

## Case Reports

# Successful management of complete placenta previa after intrauterine fetal death in a second-trimester pregnancy by uterine artery embolization: case report and literature review

**S. Kaku, S. Tsuji, T. Ono, F. Kimura, T. Murakami**

*Department of Obstetrics and Gynecology, Shiga University of Medical Science, Shiga (Japan)*

## Summary

A 27-year-old woman with complete placenta previa was referred at 22 weeks of gestation because of vaginal bleeding and fetal growth restriction. At 24 weeks, sudden fetal death occurred, but bleeding continued and transvaginal sonography revealed abundant periplacental blood flow in the uterine wall. To avoid cesarean section, the authors performed uterine artery embolization (UAE) before vaginal delivery of the fetus. Subsequently, there was little bleeding when laminaria was inserted for cervical ripening and the fetus was delivered vaginally by using vaginal gemeprost. Total blood loss was only 149 ml. The present case suggests that UAE may be an option for patients with placenta previa who desire vaginal delivery after intrauterine fetal death (IUFD) in a second-trimester pregnancy.

**Key words:** Fetal death in utero; Grade IV placenta previa; Transvaginal sonography; Uterine artery embolization; Vaginal delivery.

## Introduction

Cesarean section is generally required for delivery in patients with complete placenta previa. However, there have been several reports about therapeutic termination by vaginal delivery despite the presence of complete placenta previa (Table 1) [1-8]. When vaginal delivery is attempted in patients with complete placenta previa, uncontrollable hemorrhage is the greatest risk [2, 5, 8]. Here the authors report the successful management of a patient with complete placenta previa and intrauterine fetal death (IUFD) in the second trimester, in whom vaginal delivery was achieved with little blood loss after uterine artery embolization (UAE).

## Case Report

A 27-year-old woman (gravida 0) was referred at 22 weeks of gestation with vaginal bleeding and complete placental previa. There was also fetal growth restriction without apparent malformation. After hospitalization, bleeding continued intermittently. Uteroplacental blood flow was investigated by power Doppler ultrasonography using a transvaginal multifrequency probe (5.0-7.5 MHz). This examination revealed that blood flow was abundant (Figure 1a). At 24 weeks of gestation, the patient developed features of chorioamnionitis, followed by sudden fetal death without placental abruption. Therefore, the authors immediately started antibiotic therapy with doripenem (0.5 g infused over 60 min every eight hours). They chose vaginal delivery after careful consultation with the patient because she did not want to undergo ce-

sarean section for evacuation of a dead fetus if it could be avoided.

To avoid exacerbation of intrauterine infection, the conceptus had to be evacuated as soon as possible. Therefore, the authors could not wait for spontaneous cervical ripening. The standard Japanese protocol for evacuation of the conceptus involves inserting a tent of laminaria (a variety of seaweed) on the day before induction and leaving it in the cervix overnight. Because massive bleeding after inserting the laminaria tent for cervical ripening was reported in a patient with placenta previa [8], and transvaginal sonography revealed that blood flow was still abundant in the uterine wall around the placenta despite fetal death (Figure 1b), the authors decided to perform UAE to decrease uterine blood flow before inserting the laminaria tents. Catheters were inserted via the right transfemoral approach using the Seldinger technique, and angiography performed before embolization revealed that most of blood supply to the uterus was uterine artery (Figure 2). Therefore, catheters were advanced selectively into the bilateral uterine arteries, after which embolization was done with absorbable gelatin sponge particles. Following this procedure, vaginal bleeding decreased considerably and uterine blood flow was markedly reduced (Figure 1c). On the next day, the authors inserted laminaria tents for cervical ripening and little bleeding was noted throughout the period from insertion to removal. On the following day (two days after embolization), vaginal delivery of the fetus was achieved using vaginal gemeprost. The total blood loss during delivery was only 149 ml. Two days after delivery (four days after embolization), recovery of uterine blood flow was confirmed by transvaginal sonography. Menstruation resumed at two months after delivery.

