Case Report

Caesarean section under continuous spinal anaesthesia in a parturient with pulmonary hypertension: A case report

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ABSTRACT

Introduction: Women with pulmonary hypertension have high morbidity and mortality during pregnancy. The inability to increase cardiac output can lead to heart failure, while hypercoagulability and reduced systemic vascular resistance also lead to other risks.

Case management: This paper reports the case of a parturient admitted for caesarean section under continuous spinal anaesthesia scheduled at 34 weeks of amenorrhea following severe pulmonary arterial hypertension. She had a history of significant mitral insufficiency. The procedure was performed without incident. The catheter was removed immediately postoperatively. The baby was female and in good health. She was transferred to the resuscitation service with restoration of oral nutrition.

Conclusion: Loco-regional anaesthesia is to be preferred in pulmonary hypertension associated with pregnancy. In order to reduce the risk of mortality due to general anaesthesia for this type of patient, it is possible to practice the continuous spinal anaesthesia for caesarean section without having hemodynamic consequences.

1. Introduction

Pulmonary arterial hypertension (PAH) is a disease characterized by progressive obstruction of the pulmonary vascular bed leading to increased pulmonary vascular resistance (PVR) and secondary right heart failure [1]. It is associated with a particularly poor prognosis due to the risk of right heart failure, sudden death and thromboembolic events [2]. Pregnancy in women with PAH remains a rare event (1/100,000) and is strongly discouraged, as it is responsible for a very high maternal and fetal morbidity and mortality with a maternal mortality rate of 30–50% [1].

In the presence of PAH, the pulmonary circulation is not able to adapt to the physiological hemodynamic changes during pregnancy by limiting the preload of the left heart and the perfusion flow of the organs and the fetus [2]. The present clinical case illustrates the interest of adapting the anaesthetic strategy and therapeutic choices to cardiovascular changes.

2. Case management

A 44-year-old woman was suspected of having severe pulmonary arterial hypertension (PAH) due to mitral disease during the third trimester (30 days after birth) of her third pregnancy. She had a history of significant mitral insufficiency (MI) 6 years ago at the surgical stage with the notion of taking anti vitamin K, diuretics and beta blockers. Asthma since the age of 14 under treatment and as an obstetric history two normal vaginal deliveries. The clinical examination found a body mass index (BMI) of 40.4 kg/m², her blood pressure was 104/80 mmHg, pulse was regular, pulmonary auscultation was normal, cardiac auscultation showed a diastolic murmur of 3/6 at the mitral focus, the
electrocardiogram found an atrial fibrillation with incomplete right bundle branch block. Transthoracic echocardiography showed significant mitral insufficiency (MI) (SOR at 40 mm RV at 41 ml) associated with mitral narrowing (MR) (SM 2.7 cm²), systolic pulmonary artery pressure (Paps) at 70 mmHg, left ventricular ejection fraction at 60% and a dilated atrial mass. The patient was put on low molecular weight heparin (LMWH) curative dose, sildenafill at a dose of 50 mg once a day which allowed to decrease the pulmonary pressures to 53 mmHg. She was scheduled for caesarean delivery at 34 weeks’ gestation. LMWH were stopped 24 hours before the procedure, diuretics were stopped the day before with preparation of the asthmatic subject. The operation was performed under continuous spinal anaesthesia with a slow injection of the anaesthetic product made up of: 5 mg of hyperbaric bupivacaine, 25 μg of fentanyl and 100 μg of morphine, requiring a re-injection in the catheter of a bolus of 2.5 mg of hyperbaric bupivacaine. The metameric sensory level reached by this local anaesthetic injection was D5. This sensory level, after a negative sensitivity test, was considered sufficient to authorize the caesarean section. The anaesthesia was preceded by the placement of an 18 G peripheral venous line, a urinary catheter with monitoring of non-invasive blood pressure, Spo2 and heart rate. During the operation, the patient did not have significant hypotension or non-use of ephedrine. The procedure was performed without incident and the catheter was removed immediately postoperatively.

The newborn was female with a healthy birth. The patient was transferred to intensive care with a restoration of oral nutrition consisting of fluids 2 hours after the operative act, and 4 hours for solids with prescription of a curative dose of low molecular weight heparin 12 hours after surgery and her previous treatment. Throughout his stay in the intensive care unit, the social interaction face-to-face with loved ones was maintained.

