

Pregnancy Complicated with Maternal Pulmonary Hypertension and Placenta Accreta

Jeng-Hsiu Hung*

*Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, and
National Yang-Ming University School of Medicine, Taipei, Taiwan, R.O.C.*

Pregnancy is contraindicated in cases of maternal pulmonary hypertension, a highly morbid disease affecting young women of childbearing age. The rate of heart failure increases gradually with the severity of pulmonary hypertension. In certain instances, the severity of maternal pulmonary hypertension in rheumatic heart diseases can be higher than in congenital heart diseases. Placenta accreta is an important cause of bleeding in the second half of pregnancy and in labor. In severe cases, hysterectomy is the only way to manage the bleeding during cesarean section. A 33-year-old gravida, G2P0AA1, suffering from rheumatic heart disease with mitral valve stenosis and pulmonary hypertension, was referred to our high-risk pregnancy center at 10⁺³ weeks of gestation due to lower abdominal pain and brownish vaginal bleeding. She had received 2 mitral valve replacements in Shenzhen, China, at the ages of 22 and 26, respectively. Ultrasound scan of the abdomen at 12⁺² gestational weeks showed that the internal cervix was completely covered with the placenta, and a retroplacental hypoechoic space measuring 35 × 13 mm was observed at the upper posterior margin of the placenta. On color Doppler scan, an area of lacunar lake flow was observed in the hypoechoic space of the placenta and a spiral artery with low blood flow resistance was detected. The pulsation of the placental flow was synchronized with the maternal pulse rate. Team specialists, including neonatologists, pulmonary physicians, pediatric cardiologists, hematologists, anesthesiologists, psychiatrists and social workers, as well as high-risk obstetricians were consulted in an effort to minimize fetal and maternal morbidity and mortality. At 29⁺² weeks, the patient developed preeclampsia and delivered a healthy newborn by cesarean section, the uterus being preserved by square compression sutures. The gravida tolerated the procedures and was discharged in stable condition. [*J Chin Med Assoc* 2007;70(6):257–259]

Key Words: placenta accreta, preeclampsia, pulmonary hypertension, rheumatic heart disease

Introduction

Pregnancy is contraindicated in cases of maternal pulmonary hypertension, a highly morbid disease affecting young women of childbearing age. The rate of heart failure increases gradually with the severity of pulmonary hypertension. In certain instances, the severity of maternal pulmonary hypertension in rheumatic heart diseases can be higher than in congenital heart diseases.¹

Placenta accreta is an important cause of bleeding in the second half of pregnancy and in labor. In severe cases, hysterectomy is the only way to manage the bleeding during cesarean section. Reported here is a case of pulmonary hypertension combined with placental accreta, which was diagnosed at 10⁺³ weeks.

The gravida was treated with tocolytic and anticoagulant therapies. At 29⁺² weeks, she developed preeclampsia and delivered a healthy newborn by cesarean section, the uterus being preserved by square compression sutures. The gravida tolerated the procedures and was discharged in stable condition.

Case Report

A 33-year-old gravida, G2P0AA1, suffering from rheumatic heart disease with mitral valve stenosis and pulmonary hypertension, was referred to our high-risk pregnancy center at 10⁺³ weeks of gestation due to lower abdominal pain and brownish vaginal bleeding.

*Correspondence to: Dr Jeng-Hsiu Hung, Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, 201, Section 2, Shih-Pai Road, Taipei 112, Taiwan, R.O.C.
E-mail: jhhung@vghtpe.gov.tw • Received: December 26, 2006 • Accepted: March 3, 2007

She had received 2 mitral valve replacements in Shenzhen, China, at the ages of 22 and 26, respectively. Ultrasound scan of the abdomen at 12⁺² gestational weeks showed that the internal cervix was completely covered with the placenta, and a retroplacental hypoechoic space measuring 35 × 13 mm was observed at the upper posterior margin of the placenta. On color Doppler scan, an area of lacunar lake flow was observed in the hypoechoic space of the placenta and a spiral artery with low blood flow resistance was detected. The pulsation of the placental flow was synchronized with the maternal pulse rate. Team specialists, including neonatologists, pulmonary physicians, pediatric cardiologists, hematologists, anesthesiologists, psychiatrists and social workers, as well as high-risk obstetricians were consulted in an effort to minimize fetal and maternal morbidity and mortality.

