

Anesthesia Management for Emergency Cesarean Section in Patient with Severe Preeclampsia and Controlled Hyperthyroidism: A Case Report

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Abstract: ***Introduction:** One of the sequelae of hyperthyroidism in pregnancy is preeclampsia. Severe preeclampsia may require termination by emergency cesarean section. In some cases, the euthyroid state cannot be achieved before the surgery. Thus, specific anesthetic management must be considered in patient with hyperthyroidism state. **Case:** A 32-year-old pregnant patient with severe preeclampsia and controlled hyperthyroidism came to the Obstetrics and Gynecology Emergency Ward with a complaint of decreased fetal movement. In our patient, emergency cesarean section was performed under spinal anesthesia using 10 mg of Bupivacaine. The operation went successfully without any complications for the mother and baby. **Conclusion:** Spinal anesthesia can be used for the management of anesthesia in patients with preeclampsia and hyperthyroidism*

Keywords: Preeclampsia, Hyperthyroidism, Spinal anesthesia

1. Introduction

In pregnancy, there are physiological and anatomical changes to permit the appropriate growing fetus and prepare the body for childbirth. However, there can be pathological conditions during pregnancy that can threaten the condition of the mother and the fetus. One such pathological condition is hyperthyroidism that occurs in about 0.2%-0.4% of pregnancy. Thyroid gland dysfunction can affect both the mother and baby's condition. A state of hyperthyroidism during pregnancy can lead to fetal death in the womb, abortion, premature birth, heart failure, preeclampsia to thyroid storm.(1)

Preeclampsia is one of the sequelae of hyperthyroidism which is quite dangerous.(2) Preeclampsia causes about 5-8% mortality in pregnancies worldwide.(3) One of the treatments of preeclampsia is termination in pregnancy by section cesarean in case of emergency conditions that threaten the fetus and mother. In the case of hyperthyroid itself to perform the surgical plan requires a state of euthyroid.(2) However, in some cases that require surgery where the euthyroid condition has not been achieved can be performed surgery with the administration of the necessary anti-thyroid drugs while looking at the hemodynamic state of the patient, heart rhythm disorders, airway disorders, and thyroid storm conditions that may occur. Appropriate screening needs to be done to know the state of hyperthyroidism and eliminate the risk of complications that can occur during surgery. Not only prompt and appropriate screening, but the treatment of hyperthyroidism in pregnancy needs to be done carefully because the administration of antithyroid drugs can pass through the placenta and affect the production of thyroid hormones from the fetus.(2)

2. Case Report

A 32-year-old female patient who had second pregnancy with 40 weeks of gestational age, came to the Obstetrics and Gynecology Emergency Ward with the chief complaint of decreased fetal movement. The patient also complained of dizziness and blurred vision. Patients had uncontrolled hypertension since the gestational age of 13 weeks and had been given methyldopa 500 mg every 12 hours orally. The patient also had hyperthyroidism since the gestational age of 13 weeks. The hyperthyroid was controlled with PTU at 100 mg every 12 hours orally. The last thyroid function test at 38 weeks gestational age showed a free T4 (FT4) level of 0.8 ng/dl, Thyroid Stimulating Hormone (TSH) level of <0,005µIU/ml. Based on physical examination at the Emergency Unit, the blood pressure (BP) was 170/100mmHg, heart rate (HR) was 82 beats/min, respiration rate (RR) was 20 times/min, oxygen saturation (SpO₂) was 98%, and the body temperature was 36.8°C. A complete blood count test showed a leukocyte level of 10.4 x 10³/µL, a hemoglobin level of 11.7 g /dl, a hematocrit (HCT) level of 35.6 %, and a thrombocyte level of 355 x 10³/µL. There was protein (2+) and urobilinogen (+2) in the patient's urine. Anon-stress test was done and showed a non-reactive result. The patient was diagnosed with severe preeclampsia with controlled hyperthyroidism and fetal distress. Thus, an emergency cesarean section was planned immediately. The patient was given 10 gr MgSO₄ 40% intravenously (IV) and 10 mg nifedipine orally. The patient was assessed by the anesthesiologist and classified as American Society of Anesthesiologist (ASA) grade III with severe preeclampsia and controlled hyperthyroidism.

