

Case Presentation

Neuraxial Blockade for Cesarean in a Patient with Severe Primary Pulmonary Hypertension, Tricuspid Insufficient and Right Heart Failure: Case Report

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Introduction

The pregnant patient with pulmonary hypertension (PH) is a major challenge due to the severity of preexisting cardiopulmonary disease and changes during pregnancy that aggravate the pathology; pulmonary hypertension during pregnancy is associated with maternal and fetal morbidity and mortality, constitutes an anesthesiological and medical challenge. It is considered an absolute contraindication to pregnancy or a reason to discontinue it early. PH is a progressive disease, which produces a constant increase of at least 25mmHg in the pulmonary arterial pressure and an increase in the pulmonary vascular resistance, which causes dilation and right ventricular hypertrophy, progressing to heart failure. The diagnosis of PH is made by measuring the pressure of pulmonary artery performed by cardiac catheterization, but the alterations of this pathology can also be documented through other radiological studies [1].

The causes are multifactorial. PH has been classified into five groups: primary PH, PH associated with left heart disease, PH associated with pulmonary disease and hypoxemia, PH associated with chronic thromboembolic disease and miscellaneous causes. In the case of primary PH its overall incidence is 6-15 cases in a million. In the pathophysiology, an early vasoconstriction followed by the migration of smooth muscle fibers from the interior of the middle muscle layer into the vascular lumen of pulmonary arterioles is described. These cells are transformed into myofibroblasts and deposited as smooth muscle fibers or fibrous tissue. Once in the lumen, the cells proliferate concentrically and eventually obstruct it. As this process develops, the radius of the lumen closes and the resistance to flow increases [2].

Abstract

The pregnant patient with pulmonary hypertension (PH) is a major challenge due to the severity of preexisting cardiopulmonary disease and changes during pregnancy that aggravate the pathology; pulmonary hypertension during pregnancy is associated with maternal and fetal morbidity and mortality, constitutes an anesthesiological and medical challenge. It is considered an absolute contraindication to pregnancy or a reason to discontinue it early. We report a 27 years old female which present pulmonary hypertension and pregnancy which had to be urgently operated due to severity of pathology; the interruption of pregnancy and a definitive method of family planning was carried out in week 28 of pregnancy with a neuraxial blockade as an anesthetic method.

Keywords: Pulmonary hypertension; Pregnancy; Neuraxial blockade

Case Presentation

A 27-year-old female with a pregnancy of 28 weeks of gestation, initially valued at her ascription hospital in Culiacan, Sinaloa, and sent to the Hospital of Specialties No. 2 in Ciudad Obregón, Sonora for comprehensive evaluation of the case by Cardiology, Obstetrics and Perinatology. She started her current condition two months ago with hemoptysis, initially treated with rhinoplasty considering that the bleeding had nasal origin. However, hemoptysis persists with distal cyanosis, dyspnea at rest and cough with bloody sputum; therefore, a simple axial tomography of the chest is performed and acute pulmonary edema was reported.

Subsequently, a transthoracic and transesophageal echocardiogram was performed, reporting the following: left ventricular ejection fraction 64%, intact interatrial septum, left cavities displaced due to increased pressure in right cavities; right ventricle and atria severely dilated. Tricuspid valve with severe regurgitation; systolic pressure of the pulmonary artery 110mmHg. An electrocardiogram is performed which reports: sinus rhythm, heart rate 88 per minute, QRS + 120, PR interval 120 milliseconds, QRS wave 80 milliseconds, posterior bundle hemiblocking and right ventricular systolic overload. Rheumatic and infectious pathology is discarded. The diagnosis of severe primary pulmonary hypertension, tricuspid insufficiency and right heart failure is established. Treatment with Sildenafil 25 milligrams orally is initiated every 8 hours.

Within her medical history she denies chronic degenerative or cardiovascular diseases, allergies, trauma or transfusions. Antecedents of surgeries: appendectomy and rhinoplasty 3 years and 9 months ago

respectively. The case is discussed in joint session with the services of Cardiology and Obstetrics; it is concluded that due to the severity of the pathology, the most recommended is the interruption of pregnancy and a definitive method of family planning. The patient accepted the procedures, fetal lung maturation scheme was started and completed; was scheduled for cesarean and salpingoclasty at the Regional General Hospital No. 1 of Ciudad Obregón, Sonora at 28 weeks of gestation.

The preanesthetic evaluation is performed before the surgical event. Physical examination: weight 60 kilograms; height 1.68 meters; blood pressure 120/60 mmHg; heart rate 80 per minute; respiratory rate 16 per minute; 95% oxygen saturation with 21% inspired oxygen fraction. Conscious, oriented, hydrated, good coloration of skin and integuments, afebrile. No dyspnea, no clinical data of right heart failure. Mallampati scale I, Patil Aldreti I, Bellhouse-Dore I, oral opening greater than 5 centimeters, own and complete denture. Pulmonary: vesicular murmur present, no rales or wheezing, rhythmic cardiac sounds, tricuspid regurgitant increasing with inspiratory apnea, with an intensity II/VI. Abdomen distended by a pregnant uterus with no uterine activity, peristalsis present, no peritoneal irritation. Spinal column without apparent deviations, intervertebral spaces is palpated. Arms and legs without vascular involvement or edema, without acrocyanosis.