Anticoagulant therapy with warfarin was changed to enoxaparin with 4,000 antiXa IU/qd. Echocardiography of the gravida revealed severe tricuspid regurgitation, mild pulmonary regurgitation, left ventricular dilatation with preserved left ventricular systolic function, marked dilated atria, incomplete closure of tricuspid valves and prosthetic mitral valve with mild transvalvular regurgitation. The left ventricular ejection fraction (LVEF) was 47%, while the right ventricular systolic pressure (RVSP) was 46 mmHg with mild pulmonary hypertension. With New York Heart Association (NYHA) function class II, the gravida had been treated with tocolytic agents (magnesium sulfate and nifedipine) and anticoagulant until 29⁺² gestational weeks, when she began developing superimposed preeclampsia.

The gravida also experienced edema in both legs, increased blood pressure (as high as 150/95 mmHg) and decreased urine output. Repeated echocardiography showed LVEF was 54%, with the RVSP at 48 mmHg. Under the impressions of (1) pregnancy at 29⁺² gestational weeks with total placenta previa and placenta accreta, and superimposed preeclampsia, (2) rheumatic heart disease with mitral valve stenosis s/p with 2 mitral prosthetic valve replacements under anticoagulant therapy, (3) pulmonary hypertension with NYHA function advancing from class II to class III, and (4) anemia, cesarean section was performed under general anesthesia. The female neonate, weighing 1,214 g, had Apgar scores of 2, 5 and 10 at 1, 5 and 10 minutes, respectively. The placenta weighed 380 g, with an area measuring 3 × 4 cm protruding into the muscular layer of the posterior uterine wall, which was manually dissected from the uterine wall. Active bleeding ensued, and 3 square compression sutures with Vicryl were applied through the uterus. Bilateral ascending branches of

the uterine arteries were also ligated. The bleeding was controlled, and the uterus was preserved. The pathology of the uterine biopsy confirmed placenta accreta. The gravida recovered smoothly after delivery, her blood pressure returned to normal, and pitting edema subsided thereafter.

The newborn was immediately admitted to our neonatal intensive care unit and oral endotracheal tubing with high frequency oscillatory ventilation (HFOV) was administered to prevent respiratory failure. Chest X-rays showed initial respiratory distress syndrome with grade III changes that later improved in response to the HFOV. Dopamine was given for hypotension. Oral prophylactic indomethacin was used for 5 days. The newborn's respiratory condition improved, and extubation was performed on the 3rd postnatal day. Orogastric tube feeding with minimal amounts of formula for prematurity began on the 5th postnatal day, and total parenteral nutrition started on the 26th postnatal day. The newborn tolerated the feeding quite well. A right inguinal hernia was found and bilateral high ligations were performed on the 26th neonatal day. During hospitalization, erythropoietin was also prescribed to control neonatal anemia. Ophthalmic examinations of retinal functions were all normal. The infant was discharged on the 68th postnatal day with body weight of 2,110 g and oral feeding 40 mL q 3 hours.

Discussion

In patients with pulmonary hypertension, pregnancy can be associated with a high risk of maternal death. The use of iloprost, a prostacyclin analog, during pregnancy has been reported.² In our case, the patient was admitted as early as 10⁺³ weeks of gestation for intensive monitoring of her cardiopulmonary function. The mild pulmonary hypertension was not exaggerated during the course of pregnancy that ended at 29⁺² weeks of gestation. The pulmonary hypertension produced by rheumatic heart disease seemed tolerable during the pregnancy before 29 weeks of gestation, when the plasma volume had not sharply increased. The RVSP did not increase during the course of this pregnancy.

Pulmonary hypertension is a progressive and fatal disease characterized by elevation of pulmonary vascular resistance and right heart failure.³ The optimal method to anesthetize patients with pulmonary hypertension for cesarean section is controversial but depends on the severity of the disease in individual cases. Most reports describing successful management of such patients utilized epidural anesthesia.⁴ All pulmonary

hypertension patients described in these reports exhibited a normal cardiac output in the preoperative period and lowering pulmonary artery pressure following the administration of vascular dilators or nitric oxide inhalation.³ General anesthesia is also of potential use for pulmonary hypertension patients.⁵ Since the patient in this report exhibited superimposed preeclampsia and cardiac function advancing to NYHA III in the preoperative period, general anesthesia was used for the delivery of the newborn.

The majority of cases of placenta accreta are unanticipated and initially identified intraoperatively. Color Doppler ultrasound is adequate for the evaluation of placenta in the first trimester of pregnancy.⁶ Placenta accreta with intraplacental lacunae can be identified by detecting the spiral artery waveform in the lacunae of the placenta together with a loss of the hypoechoic retroplacental myometrial zone. Based on these findings, placenta accreta can be found in the first trimester and termination of pregnancy can be denied at an early gestational stage.

