

General Anesthesia for Cesarean Section in a Parturient with Quintuplet Pregnancy

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Recently, the incidence of multiple pregnancy has increased due to the use of induction agent of ovulation or gamete intrafallopian transfer (GIFT) for the treatment of infertility^{1,2}. The maternal complications may include premature labor, preeclampsia, thrombocytopenia, abruptio placenta and so on, and require urgent delivery by Cesarean section. Therefore, the anesthetic risks presented by multiple pregnancy are high for both mother and premature fetuses. The anesthetic management has extensively been discussed but there has been no ideal method of obstetric anesthesia for Cesarean section of multiple pregnancy². In this paper, we present a case of a parturient with a quintuplet pregnancy who underwent Cesarean section under general anesthesia, and we discuss the anesthetic methods for Cesarean section of multiple pregnancy.

Case Report

A 29-year-old woman with a quintu-

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plet pregnancy of 16 weeks' gestation was admitted to the maternity unit to undergo Shirodkar procedure due to an incompetent cervix. She had undergone GIFT as the treatment of choice for unexplained infertility. At 24 weeks' gestation, ritodrine therapy was begun to prevent premature labor. The obstetric-anesthetic-pediatric team was formed to cope with the quintuplet delivery.

At 27 weeks, antithrombin III therapy was begun to prevent the occurrence of disseminated intravascular coagulation (DIC), as the patient had showed low plasma concentration of antithrombin III, high concentration of fibrin degradation products (FDPs) and thrombocytopenia.

At 28 weeks, she developed hypertension, tachycardia, severe peripheral edema, macrohematuria, oliguria and upper abdominal tenderness. Her hemoglobin was 9.3g%, platelet count was 95,000 mm⁻³ and FDPs were between 40 to 80 µg·litre⁻¹ (normal value < 10 µg·litre⁻¹). It was decided to proceed to Cesarean section within a 6 hr period. She was given famotidine 20 mg i.v. one hour before surgery. After the arrival of the patient in the operating room, a central venous catheter was inserted. Indirect arterial blood pressure, continuous ECG,

Table 1. Neonatal conditions

No.	1.	2.	3.	4.	5.
Sex	M	M	F	F	M
Time of delivery	15:22	15:23
Apgar score					
one minute	6	6	4	3	6
five minutes	8	8	7	7	8
Weight (g)	1360	1105	1130	1220	1125
Result	alive

pulse oximetry and urinary output were monitored. Anesthesia was induced with thiopental 250 mg and she was administered oxygen through a face mask without ventilation. Intubation was facilitated by the administration of succinylcholine 40 mg i.v., and cricoid pressure was maintained until the cuff of the tracheal tube was inflated. Anesthesia was maintained with 4 $l \cdot \text{min}^{-1}$ of nitrous oxide and 2 $l \cdot \text{min}^{-1}$ of oxygen without any volatile anesthetic agent under controlled ventilation. Three male and two female infants were delivered, weighing 1,105 to 1,360 g (table 1). Following delivery, pentazocine 30 mg, diazepam 5 mg and vecuronium 4 mg were given intravenously. Blood pressure was stable during the surgery.

Nitrous oxide was switched off when the surgery was completed. Immediately after extubation, the value of oxygen saturation dropped from 97% to 95% in spite of inhalation of 100% oxygen through a face mask. She was continued to be monitored within the obstetric ward. Monitoring included direct arterial blood pressure, ECG, pulse oximetry, central venous pressure and urinary output. The patient was given 5 $l \cdot \text{min}^{-1}$ of oxygen and furosemide 20 mg was administered intravenously. After that the pH was 7.378, PaCO_2 33.8 mmHg and PaO_2 131 mmHg. The second dose of furosemide 20 mg was administered with improvement of hematuria and oliguria.

Nicardipine was continuously infused at a rate of 2 $\mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ to lower the systolic blood pressure within a normal range. Six units of platelet were administered immediately after surgery to increase the platelet count. On the 5th postoperative day, all monitors were taken off. The patient made an uncomplicated recovery and was discharged from the hospital on the 20th postoperative day.

Discussion

The newer reproductive technologies have resulted in a higher incidence of multiple pregnancy^{1,2}. Cetrulo et al.³ reported that quintuplet pregnancy is predicted at the rate of 90⁴. The incidence of complications and the risk of perinatal mortality in multiple pregnancy are higher than singleton pregnancy. These have increased the complexity for the management of multiple pregnancy, especially in the area of caring for more than triplet pregnancy. The rate of Cesarean section has increased dramatically for multiple pregnancy, and recent surveys reported a 90–95% Cesarean section rate for triplet pregnancies⁴. We think that Cesarean section is preferable in cases of more than triplet pregnancy, because the combination of Cesarean section and intensive care of lower birth weight infants has reportedly improved the survival rate of both mother and infants. But the reports of multiple pregnancy have mostly been based on

Table 2. The advantages and disadvantages of general and epidural anesthesia for more than triplet pregnancies

Advantages of general anesthesia
unconsciousness
prevention of atelectasis and hypoxemia
Disadvantages of general anesthesia
aspiration of gastric contents
hypotension
postpartal uterine bleeding
neonatal respiratory and central nervous system depression
Advantages of epidural anesthesia
less postoperative nausea and vomiting
Disadvantages of epidural anesthesia
preservation of consciousness
prolonged aortocaval compression
prolonged hypotension
fetal distress
epidural hematoma

twin pregnancy⁵⁻⁷.

Maternal complications with multiple pregnancy include pregnancy-induced hypertension, premature labor, anemia, toxemia, pre-eclampsia, abruptio placenta, polyhydramnion, coagulopathy, thrombocytopenia, hemorrhage and HELLP syndrome⁸. The increases in tidal volume, plasma volume and red cell mass, cardiac output, glomerular filtration rate, total body water and body weight are seen as maternal physiologic changes during multiple pregnancy². After delivery, the mother is at high-risk of developing pulmonary edema, acute renal failure and liver rupture^{8,9}.

