Case Report

**Total intravenous anesthesia for cesarean section in a patient with corrected transposition of the great arteries with etomidate and remifentanil**

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**ABSTRACT**

We report anesthetic management of a 34 years old, term pregnant woman, for elective cesarean section, who had congenitally corrected transposition of the great arteries (CCTGA), associated with severe pulmonary stenosis and severe tricuspid regurgitation. We used etomidate, remifentanil and cisatracurium as Total Intravenous Anesthesia with invasive hemodynamic monitoring. The postoperative course was uneventful, and the patient was discharged from the hospital on the second postoperative day. (Rawal Med J 2008;33:123-125).

**Key words:** TIVA, cesarean section, corrected transposition of the great arteries, etomidate, remifentanil.

**INTRODUCTION**

There is an increase in the numbers of pregnant individual with serious congenital heart disease. In such pregnancies, anesthetic management for labor or cesarean section (CS) is challenging. Congenitally corrected transposition of the great arteries (CCTGA) is a rare congenital heart disease, comprising less than 0.5-1% of all forms
of congenital heart disease.\(^1\) Double discordance (atrioventricular and ventriculoarterial discordance), results in a physiologically corrected circulation, but the left ventricle supports the pulmonary circulation and the right ventricle supports the systemic circulation. Isolated CCTGA without other cardiac malformations are rare, only about 1-15% of all cases. Many kinds of other cardiac malformations are associated with CCTGA.\(^1\) The natural history and clinical presentation of CCTGA patients depends on the presence and severity of associated cardiac lesions and normal lifespan was reported.\(^2\) Anesthetic management of the patient with CCTGA depends on its severity and coordination with cardiologist is helpful. In this report, we present a pregnant woman with CCTGA associated with severe PS, severe tricuspid regurgitation (TR) and reduced RV systolic function managed with total intravenous anesthesia (TIVA) using etomidate and remifentanil.

**CASE PRESENTATION**

Patient was a 34 years old, pregnant (38 weeks) woman, G2P1, with CCTGA, associated with severe PS, severe TR and systemic ventricular dysfunction. She was referred for elective cesarean section in our heart hospital. She had a previous cardiac surgery (atrioventricular septal defect closure) and cesarean section (CS), 21 and 11 years ago respectively. She was taking ferrous sulfate, folic acid, aspirin, heparin and multivitamin. She was asyanotic, with moderate orthopoea and palpitation. Her weight was 82kg, height 164cm, BP 150/90mmHg, Heart Rate 80/minute and Respiratory Rate of 16. Fetus was 38-39 weeks, in good condition. ECG showed normal sinus rhythm. Transthoracic echocardiographic revealed congenitally corrected TGA, severe valvar pulmonary stenosis, reduced systemic ventricular function, moderate to severe left side AV valve regurgitation and occasional right to left small shunt. There was not any abnormality in laboratory tests.
Anesthesia was induced with etomidate 14mg, remifentanil 120µg and cisatracurium 14mg, applying Sellick's maneuver. After tracheal intubation, anesthesia maintained with remifentanil infusion (2-3 µg/kg/min), with target of maintaining SBP about 120-130mmHg. Operation was completed with good newborn and patient outcome, without any cardiac events during surgery. Also tubal legation performed. The newborn was a male, 3050g with 9/10 APGAR score in first and fifth minutes, respectively. Post delivery, midazolam 2mg, oxytocine 30mg and antibiotic were administrated. At the end of operation, incision was infiltrated with 12ml of bupivacaine 0.25%. Totally 1200ml crystalloid fluid was administrated during surgery. She was discharged from the hospital on the second postoperative day.

**DISCUSSION**

Few patients with CCTGA live past 50 years, with the median age of death at 40 years. The cause of death is usually heart failure, resulting from the inadequacy of right ventricle to support the systemic circulation. CCTGA is usually diagnosed in late childhood or early adulthood, it can be diagnosed prenatally. Patients traditionally present with heart failure or heart block but other common presenting characteristics include single loud second heart sound, heart murmur, cyanosis, bradycardia and tachyarrhythmia. The gold standard tool for diagnosis is transesophageal echocardiography (TEE). Complete heart block is a common finding. Pregnant patients with CCTGA have right ventricles that are already stressed due to the physiological changes of pregnancy and any additional stress may precipitate to heart failure.

Different anesthetic methods were used for labor or cesarean section in these patients. Epidural analgesia (low dose of local anesthetic augmented with opioid, Opioid-only) and continuous spinal analgesia also were used in labor successfully.
blockade can provides a more gradual onset of block, thus allowing more precise control over the patient’s blood pressure while providing adequate pain relief in C/S. Continuous epidural anesthesia was usually considered the best anesthetic method for complicated patients and it was also used safely for C/S in CCTGA. Takasusuki et al used general anesthesia (using anesthesia induction with thiamylal, vecuronium and fentanyl, and maintenance with oxygen-air-isoflurane), for elective cesarean section in CCTGA with mitral insufficiency. Tsuda et al used midazolam and fentanyl for induction and sevoflurane and fentanyl for maintenance of anesthesia, in emergency CS, but dopamine and dobutamine were needed to support blood pressure and cardiac function. Kawano et al used combined general anesthesia (induction with thiamylal and maintenance with propofol infusion that supplemented by isoflurane) and continuous epidural anesthesia for elective CS. We tried to maintain our patient in a euvoletic state. Using direct arterial, central venous pressure monitoring and arterial blood gas/electrolites with other basic monitoring (continuous pulse oximetry, ECG and ETco2) could help us to provide an optimal fluid therapy. The patient’s arterial blood pressure never fell below 120mmHg or exceed over 140mmHg. Invasive hemodynamic monitoring in operative room and ICU and pulmonary artery catheter was used for monitoring cardiac performance. Using etomidate/remifentanil for induction and titrating remifentanil infusion, we could control BP excellently. Hemodynamic stability of etomidate is unique among anesthetics and is still very safe for major surgeries. Remifentanil is a titratable ultra short half-life opioid that has minimal side effects on mother or newborn. It was used safely, for induction and maintenance of anesthesia in CS. There are controversies about effectiveness of incision infiltration with bupivacaine. In our case, it seems it was very effective. In conclusion, anesthetic management of the patients with CCTGA depends on the
associated intracardiac anomalies. We used TIVA with etomidate and remifentanil using invasive hemodynamic monitoring which provided a very safe anesthesia method for CS in our patient.

REFERENCES