Revised manuscript accepted for publication October 12, 2015

Table 1. — Therapeutic termination by vaginal delivery in patients with complete placenta previa.

	Number of patients	Gestational week (mean)	Abortion or spontaneous death	Feticide before termination	Mean days from fetal death to delivery	Cervical ripening method	Delivery method	Number of patients requiring blood transfusion
Halperin <i>et al.</i> [1]	8	19-24 (21.2)	Abortion	No	-	Laminaria	Mechanical evacuation	0
Ruano <i>et al.</i> [2]	9	18-31 (23.2)	Abortion	No	-	Mifepristone	Misoprostol and /or sulprostone	4
Ruano <i>et al.</i> [2]	6	18-27 (21.3)	Abortion	Yes	7	Mifepristone and dilapan	Gemeprost or sulprostone	0
Ruano <i>et al.</i> [3]	1	29	Abortion	Yes	4	NA	NA	0
Borrás <i>et al.</i> [4]	2	21-22 (21.5)	Abortion	Yes	3	Mifepristone	Misoprostol	0
Poret-Bazin <i>et al.</i> [5]	1	28	Abortion	Yes	6	Mifepristone	Misoprostol	1
Sillender <i>et al.</i> [6]	1	22	Spontaneous death	-	1	Mifepristone	Misoprostol	0
van der Ploeg <i>et al.</i> [7]	2	23-33 (28.0)	Spontaneous death	-	17	None	Oxytocin or spontaneous labor	0
Taki <i>et al.</i> [8]	1	23	Spontaneous death	-	21	Laminaria	Gemeprost	1
Present case	1	24	Spontaneous death	-	2	Laminaria	Gemeprost	0

NA: not available.

