after delivery of the baby and the placenta was removed. Manual detachment of the placenta was not clear and easy due to placenta accreta. The bed of accreta was safely sutured to block additional bleeding after releasing TOUA and the vascular clips were removed. The operation time was 60 minutes and the estimated blood loss was 1,000 mL. The preoperative hemoglobin was 10.9 g/dL. During operation, the patients received 2 units of packed red blood cell. The immediate postoperative vital sign was stable and the patient had no active vaginal bleeding before leaving the operation room. The patient received routine postoperative care at a general ward.

After 2 days of surgery, the hemoglobin level was 8.6 g/dL. The patient was discharged at 4 days of the operation without any complications.

## Discussion

Immediate treatment to control postpartum heavy bleeding can rapidly reduce morbidity and mortality. Therefore, a novel and rapid intra-operative therapeutic method to control immediate postpartum heavy bleeding from the uterus is required.

However, most treatment of postpartum heavy bleeding has been performed immediately after the delivery procedure and not in the delivery or operation room, which leads to delayed intervention time. Therefore, for management of delivery with high risk postpartum bleeding, a safe intra-operative method to control complications, especially bleeding, is required.

Placenta previa is the major cause of heavy postpartum bleeding. In most cases of placenta previa, surgeons have to prepare an emergent situation during cesarean delivery of complete placenta previa. But there are few methods to manage intra-operative bleeding safely and immediately.

TOUA is an intra-operative technique to reduce uterine bleeding through bilateral block of uterine arterial blood flow. This technique was previously mentioned in the literature for efficacy and safety [5-7]. The benefits of TOUA during cesarean delivery of placenta previa include intra-operative intervention, reduction of estimated blood loss, high cost effectiveness, and preservation of further fertility. The most important benefit of TOUA is safe suturing of the bleeding site

due to clear operation field. In addition, we can confirm any further bleeding suture sites by repeated release and occlusion of both uterine arteries.

The location of the uterine artery in pregnancy can differ from the usual and the operator may have difficulty in finding the uterine artery. Therefore, the technique of TOUA needs a skillful surgeon.

The 2 patients received routine postoperative care in a general ward without ICU care. To determine the safety and efficacy of TOUA in cesarean delivery of complete placenta previa with or without placenta accreta, a large number of studies are required. Currently, we are conducting an ongoing study on recruited patients.

In conclusion, TOUA during cesarean delivery of placenta previa is a good method to reduce blood loss without any complications.

## Conflict of interest

No potential conflict of interest relevant to this article was reported.

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