Severe Primary Pulmonary Hypertension in Pregnancy: Case Report

Gebelikte Ciddi Primer Pulmoner Hipertansiyon

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ABSTRACT In this case report, the management of a 35-week pregnant patient with primary pulmonary hypertension who had a cesarean section operation under regional anesthesia is discussed in the light of literature. In the preoperative examination, the patient suffered from severe dyspnea. She was discovered to have tricuspid insufficiency (4°) and her systolic pulmonary arterial pressure (PAP) was measured at 110 mmHg. The patient was successfully managed with combined spinal epidural anesthesia and was then referred to the cardiology intensive care unit.

Key Words: Idiopathic pulmonary hypertension; pregnancy; anesthesia, spinal

ÖZET Bu olgu sunumunda 35 haftalık primer pulmoner hipertansiyonlu gebe bir hastada rejyonel anestezi altında sezaryen cerrahisi yönetimi literatür eşliğinde tartışılmıştır. Hastanın preoperatif değerlendirilmesinde ileri derecede dispneik olduğu görüldü. Ayrıca 4° triküspit yetersizliği mevcuttu ve sistolik pulmoner arter basıncı (PAP) 110 mmHg idi. Başarılı bir kombine spinal epidural anestezi yönetimi ile hasta sorunsuz bir şekilde kardiyoloji yoğun bakım ünitesine transfer edildi.

Anahtar Kelimeler: İdiyopatik pulmoner hipertansiyon; gebelik; anestezi, spinal

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Cardiac disease is one of the most important causes of maternal morbidity and mortality. Physiological changes that occur during pregnancy such as increased blood volume, decreased systemic vascular resistance, fluctuating cardiac output and predisposition to coagulation causes increases in the cardiac work load. The incidence of cardiac disease in pregnancy is reported as being 0,2-4% in the developed world.[1,2] A dvances in the diagnosis and treatment of congenital and rheumatic cardiac diseases have resulted in more women being able to conceive. The physiological changes in the cardiovascular system during pregnancy, parturition and the postnatal period pose a health risk for patients.[3,4] The incidence of cardiovascular system pathology also increases with the use of anesthesia.

Pulmonary hypertension (PH) seen during pregnancy may be idiopathic or secondary to cardiovascular diseases and has a reported mortality rate of 30-56%.[5-7] The aim of this case report was to discuss the preoperative anesthesia method in a pregnant woman with PH and a high cardiac risk.

CASE REPORT

A 24-year-old, 34-week pregnant patient (height: 160 cm, weight: 65 kg) was admitted to the cardiology department with the complaint of progressive persistent dyspnea for the past 15 days.

The patient was evaluated by the cardiology department and then presented to medical council to discuss the medical management of the pregnancy. The medical council members included anesthesiologists, gynecologists, cardiologists and neonatal pediatricians.

The patient history was as follows: primary pulmonary hypertension (systolic: 60 mmHg) was diagnosed during her first pregnancy 2 years ago by transthoracic echocardiography and medical therapy had been given (Diltiazem hydrochloride 2x60 mg). This previous pregnancy had been successfully terminated by a cesarean operation with spinal anesthesia. On preoperative examination the patient was conscious, cooperative and orientated. Her respiration was spontaneous but labored and rapid. Her head and neck examination revealed mild cyanotic lips and distended jugular veins. There was mild cyanosis and pretibial edema (++) in her fingers and toes. Her blood-oxygen saturation rate was measured at 84-86% with a peripheral pulse oximeter at room atmosphere, and 90-92% when measured with a face mask (3 lt/min O_2). Her cardiovascular sounds revealed rhythmic tachycardia, positive S1 and S2 sounds and a tricuspid 2/6 systolic murmur. Electrocardiography (ECG) findings included sinus tachycardia (110-130/min) and right axis deviation and her non-invasive blood pressure was 100/60 mmHg. Transthoracic echocardiography revealed right ventricular dilatation and 4th degree tricuspid insufficiency, her systolic pulmonary arterial pressure (PAP) was 110 mmHg (mean PAP 73 mmHg) and her left ventricle ejection fraction (LVEF) was 55%. No abnormality was detected in the preoperative laboratory values.

The medical council decided to add the inhaler Iloprost (trometamol) to her drug regimen and terminate the pregnancy by a cesarean operation under combined spinal-epidural anesthesia. Low-molecular weight heparin was discontinued 12 hours before the operation.

The medical council decided on surgery on the fourth day when transthoracic echocardiography was repeated and the pulmonary arterial pressure had reached 95 mmHg. The patient was monitored revealing a noninvasive blood pressure of 110/55 mmHg, a pulse of 120/min and a SpO_2 of 86%. Three L min^{-1} oxygen was administered by a nasal cannula.