Placenta accreta is characterized by placental villi abnormally adherent to or invading the myometrium. This patient had been suffering from rheumatic heart disease and pulmonary hypertension for 11 years. On room air, the pulse oximeter showed oxygen saturation of 95.5% when she was first admitted at 12 gestational weeks. The occurrence of the total placenta previa and placenta accreta may be associated with the previous dilatation and curettage for the patient's abortion and the state of constant low oxygen saturation, resulting from her pulmonary hypertension.

Several surgical methods have been advocated to reduce hemorrhage during surgery for placenta accreta. One protocol initially advocated placing angiographic equipment in the operating room, and inserting a femoral artery catheter in order to facilitate angiographic embolization of the uterine arteries in case of hemorrhage.⁷ But this did not appear to reduce either bleeding or the need for hysterectomy. Internal iliac vessel ligation was also described as a technique for reducing hemorrhage prior to delivering the placenta.⁷ Failure to use this technique may contribute to maternal mortality.⁸ In our case, the major part of myometrial invasion of the placenta accreta was located at the posterior lower part of the uterus. This led to the possibility of applied rectangular compression sutures for stopping hemorrhage after removing the placenta during cesarean section.

Uterine compression sutures, such as B-Lynch-type uterine compression sutures, have been reported as an alternative to hysterectomy for severe postpartum hemorrhage with a good success rate.⁹ In our case, we

used multiple square sutures with absorbable Vicryl placed through the uterus.¹⁰ No uterine synechia was found postpartum. This case report suggests that in a high-risk pregnancy complicated with placenta accreta and pulmonary hypertension, the continuity of a pregnancy detected in the first trimester of pregnancy is an encouraging option, even though it is very risky, with maternal death rate between 30% and 50%.¹¹

This case report suggests that although a pregnancy complicated with both maternal pulmonary hypertension and placenta accreta is complex and risky, it need not be given up.

Acknowledgments

This study was supported by research grants from the National Science Council (NSC94-2314-B-075-014) and Taipei Veterans General Hospital (V95C1-017), Taipei, Taiwan, R.O.C.

References

1. Lin JH, Zhao WX, Su Y, Shi J, Jiang GJ, Wu ZM. Perinatal management and pregnancy outcome in pregnant women with pulmonary hypertension complicating cardiac disease. *Zhonghua Fu Chan Ke Za Zhi* 2006;41:99-102.
2. Elliot CA, Stewart P, Webster VJ, Mills GH, Hutchinson SP, Howarth ES, Bu'Lock FA, et al. The use of iloprost in early pregnancy in patients with pulmonary arterial hypertension. *Eur Respir J* 2005;26:168-73.
3. Hsieh SP, Wang JS, Tsui CY, Liu HC. Plexogenic pulmonary vascular lesions in primary pulmonary arteriopathy—report of two autopsy cases. *J Chin Med Assoc* 1990;45:134-8.
4. Duggan AB, Katz SG. Combined spinal and epidural anaesthesia for caesarean section in a parturient with severe primary pulmonary hypertension. *Anaesth Intensive Care* 2003;31:565-9.
5. Decoene C, Bourzoufi K, Moreau D, Narducci F, Crepin F, Krivosic-Horber R. Use of inhaled nitric oxide for emergency Cesarean section in a woman with unexpected primary pulmonary hypertension. *Can J Anesth* 2001;48:584-7.
6. Chen YJ, Wang PH, Liu WM, Lai CR, Shu LP, Hung JH. Placenta accreta diagnosed at 9 weeks' gestation. *Ultrasound Obstet Gynecol* 2002;19:620-2.
7. O'Brien JM, Barton JR, Donaldson ES. The management of placenta accreta: conservative and operative strategies. *Am J Obstet Gynecol* 1996;175:1632-8.
8. Weiniger CF, Elram T, Ginosar Y, Mankuta D, Weissman C, Ezra Y. Anaesthetic management of placenta accreta: use of a preoperative high and low suspicion classification. *Anaesthesia* 2005;60:1079-84.
9. Smith KL, Baskett TF. Uterine compression sutures as an alternative to hysterectomy for severe postpartum hemorrhage. *J Obstet Gynaecol Can* 2003;25:197-200.
10. Wu HH, Yeh GP. Uterine cavity synechiae after hemostatic square suturing technique. *Obstet Gynecol* 2005;105:1176-8.
11. Warnes CA. Pregnancy and pulmonary hypertension. *Int J Cardiol* 2004;97:11-3.