The patient was transferred to the operating room and basic vital signs monitoring, including BP, HR, ECG, and oximetry, was applied. The initial vital signs before the operation begins were as follows: BP 160/90mmHg, HR 80 beats/min, RR 16times/min, SpO₂ 99%, body temperature

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36.6°C, and compos mentis consciousness. The patient was given the premedication drugs, including 5 mg dexamethasone, 10 mg diphenhydramine, and 2 mg midazolam IV. Then, the patient was positioned in a left lateral decubitus position. Spinal regional anesthesia was done using a 27G catheter with 10 mg Bupivacaine at the level of L2-L3 vertebrae. After the anesthesia was performed, the patient was positioned back into the supine position. Within 5 minutes, the desired nerve block has been reached and cesarean section began immediately. During the cesarean section, the vital sign was stable with an average BP of 120-130/80-90 mmHg, HR of 70-85 beats/min, RR of 16-18 times/min, and the SpO₂ of 99-100%. The cesarean section lasted for 75 minutes. A baby boy was born with a birth weight of 3200grams and an APGAR score of 7-8. The amount of bleeding during surgery was approximately 300 ml, urine output was ±150 ml, and the total intravenous fluid given was 700 ml.

After the cesarean section, the patient was transferred to the recovery room and the vital sign was monitored for 2 hours. The patient was in a stable condition with the vital sign were as follows: BP 125-135/80-90 mmHg, HR 70-85 beats/min, RR 16-18 times/min, and SpO₂ 99-100%. As a postoperative pain control treatment, the patient was given morphine 20 mg in 20 ml normal saline administered at a rate of 0.8 ml/hour using a syringe pump. Other therapies given by the obstetrician were oxytocin 20 IU in 500 ml ringer lactate at a rate of 20 drops/min and MgSO₄ 40% 6 grams in 500 ml ringer lactate at a rate of 28 drops/min. Afterward, the patient was then transferred to the intensive care unit (ICU) with indications of close monitoring of the post-cesarean section with severe preeclampsia. While in the ICU, the patient was given additional therapy, such as propranolol 10 mg every 8 hours orally, amlodipine 10 mg every 24 hours, cefadroxil 500 mg every 12 hours, ferrous sulfate 300 mg every 12 hours, and paracetamol 500 mg every 6 hours orally. Intravenous administration of analgesia is discontinued on the 2nd day postoperatively. The pain control therapy was converted into mefenamic acid 500 mg every 8 hours orally.

After two days, the patient was transferred to a regular inpatient room and was discharged on the 5th day of postoperatively without any complications. The patient was given take-home medicine, including propranolol (10 mg three times daily), cefadroxil (500 mg twice daily), ferrous sulfate (300 mg twice daily), paracetamol (500 mg four times daily), and mefenamic acid (500 mg three times daily) orally.

3. Discussion

The recommended therapy for severe preeclampsia is antihypertensive therapy, seizure prophylaxis, and emergency labor management.(3) Our patient was given nifedipine 10 mg orally in the Emergency Ward. This was consistent with the previous studies that recommend nifedipine 10-30 mg on an oral basis and may be repeated 45 minutes if necessary in severe preeclampsia cases. As the seizure prophylaxis, our patient was given MgSO₄ 40% 10 gr IV, which was 4 grams as bolus injection and 6 grams were given as a drip for 6 hours. Demimaran and Toker

stated in their study that the administration of MgSO₄ with a loading dose of 4-6 grams followed by infusion of 1-2 grams per hour is the standard protocol for seizure prophylaxis in severe preeclampsia. The use of MgSO₄ is very effective for seizure prevention by administering 4-6 grams of a loading dose in 15-20 minutes and continued with 2 grams per hour in 100 ml of infusion fluid and discontinued after 24 hours of delivery.(4)