In keeping with antisepsis protocols, guided by ultrasound (US GE brand), a 3-way central venous catheter was inserted through the right internal jugular vein. The central venous pressure (CVP) was 6 mmHg. The left radial artery was cannulated with a 20 G catheter and then connected to a pressure transducer. The patient was placed in a seated position. Following antisepsis of the skin, a combined spinal-epidural catheter (18 G) was inserted into the L3-L4 space. Intrathecal 6 mg (1,2 ml) of 0.5% heavy marcaine was administrated. The epidural catheter was directed 4 cm cephalad, and then the patient was placed in the supine position. The sensorial block level was evaluated by the pinprick test every 2 minutes. The hemodynamic parameters were continually followed. The sensorial block level reached T4 in 10 minutes and the operation was initiated. The baby was removed within 6 minutes of incision. The blood pressure of the patient was 90/45 mmHg, and 5 mg of intravenous ephedrine was administrated along with a slow infusion of oxytocin (15U).

The Apgar scores of the baby (2540 g, 46 cm, male) were 6 and 9 at the 1st and 5th minutes. The operation lasted for 38 minutes, after which, the patient was followed up for approximately 48 minutes. No hemodynamic problems were encountered and the patient was referred to the cardiology intensive care unit. Two hours after surgery, 5 ml of 0.20% bupivacaine was administrated into the epidural and the catheter was removed.

Right cardiac catheterization was performed 4 days after surgery. A vasoreactivity test with adenosine was done and found to be negative. The

pulmonary arterial pressure was 95/39 (mean 64) mmHg. No complications were observed during the follow up period.

The patient was discharged on the 7th post-operative day with a treatment regimen of warfarin sodium tablets and Iloprost Trometamol inhaler.

DISCUSSION

Despite the advances in medicine, cardiac disease remains an important cause of maternal morbidity and mortality during pregnancy.[3] Pulmonary hypertension in pregnancy carries a mortality of 30-56%.[5,6]

Most patients with primary pulmonary hypertension die during parturition or within 2 weeks postoperatively.[1,6] In their retrospective study, Bonnin et al. found that PH carried a mortality rate of 36%.[8] In another retrospective study by Curry et al. where nine pregnant women with PH were evaluated, two died and two miscarried, one at 6 weeks and one at 12 weeks.[6]

The anesthetic management of patients with primary pulmonary hypertension is still controversial.[9] Some studies support general anesthesia, whereas others support regional anesthesia. Intubation can be difficult with general anesthesia. Laryngoscopic and tracheal intubation, which causes sympathetic activation, may worsen any existing pathology. Furthermore, the positive-pressure ventilation given during general anesthesia may cause cardiac failure.[8,10]

The positive effects of regional anesthesia have been discussed in many case reports.[11] However, high doses of anesthetics and block levels are not recommended during cesarean section. Single shot high dose spinal anesthesia should not be administrated to these patients and epidural anesthesia should be preferred because with this method the anesthetic drug can be used in differing titrations.[1,11,12]

In our case, combined spinal epidural anesthesia was administrated. We preferred to give this patient 6 mg of heavy bupivacaine into the spinal space and 10 mg (5 ml) of isobaric bupivacaine into the epidural space two hours postoperatively. Thus an adequate sensorial block was obtained in a short period of time with the use of a low dose local spinal anesthetic and postoperative pain control was successfully achieved.

Invasive monitoring including invasive blood pressure (IBP) monitoring through an arterial line and CVP monitoring are mandatory in this situation. IBP monitoring recognizes early changes in blood pressure and assesses arterial blood gases while central venous catheterization guides the fluid therapy. In our case, the patient was monitored with the standard anesthesia method through the radial artery and CVP. Pulmonary artery catheterization was not performed due to the high risk of pulmonary arterial rupture and rhythm abnormality.[1,5,12]

Intravenous 5 mg ephedrine hydrochloride was administrated once during the operation. Ephedrine is an indirect sympathomimetic amine and is the first preferred vasopressor for obstetric anesthesia.[11,13,14]

Following placental excision, a slow intravenous oxytocin infusion was preferred since a bolus dose can be associated with hemodynamic instability.[6] There is deficiency in the prostacyclin synthesis enzyme in cases with PH which leads to a decreased production of prostacyclin. Prostacyclin is generally considered a potent vasodilator which possesses antithrombotic and antiproliferative properties. Prostacyclin remains a mainstay in the treatment of PH.[15,16] The inhaler Iloprost was given to our patient in the preoperative period and pulmonary arterial pressure was seen to improve significantly in the follow-up period.

As a result, it is both increased patient safety with low-dose spinal anesthesia by using the combined spinal epidural anesthesia in risky pregnants. At the same time, epidural catheter can provide the maintenance of anesthesia and postoperative analgesia. Also, pregnants with pulmonary hypertension must be treated with multidisciplinary approaches in preoperative and postoperative periods.

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