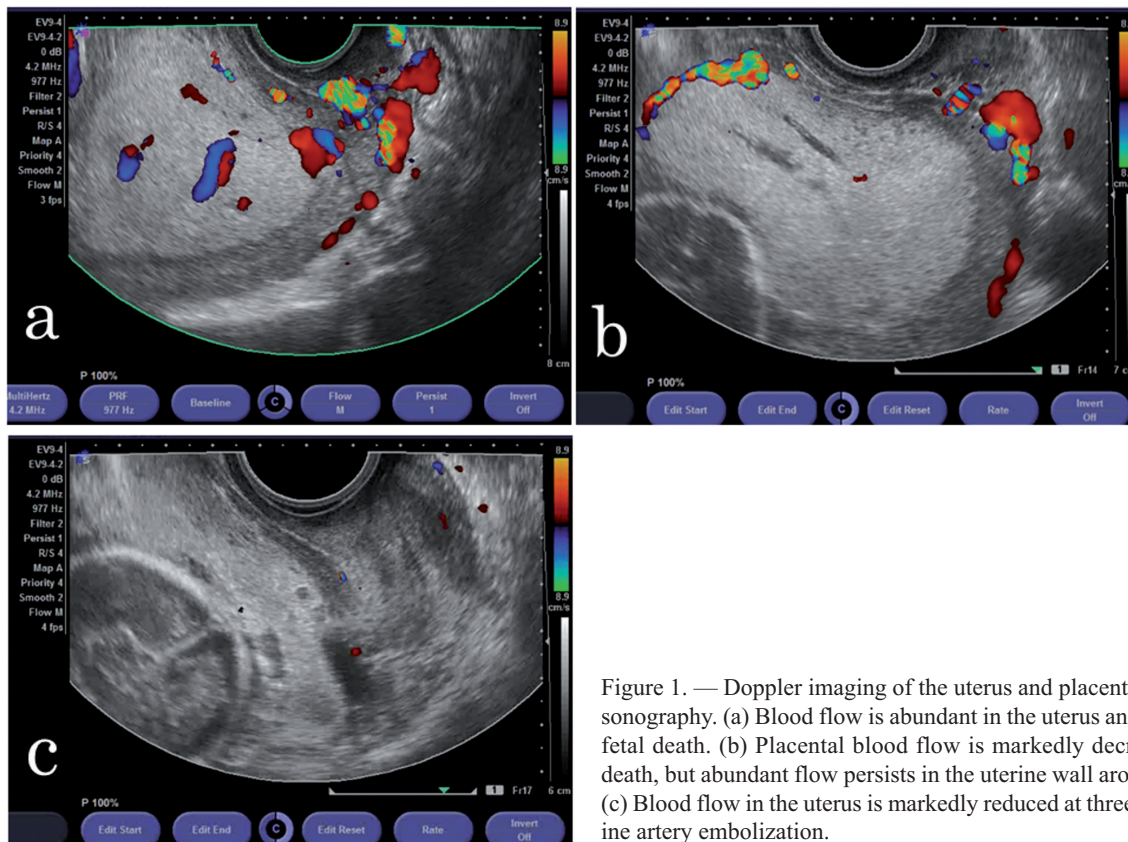


Figure 1. — Doppler imaging of the uterus and placenta by transvaginal sonography. (a) Blood flow is abundant in the uterus and placenta before fetal death. (b) Placental blood flow is markedly decreased after fetal death, but abundant flow persists in the uterine wall around the placenta. (c) Blood flow in the uterus is markedly reduced at three hours after uterine artery embolization.

## Discussion

In women with complete placenta previa, there have been several reports about therapeutic termination by vaginal delivery (Table 1) [1-8], but uncontrollable hemorrhage is the greatest risk when vaginal delivery is attempted [2, 5, 8]. Some authors have reported that performing feticide before

induction of labor is effective for decreasing blood loss in women with complete placenta previa [2-5], but there have also been reports of uncontrollable hemorrhage after feticide or IUFD [5,8]. A laminaria tent or mifepristone is often used to promote cervical ripening [1, 2, 4-6, 8], but the authors could not have used mifepristone because it is not approved in Japan. Taki *et al.* reported severe hemorrhage

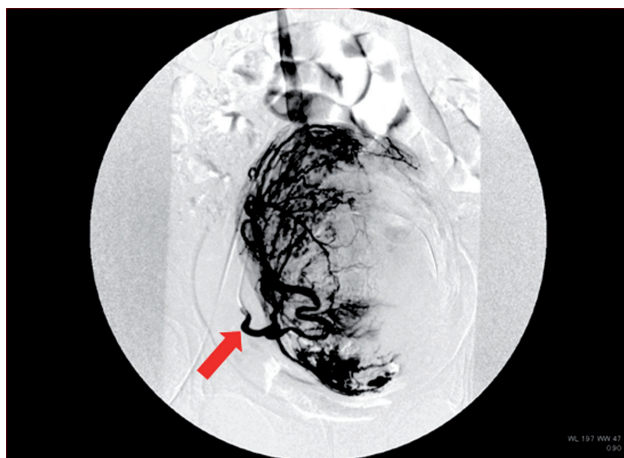


Figure 2. — Angiography via the right uterine artery demonstrates that the uterine artery provides the majority of blood supply to the uterus (red arrow: uterine artery).

soon after removal of a laminaria tent that had been inserted for cervical ripening, suggesting that the tent may cause placental separation [8], therefore the present authors decided to perform UAE before attempting cervical ripening. After UAE, uterine blood flow showed a marked decrease and cervical ripening with laminaria followed by delivery and were achieved safely with little bleeding due to the effect of embolization.

When UAE is performed, we need to consider both the potential complications and the possibility of an insufficient hemostatic effect because of collateral blood supply to the uterus. Various complications of UAE have been reported due to embolic material entering other arteries, including transient buttock ischemia and pelvic abscess [9, 10]. Accordingly, the present authors considered performing selective UAE to reduce the risk of complications. It has been reported that collateral blood supply develops to the pregnant uterus [11], but internal iliac artery angiography before embolization revealed that the uterine artery accounted for most of the blood supply to the uterus even though the patient was in week of 24 gestation. Therefore, the authors performed selective UAE and obtained a marked decrease of uterine blood flow without any complications.

