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Anesthesia in Caesarean Section Patients with Hyperthyroid

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Abstract. *Thyrotoxicosis is defined as a state of excess thyroid hormone and is not synonymous with hyperthyroidism, which is the result of excessive thyroid function. The prevalence of hyperthyroidism ranges from 0.2% to 1.3% in iodine-sufficient regions of the world. The combination of increasing FT4 and suppressing TSH is one way to enforce the hyperthyroidism diagnosis. The case of a 22-year-old woman with a diagnosis of G6P3A2H3 premature contractions has been reported , who came to the surgical room at Dr. HOSPITAL. Suhatman MARS to perform a caesarean section. Based on the pre-operative physical examination carried out, it was found that the patient's physical status was ASA II. In this patient, regional anesthesia will be planned. The patient has a history of hyperthyroidism since ± 10 years ago and regularly takes Thyrozol once a day during pregnancy and controls it with a specialist in Internal Medicine. Theoretically, this shows that the suspected condition of the patient is hyperthyroidism and if continued it could lead to Graves' disease, toxic nodular goiter, subclinical hyperthyroidism, or other conditions that lead to hyperthyroidism so surgery must be carried out taking this situation into account.*

Keywords: *ASA, hyperthyroidism, TSH, FT4*

1. INTRODUCTION

Thyrotoxicosis is defined as a state of excess thyroid hormone and is not synonymous with hyperthyroidism, which is the result of excessive thyroid function. The prevalence of hyperthyroidism ranges from 0.2% to 1.3% in iodine-sufficient regions of the world. About 5% of patients have normal FT4 levels but elevated serum T3 levels, a condition called T3 thyrotoxicosis. In addition, very mild Graves' disease can cause FT4 to be high enough to cause suppression of serum TSH levels, a situation called subclinical hyperthyroidism. The combination of increased FT 4 and suppressed TSH is one way to diagnose hyperthyroidism.

2. LITERATURE REVIEW

The condition of excess thyroid hormone is called thyrotoxicosis. This occurs as a result of excessive thyroid function. Thyrotoxicosis is not synonymous with hyperthyroidism. The main etiologies of thyrotoxicosis are hyperthyroidism caused by Graves' disease, toxic multinodular goiter (MNG), and toxic adenoma. The term "thyrotoxicosis" is used by some experts for all conditions characterized by elevated serum levels of thyroid hormone, while the word "hyperthyroidism" is used for conditions in which the thyroid gland synthesizes and

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secretes excessive amounts of thyroid hormone. The combination of elevated FT 4 and suppressed TSH makes the diagnosis of hyperthyroidism.

About 5% of patients have normal FT4 levels but elevated serum T3 levels, a condition called T3 thyrotoxicosis. In addition, high levels of FT4 in very mild Graves' disease can result in suppressed serum TSH levels. This condition is called subclinical hyperthyroidism. If FT 4 and TSH are elevated and RAIU is also elevated, consider a TSH-secreting pituitary tumor or common or generalized pituitary resistance syndrome. Severely ill patients may have low serum TSH levels but also low serum FT4 and T3 levels (so-called sick euthyroid syndrome). (David G. Gardner & Dolores Shoback. 2018).

In a condition called familial hyperthyroxinemia dysalbuminemia, abnormal albumin is present in the serum that prefers to bind. The antithyroid drugs methimazole, carbimazole, and PTU work by inhibiting TPO-mediated iodination of TG to form T4 and T3 in the thyroid gland. PTU inhibits peripheral T4 to T3 conversion; however, this effect is generally not considered clinically important except perhaps in patients with severe thyrotoxicosis or thyroid storm. Additionally, each of these drugs may have immunosuppressive effects that may be responsible for the disease remissions some patients experience after 1 to 2 years of treatment.

Case Report

Patient Mrs. L, 22 years old, with a diagnosis of G6P3A2H3 premature contractions, came to the Dumai Regional Hospital operating room to carry out a caesarean section. Based on the pre-operative physical examination carried out, the patient's physical status was found to be ASA II. In this patient, regional anesthesia will be planned. The patient has a history of hyperthyroidism since ± 10 years ago and routinely takes Thyrozol once a day during pregnancy and controls it with a specialist in Internal Medicine. The patient has no history of hypertension, heart disease, diabetes mellitus, asthma, allergies, or a history of surgery, either Sectio Caesarea or other operations. The patient's vital signs, nutritional status and general status were generally good pre-operatively. On November 21 2023, 1 day before entering the hospital, the patient had a thyroid hormone examination with low TSH levels and normal T4 levels. Theoretically, this shows that the suspected condition of the patient is hyperthyroidism and if continued it could lead to Graves' disease, toxic nodular goiter, subclinical hyperthyroidism or other conditions that lead to hyperthyroidism so surgery must be carried out taking this situation into account.