This case report follows care guidelines [3].

3. Discussion

Pulmonary hypertension is defined by a mean pulmonary pressure (mPAP) greater than 25 mmHg at rest, the normal mPAP being around 15 mmHg.

Pregnancy-induced cardiovascular changes, which peak at around 32 weeks of amenorrhoea, expose women with heart disease to complications [4,5].

The prognosis during pregnancy is variable depending on the etiology of PAH. Idiopathic PAH has a better prognosis with a significantly decreasing mortality over the last 40 years, 30% in 1978–1996 versus 9% in 1998–2013, thanks to targeted therapies and adequate management [6]. Maternal mortality is 5–17% for mitral valve disease without PAH, and increases to 30–50% in the presence of PAH. It should be noted that most deaths occur at the time of delivery or in the first hours postpartum [7].

At the time of delivery, maternal death may be due to abrupt changes in venous return by auto-transfusion from the uterus (200–400 ml with each contraction), to the right ventricle leading to dilatation or even right heart failure [8]. In the immediate postpartum period, sinus bradycardia or atrioventricular block would be the cause of sudden death. The risk factors for mortality found in epidemiological studies were delays in admission and diagnosis of PH, severity of PH, primiparity, caesarean section and general anaesthesia [9].

Due to the physiological changes of pregnancy, PAH in pregnant women is often not diagnosed until the 24th week of amenorrhoea, often revealed by cardiopulmonary decompensations. The onset of this dyspnoea is generally progressive and often neglected, and is attributed to "physiological complaints" during pregnancy, which explains the frequent delay in treatment [10]. Prophylactic caesarean section between 32 and 36 weeks' gestation is still the preferred mode of delivery, as it avoids the haemodynamic constraints associated with pain during labour and expulsive efforts, and facilitates maternal haemodynamic management [11].

The mode of anaesthesia has raised more questions, as it is true that this point is discussed in the literature. Moreover, as the studies evaluating general anaesthesia and loco-regional anaesthesia have not been comparative, several authors have proposed combined spinal-peridural anaesthesia as a type of anaesthesia. The risk of epidural anaesthesia in these patients, who are often hypovolemic.

Diuretic treatment is to decrease the venous return excessively. Continuous spinal anaesthesia is performed with low doses of local anaesthetics combined with liposoluble morphine in order to maintain haemodynamic stability. General anaesthesia is performed in case of contraindications to perimillary anaesthesia [12].

The use of oxytocic must be very careful because of their hemodynamic effects. Low doses should be preferred and boluses should be avoided. The vasodilator effects by lowering systemic vascular resistance induces tachycardia with an increase in myocardial work: there is therefore a risk of cardiac failure which may go as far as defusing in the case of PAH [13,14].

4. Conclusion

Due to high maternal mortality and despite obvious therapeutic progress, pulmonary hypertension remains a formal contraindication to pregnancy. Loco-regional anaesthesia is preferred over general anaesthesia, regardless of the route of delivery.

Nevertheless, spinal anaesthesia in a single injection is to be avoided because of the importance and brutality of the sympathetic block. In order to limit the hemodynamic consequences during an anaesthesia for caesarean section, it is preferable to carry out a continuous spinal anaesthesia with a compatible metameric level.

Ethical approval

The ethical committee approval was not required given the article type (case report)

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Author contribution

EL AIDOUNI Ghizlane: Corresponding author, study concept, Data collection, data analysis, writing review & editing. MERBOUH Manal: Contributor. ARHOUN EL HADDAD Inass: Contributor. KACHMAR Safae: Contributor. LAARIBI Illyas: Contributor. DOUQCHI Badie: Contributor. OULALITE Mohamed Amine: Contributor. BKIYAR Houssem: Supervision and data validation. SMAILIB Nabil: Supervision and data validation. HOUSNI Brahim: Supervision and data validation.

Registration of research studies

As this manuscript was a case report with no new medical device nor surgical techniques, not prior registration is required.

Guarantor

EL AIDOUNI Ghizlane.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.
Provenance and peer review

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Declaration of competing interest

The authors state that they have no conflicts of interest for this report.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2021.102923.

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