Because the present patient was a primigravida, the authors used absorbable gelatin sponge particles instead of permanent embolic material in order to preserve uterine function for future pregnancy. Uterine blood flow recovered by four days after UAE and menstruation resumed by

two months after delivery, therefore this temporary embolization method was effective in the present patient.

In conclusion, the present case suggests that UAE can be employed to allow early vaginal delivery with little blood loss in patients with placenta previa who desire vaginal delivery after intrauterine fetal death in a second-trimester pregnancy.

## References

- [1] Halperin R., Vaknin Z., Langer R., Bukovsky I., Schneider D.: "Late midtrimester pregnancy termination in the presence of placenta previa". *J. Reprod. Med.*, 2003, 48, 175.
- [2] Ruano R., Dumez Y., Cabrol D., Dommergues M.: "Second- and third-trimester therapeutic terminations of pregnancy in cases with complete placenta previa--does feticide decrease postdelivery maternal hemorrhage?". *Fetal Diagn. Ther.*, 2004, 19, 475.
- [3] Ruano R., Kondo M.M., Bunduki V., Rodeck C., Zugaib M.: "Follow-up of uteroplacental vascularization after feticide in third-trimester therapeutic termination of pregnancy with complete placenta previa". *Ultrasound Obstet. Gynecol.*, 2006, 27, 463.
- [4] Borrás A., Gómez O., Sanz M., Martínez J.M., Puerto B.: "Feticide followed by mifepristone-misoprostol regimen for midtrimester termination of pregnancy in two cases of complete placenta previa". *Fetal Diagn. Ther.*, 2010, 28, 114.
- [5] Poret-Bazin H., Simon E.G., Bleuzen A., Dujardin P.A., Patat F., Perrotin F.: "Decrease of uteroplacental blood flow after feticide during second-trimester pregnancy termination with complete placenta previa: quantitative analysis using contrast-enhanced ultrasound imaging". *Placenta*, 2013, 34, 1113.
- [6] Sillender M., Krishnamurthy S.: "Medical management of second trimester fetal death complicated by a complete placenta praevia". *J. Obstet. Gynaecol.*, 2000, 20, 537.
- [7] van der Ploeg J.M., Schutte J.M., Pelinck M.J., Huisjes A.J., van Roosmalen J., de Vries J.I.: "Management of fetal death after 20 weeks of gestation complicated by placenta previa". *J. Matern. Fetal Neonatal Med.*, 2007, 20, 267.
- [8] Taki M., Sato Y., Kakui K., Tatsumi K., Fujiwara H., Konishi I.: "Management of fetal death with placenta previa". *J. Matern. Fetal Neonatal Med.*, 2012, 25, 196.
- [9] Badawy S.Z., Etman A., Singh M., Murphy K., Mayelli T., Philadelphia M.: "Uterine artery embolization: the role in obstetrics and gynecology". *Clin. Imaging*, 2001, 25, 288.
- [10] Al-Thunyan A., Al-Meshal O., Al-Hussainan H., Al-Qahtani M.H., El-Sayed A.A., Al-Qattan M.M.: "Buttock necrosis and paraplegia after bilateral internal iliac artery embolization for postpartum hemorrhage". *Obstet. Gynecol.*, 2012, 120, 468.
- [11] Mounts K.O., Worrell M.B., Boyle D.W.: "Collateral arterial blood supply to the pregnant uterus in the sheep". *J. Anat.*, 1995, 187, 191.

Corresponding Author:

S. KAKU, M.D., Ph.D.

Department of Obstetrics and Gynecology

Shiga University of Medical Science

Tsukinowa-cho, Seta, Otsu

Shiga 520-2192 (Japan)

e-mail: kaku@belle.shiga-med.ac.jp