Case Report

Anesthesia with etomidate and remifentanil for cesarean section in severe peripartum cardiomyopathy

Eisa Bilehjani, Amir Abbas Kianfar, Mehrnoosh Solmaz Fakhari

From Department of Cardiovascular Anesthesia, Madani Heart Hospital, Tabriz University of Medical Sciences; Tabriz, Iran.
Correspondence: Dr. Eisa Bilehjani, Department of Cardiovascular Anesthesia, Madani Heart Hospital, Tabriz University of Medical Sciences; Tabriz - Iran.
E-mail: isa_bilehjani@yahoo.com
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ABSTRACT

We report a 19 years old patient, at 32 weeks of gestation, with severe peripartum cardiomyopathy, in heart failure and pulmonary edema. General anesthesia was induced with etomidate and maintained with remifentanil infusion safely, without any adverse outcome on mother or newborn. (Rawal Med J 2008;33:109-111).

Keywords: Peripartum cardiomyopathy, cesarean section, etomidate, remifentanil, general anesthesia.

INTRODUCTION

Peripartum cardiomyopathy is a dilated cardiomyopathy. Different analgesia and anesthesia methods have been used in these patients for delivery or cesarean section such as continuous epidural or spinal blockade,\textsuperscript{1,2} combined spinal/epidural blockade\textsuperscript{3,4} and general anesthesia.\textsuperscript{5} Recently, remifentanil infusion was used frequently for delivery or cesarean section in peripartum cardiomyopathic patients\textsuperscript{5,6} but there are no report about etomidate use in these patients. We used etomidate and remifentanil for emergent cesarean section in a 19 years old woman at 32 weeks of gestation with successful outcome.
CASE PRESENTATION

The patient was 19 years old female with 32 weeks of gestation had diagnosis of heart failure and pulmonary edema due to severe peripartum cardiomyopathy. Her chief complaint was dyspnea, orthopnea and palpitation which developed 20th week. Hydralazine, methyldopa and low molecular weight heparin were administrated. At 28th week, she was admitted to CCU because of clinical worsening, fever and productive cough and improved with cefixime. She complained severe shortness of breath and palpitation. Her Blood Pressure was 120/80mmHg, Respiratory Rate 47, Pulse Rate 138 (sinus tachycardia) and auxiliary temperature 36°C. Diffuse bilateral crackles were heard on chest auscultation. Drug regimen was captopril, spironolactone, isosorbide dinitrate, hydralazine, methyldopa and cefixime. Transthoracic echocardiography (TTE) showed four chamber dilation, LVEF (left ventricular ejection fraction) < 10%, moderate MR (mitral regurgitation), moderate AI (aortic insufficiency), moderate TR (tricuspid regurgitation) and RVSP (right ventricular systolic pressure) of 50\text{mmHg}. Cardiac enzymes, liver and renal function tests were within normal limits. A CXR showed cardiomegaly and pulmonary edema (fig 1).

Fig 1: preoperative chest-x-ray

Emergency cesarean section was recommended. Arterial and venous pressures were 210/120 and 18 mmHg, respectively. General anesthesia was induced with intravenous etomidate 18mg, midazolam 2mg and cisatracurium 16mg. Trachea was intubated with Sellick maneuver (7.5mm ID cuffed tracheal tube). Remifentanil and
tri-nitroglycerin infusion was started. Remifentanil infusion was increased from 1 to 2µg/kg/min because of hypertension. Mechanical ventilation was continued with FiO2=0.7, PEEP=10mmHg, TV=600ml, RR=18 cycle/min with a peak airway=42mmHg. Systolic blood pressure was maintained about 140-150mmHg. Fifteen minutes after induction, a preterm female baby was born with weight of 2200 and APGAR score 8 and 9 in first and 5th post-delivery minutes, respectively. Operation time was 80 minutes. After IV injection of 5mg morphine sulfate and discontinuing of remifentanil infusion, neuromuscular blockade was reversed with neostigmine 2mg IV at the end of surgery. Trachea was extubated when she was awake. She was transferred to postcardiac surgery ICU and underwent invasive hemodynamic monitoring. At seventh postoperative day, TTE showed an EF=15%, LVEDD (left ventricular end diastolic diameter)=8.28cm, LVSD (left ventricular systolic diameter)=7.35cm, LAD (left atrial diameter)=5.50cm, mean PAP (pulmonary artery pressure)=30mmHg, RVSP=50mmHg, moderate TR, and severe MR.

Patient was discharged home on 7th postoperative day on carvedilol, captopril, furesmide and warfarin. Newborn breast feeding was started on second day and she had brief physiologic hyperbilirubinemia. Two and eight weeks later on outpatient visit, newborn had not any problem and mother was in physical functional class III. Echocardiography at 8th week revealed LVEF<15%, sever MR, moderate TR, moderate AI, moderate PAH.

**DISCUSSION**

Peripartum cardiomyopathy is a rare but life threatening disease. Its incidence is 1/1300-1/15000 in pregnancies. Its etiology is still unknown, but it may be due to nutritional deficiencies, small vessel coronary artery abnormality, hormonal effects, pre-eclampsia/toxemia, myocarditis or abnormal immunologic response to fetal
antigens. Peripartum cardiomyopathy may complicate normal pregnancy, preeclampsia or present as unknown cardiac arrest. Anesthetic management of these patients is the same as other heart failure, keeping in view the unique hemodynamic changes of pregnancy. Recovery of cardiac function in peripartum cardiomyopathy usually is slow and incomplete and risk of recurrence or worsening of clinical condition in the following pregnancies is very high.

The main purpose of anesthesia is to prevent further cardiac depression and uncontrolled changes in afterload and preload. Invasive hemodynamic monitoring is useful and continuous epidural blockade usually is the preferred analgesia method that can be used for delivery, cesarean section or post operative analgesia. Remifentanil is a titratable ultra short half-life opioid that has minimal side effects on mother or newborn. It is used for induction and maintenance of anesthesia in cesarean section, as in peripartum cardiomyopathy. Etomidate is an old anesthetic agent which was synthesized in 1964 and introduced into clinical practice in 1972. Hemodynamic stability of etomidate is unique among the rapid-onset induction agents. After widespread use of etomidate for about one decade, its use was limited significantly in 1984 because of reports of temporary adrenal steroid synthesis inhibition. Because of its beneficial properties and lack of any recent report of clinical adrenocortical suppression or poor outcome, after a single dose or brief infusion, its use was increased again for anesthesia induction.

Etomidate has been primarily used in sick patients or patients with cardiovascular disease. Anesthesia induction with etomidate in heart failure seems safe. There are reports of etomidate use in other compromised cardiovascular diseases, but there are no reports about its use in patients with peripartum cardiomyopathy. In our patient, with severe left ventricular dysfunction (LVEF<10%), we used etomidate for
induction and then remifentanil for maintenance of anesthesia. This method provides a good clinical condition for surgery with minimal anesthetic side effect on newborn. In summary, our patient had a severe left ventricular dysfunction and we suggest that etomidate and remifentanil together, can be used as a safe anesthesia induction and maintenance in peripartum cardiomyopathy.

REFERENCES