Cardiac function

New York Heart Association (NYHA) scale II; Surgical risk: American Society of Anesthesiologist (ASA) IV, Anesthetics Surgical Risk scale (RAQ): EIVB (elective major surgery, ASA IV), high thromboembolic risk. The patient is premedicated with ranitidine 50 milligrams intravenously, metoclopramide 10 milligrams intravenously, cefotaxime 1 gram intravenously. Due to the clinical condition of the patient, type I monitoring (non-invasive blood pressure, electrocardiogram, pulse oximetry and bladder catheter) is performed. Baseline vital signs: blood pressure 120/66 mm/Hg; heart rate 83 per minute, respiratory rate 16 per minute, oxygen saturation 98%. Face mask with supplemental oxygen is placed at 2 liters per minute. Anxiolysis: midazolam 1.5 milligrams intravenously.

Anesthetic technique

With medial approach, epidural blockade is performed in the intervertebral space L2-L3 at first attempt, atraumatic, without incident with Weiss #17G needle (Pitkin test). Fractional lidocaine 20% 300 milligrams is administered by epidural route with needle and cephalic epidural catheter in a total time of 15 minutes. There were no toxicity or absorption data, latency of 18 minutes, diffusion to T4 dermatome.

Maintenance

Oxygen by face mask at 2 liters per minute with oxygen saturation 98%. Ephedrine 20 milligrams intravenously fractionated, maintaining mean arterial pressure of 65-70 mmHg. Medical obstetrician indicates dose of ergometrine of 0.4 milligrams intravenously, however, 5 international units of oxytocin were administered in infusion. Analgesic treatment: ketorolac 50 milligrams intravenously, buprenorphine 120 micrograms subcutaneous route. Solutions crystalloid: 600 milliliters. Uresis: 150 milliliters; bleeding approx 200 milliliters. Hydric balance: +10 milliliters. No transanesthetic

events. Patient is admitted to the intensive care unit hemodynamically stable with no sedation effect, Analog Visual Scale (AVS) 0 points, Aldrete 9 points, Bromage 2 points, blood pressure 90/66 mmHg, heart rate 71 per minute, respiratory rate 18 per minute, 100% oxygen saturation with supplemental oxygen per facial mask at 2 liters per minute.

Discussion

Among women in reproductive age, approximately 8% of PH cases are associated with pregnancy. It is possible that pregnancy initiates PH in some women; however, the symptoms of a pre-existing condition are more likely to be discovered by the hemodynamic stress of pregnancy. When the symptoms appear in this stage, the diagnosis is made by exclusion of other causes. Maternal mortality is high (between 30 and 50%) and usually occurs during childbirth or the immediate postpartum period. Death is usually caused by right ventricular failure [3].

The main objectives in the anesthetic management of the pregnant patient with PH include: avoiding the increase in pulmonary vascular resistance and pulmonary arterial pressure; prevent changes in right ventricular preload; maintain a normal left ventricular afterload, and preserve right ventricular contractility. Based on the above, General Anesthesia (GA) can be considered as the technique of choice in these cases due to its greater hemodynamic stability; however, it presents some disadvantages such as cardiac depression caused by volatile agents, increased pulmonary vascular resistance during orotracheal intubation and positive pressure during ventilation [4].

According to the experience in this case, the neuraxial technique demonstrates a safety that surpasses the benefit-risk of general anesthesia, if GA is not performed correctly. Even recent literature suggests the combined blockade (epidural and spinal with low doses of anesthetic) as the technique of choice. In the final stages of the disease, general anesthesia is recommended, the patient of the present case is not in the final stage despite factors of poor prognosis (right ventricular hypertrophy and right atrial hypertrophy) [2]. Class I monitoring was decided by the functional cardiac stage (NYHA 2). However, the recommendation for these cases is to measure invasively the systemic blood pressure and central venous pressure. And finally, when considering the side effects of ergometrine as hypertension (pulmonary and systemic), it is preferred not to administer it; in the present case was replaced by oxytocin at low doses in continuous infusion as recommended by the universal literature to prevent adverse effects such as hypotension and tachycardia [3].

Conclusion

Pulmonary hypertension is a disease with poor prognosis and low prevalence with a maternal mortality of 30 to 50%, so that pregnancy is contraindicated. If the diagnosis of PH is made during pregnancy or if the patient decides to become pregnant, a multidisciplinary approach is mandatory, including the anesthesiology department, since perioperative anesthetic considerations are important in these patients (pregnant women with heart disease). Neuraxial blockade performed by an expert can be considered as the technique of choice for cesarean in this type of patients. The absolute pressure value in the pulmonary artery is a poor indicator of severity. Factors associated with poor prognosis during pregnancy include right ventricular

hypertrophy, low cardiac index, right atrial pressure and increased pulmonary vascular resistance. It is important to consider the side effects of the drugs used in the prophylaxis of uterine atony in patients with heart disease.

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