For the emergency cesarean section, our patient was given spinal regional anesthesia with 10 mg Bupivacaine given using catheter size 27G. A study conducted by Demimaran and Toker stated that neuraxial anesthesia is a better option in severe preeclampsia compared to general anesthesia. Spinal/ neuraxial anesthesia should be chosen as long as there is no contraindication of neuraxial anesthesia, such as coagulation disease. Henke et al found in their study that spinal anesthesia may cause more severe hypotension than epidural anesthesia among patients with severe preeclampsia. However, this hypotension can be easily overcome and only lasts for a short period. The hypotension is due to the rapid onset of a sympathetic block and reduced intravascular volume. The study also stated that the incidence of hypotension requiring treatment in the severe preeclampsia group was lower compared to the normotensive control group and there was a significant difference in the external results of spinal anesthesia compared to epidural or general anesthesia.(5) During cesarean section, the vital sign of our patient was stable with an average systolic BP of 120-130 mmHg and an average diastolic BP of 80-90 mmHg. However, the emergency drugs, such as ephedrine, were prepared in case of hypotension due to spinal anesthesia.

Our patient has a history of hyperthyroid since the gestational age of 13 weeks and has been given PTU 100 mg twice daily orally. Our patient has achieved the euthyroid state with the last thyroid hormone test at the 38th week gestational age was FT₄ 0.8ng/dl and TSH <0,005µIU/ml. A previous study stated that the patient could safely achieve the euthyroid state in 6-8 weeks by administering PTU daily so that patients with hyperthyroid who are planned to have elective surgery are in a euthyroid state during surgery. In case of emergencies that require immediate surgery, the patients with hyperthyroidism may be given a beta-blocker, an ipodate sodium, a glucocorticoid, and a PTU when needed.(6) A study conducted by Park et al stated that anesthesia management in patients with hyperthyroidism should focus on sympathetic nerve stimulation during perioperative to reduce the cardiovascular side effects during the surgery. General anesthesia is a better choice in patients with uncontrolled thyrotoxicosis that requires immediate surgery due to adequate sedation and minimal hemodynamic changes. However, spinal/neuraxial anesthesia may also be suitable alternative anesthesia for uncontrolled thyrotoxicosis due to its ability to lower blood pressure and heart rate, reduce the adverse effect of histamine secretion in response to the use of muscle paralysis, and provide better postoperative pain control.(7) The spinal anesthesia was chosen for our patients because our patient was in a euthyroid state before the emergency cesarean section.

Post-operative pain management is an important aspect. Inadequate postoperative pain control may cause a slowdown in the patient's recovery. According to a study by Kintu et al, it was found that the most severe pain level after the cesarean section was during the 6 hours post-surgery. Morphine was chosen for our patient as postoperative analgesia. Garimella et al. stated that opioids are still the main choice for postoperative analgesia, such as morphine. Morphine has a rapid onset of action and reaches its peak effect in 1-2 hours. Morphine also works directly on the opioid receptors in the central nervous system. However, opioid use itself has side effects, such as hypoxia and respiratory depression. Therefore, close monitoring of respiration rate and oxygen saturation is required in a patient with opioid analgesia. Long-term opioid use may cause addiction. Thus, multimodal analgesia is recommended to reduce side effects as well as addiction.(8,9) Previous studies stated that paracetamol may be added to improve postoperative pain control and reduce the need for opioids.(10) Additional administration of other drugs such as celecoxib and parecoxib is also effective in reducing the need for analgesia as well as safe for nursing mothers.

4. Conclusion

The spinal anesthesia may be used in the preeclampsia patient with hyperthyroid due to its ability to lower blood pressure and heart rate, reduce histamine secretion, and improve postoperative pain control.

5. Disclosures

Conflict of Interest

The author reports no conflicts of interest in this work.

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6. Author Contribution

All authors contribute in conceiving, designing, conduct the study, prepare the manuscript and agree for this final version of manuscript to be submitted to this journal.

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