Lower birth weight of infants is the major cause of elevated perinatal mortality in multiple pregnancy. As the number of fetuses increases, each birth weight decreases. Fetal complications include growth retardation, abnormal presentation, congenital malformation, premature rupture of membrane and prolapse of the umbilical cord. Hyaline membrane disease, hypoglycemia, hypocalcemia and hyperbilirubinemia

are more common as neonatal complications in multiple pregnancy⁵. The perinatal mortality for twin pregnancy is approximately 15%, five times that for singletons, and the perinatal mortality for multiple pregnancy of higher fetal number is correspondingly increased³.

In this situation, the mother may be unhappy at the prospect of being awake during the surgery. Therefore, general anesthesia may be preferable in this case due to the high-risk nature of the procedure. The advantages and disadvantages of general and epidural anesthesia for more than triplet pregnancy are shown in table 2. A parturient with more than triplet pregnancy is at high-risk for marked respiratory distress. General anesthesia with positive pressure ventilation would minimize airway closure with atelectasis and hypoxemia¹⁰. Mortality associated with general anesthesia is influenced by the occurrence of regurgitation of gastric contents. The use of H₂-receptor antagonists provides a method for controlling both gastric

volume and pH. Rapid-sequence induction of anesthesia is achieved by i.v. injection of thiopental followed by succinylcholine, and a patient is intubated orally. Cricoid pressure must be applied to prevent aspiration of gastric contents. After endotracheal intubation, the stomach is emptied by using a gastric tube.

0.5% MAC of volatile agent is often used in operative delivery of singleton or twin pregnancies. But this concentration may not be safe for more than triplet pregnancy. In this situation, the birth weight of each fetus is lower. In addition the premature infant is more sensitive to drug depression than the term fetus¹¹. Therefore the premature infant of lower birth weight may develop severe respiratory and central nervous system depressions. Also the volatile agent may produce maternal hypotension and postpartal uterine bleeding. We did not use any volatile agent, and a modified neuroleptanesthesia (NLA) with vecuronium was used after delivery. The arterial blood pressure was stable during the operation. The patient did not report awareness with recall associated with general anesthesia for Cesarean section¹².

Epidural anesthesia has many advantages when the Cesarean section is performed for singleton or twin pregnancies. But in cases of more than triplet pregnancy the total body weight of fetuses is heavier than singleton pregnancy. Therefore the more enlarged uterus increases the likelihood of aortocaval compression and hypotension when epidural anesthesia is performed. This may result in marked fetal distress. Maternal and fetal mortality rates may increase remarkably. A parturient with multiple pregnancy is likely to develop coagulopathy or thrombocytopenia. Platelet count is significantly lower and bleeding time significantly prolonged in patients with pre-eclampsia¹³. These situations are

a contraindication to epidural anesthesia because of epidural hematoma formation leading to spinal cord compression and neurologic complications. However the safe platelet count limit is indistinct^{14,15}.

In conclusion, we consider that general anesthesia is a preferable choice for more than triplet pregnancy.

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References

1. Murdoch AP, Harris M, Mahroo M, et al: Is GIFT (gameta intrafallopian transfer) the best treatment for unexplained infertility? *Br J Obstet Gynaecol* 98:643-647, 1991
2. Mueller-Heubach E: Complications of multiple gestation. *Clin Obstet Gynecol* 27:1003-1013, 1984
3. Cetrulo CL, Ingardia CJ, Sbarra AJ: Management of multiple gestation. *Clin Obstet Gynecol* 23:533-547, 1980
4. Børlum K-G: Third-trimester fetal death in triplet pregnancies. *Obstet Gynecol* 77:6-9, 1991
5. Ho SK, Wu PYK: Perinatal factors and neonatal morbidity in twin pregnancy. *Am J Obstet Gynecol* 122:979-987, 1975
6. Medearis AL, Jonas HS, Stockbauer JW, et al: Perinatal deaths in twin pregnancy: A five-year analysis of statewide statistics in Missouri. *Am J Obstet Gynecol* 134:413-421, 1979
7. Redick LF: Anesthesia for twin delivery. *Clin Perinatol* 15:107-122, 1988
8. Patterson KW, O'Toole DP: HELLP syndrome: A case report with guidelines for diagnosis and management. *Br J Anaesth* 66:513-515, 1991
9. Crosby ET, Elliott RD: Anaesthesia for Cesarean section in a parturient with quintuplet gestation, pulmonary oedema and thrombocytopenia. *Can J Anaesth* 35:417-421, 1988
10. Craft JB, Levinson G, Shnider SM: Anaesthetic considerations in Cesarean section for quadruplets. *Can Anaesth Soc J* 25:236-239, 1978
11. Dewan DM: Anesthesia for preterm delivery, breech presentation, and

- multiple gestation. *Clin Obstet Gynecol* 30:566-578, 1987
12. Lyons G, MacDonald R: Awareness during Cesarean section. *Anaesthesia* 46:62-64, 1991
 13. Ramanathan J, Sibai BM, Vu T, et al: Correlation between bleeding times and platelet counts in women with preclampsia undergoing cesarean section. *Anesthesiology* 71:188-191, 1989
 14. Rolbin SH, Abbott D, Musclow E, et al: Epidural anesthesia in pregnant patients with low platelet counts. *Obstet Gynecol* 71:918-920, 1988
 15. Hew-Wing P, Rolbin SH, Hew E, et al: Epidural anaesthesia and thrombocytopenia. *Anaesthesia* 44:775-777, 1989