3. RESULTS AND DISCUSSION

Patient Mrs. L, 22 years old, with a diagnosis of G6P3A2H3 premature contractions, came to the operating room at Dumai Regional Hospital to carry out a caesarean section. Based on the pre-operative physical examination carried out, the patient's physical status was found to be ASA II. In this patient, regional anesthesia will be planned. The patient has a history of hyperthyroidism since ± 10 years ago and routinely takes Thyrozol once a day during pregnancy and controls it with a specialist in Internal Medicine. The patient has no history of hypertension or heart disease.

Diabetes Mellitus, Asthma, Allergies, as well as a history of surgery, either Sectio Caesarea or other operations. The patient's vital signs, nutritional status, and general status were generally good pre-operatively. On November 21 2023, 1 day before entering the hospital, the patient had a thyroid hormone examination with low TSH levels and normal T4 levels. Theoretically, this shows that the suspected condition of the patient is hyperthyroidism and if continued it could lead to Graves' disease, toxic nodular goiter, subclinical hyperthyroidism or other conditions that lead to hyperthyroidism so surgery must be carried out taking this situation into account.

Pre-induction physical status was classified as ASA II, and the mallampati score was 1. From the results of the patient's history and previous history, the patient was classified as ASA II with information that the patient had a history of hyperthyroidism for 10 years which was classified as a mild disease without substantive functional limitations (such as well-controlled endocrine disease). , smoker, pregnancy). A Mallampati score of 1 was obtained because the patient's entire palatal arch, including the bilateral faucial pillars, was visible below the base of the pillars7,10. The anesthesia technique used is Spinal Subarachnoid in the Supine position. Theoretically, obstetric patients for whom spinal anesthesia is planned are usually placed in the lateral decubitus or sitting position, and intrathecal hyperbaric lidocaine solution (50 to 60 mg) or bupivacaine (10 to 15 mg) is injected. (Cunningham, FG et al. 2018). Before the operation begins, the patient is fitted with anesthesia monitoring equipment in the form of a digital sphygmomanometer and pulse oximeter. The operation began at 11.00 and lasted for 50 minutes with anesthesia lasting > 50 minutes with subarachnoid spinal conduction anesthesia technique using bupivacaine, premedication with ondansetron, oxytocin medication, morphine analgesic and Ringer Lactate fluid therapy.

Bupivacaine should be chosen if it is unlikely that the obstetrician will complete the operation in 45 minutes or less. Signs of cardiovascular stimulation (tachycardia and hypertension) may occur with concentrations of local anesthetics that produce central nervous

system excitation or from injection or absorption of epinephrine (often combined with local anesthetics). At low concentrations all local anesthetics inhibit nitric oxide, causing vasoconstriction. All local anesthetics except cocaine produce smooth muscle relaxation and arterial vasodilation at higher concentrations, including arteriolar vasodilation. (John F. Butterworth, et al. 2018). The addition of fentanyl, 10 to 25 mcg, or sufentanil, 5 to 10 mcg, to the intrathecal local anesthetic solution will increase the intensity of the spinal block and prolong its duration without adversely affecting neonatal outcomes, whereas the typical intraoperative dose of fentanyl is 2–50 mcg/kg . The addition of preservative-free morphine, 0.1 to 0.3 mg, can prolong postoperative analgesia up to 24 hours, but requires monitoring for delayed postadministration respiratory depression, where a typical dose is 0.03–0.15 mg/kg for postoperative analgesia. Opioids bind to specific receptors located throughout the central nervous system and other tissues, and although they provide a certain degree of sedation and in some situations can produce general anesthesia when given in large doses, they are primarily used to provide analgesia. Activation of opioid receptors inhibits presynaptic release and postsynaptic responses to excitatory neurotransmitters (e.g. acetylcholine, substance P) released by nociceptive neurons. In general, opioids have minimal direct effects on the heart, whereas larger doses of morphine, fentanyl, sufentanil, remifentanil, and alfentanil are associated with nerve-mediated bradycardia. vagus. (John F. Butterworth, et al. 2018).

In terms of drug interactions, opioids potentiate the analgesia produced by epidural and spinal local anesthetics. Research conducted by Ebriedkk shows the addition of fentanyl with low dose bupivacaine to spinal anesthesia for Caesarean section can provide comparable anesthesia with a lower risk of hypotension and longer postoperative analgesia, and recommends the use of intrathecal fentanyl 25 mcg with bupivacaine 8 mg as appropriate to improve patient hemodynamic status, in addition, to improve postoperative analgesia for cesarean section (John F. Butterworth, et al. 2018). (Ebrie, AM et al. 2022). Theoretically, after the baby is born, an intravenous infusion containing two ampoules or 20 units of oxytocin per liter of crystalloid is infused at a rate of 10 mL/minute. The goal of induction or augmentation using oxytocin is to exert an effect on uterine activity sufficient to produce cervical changes and fetal descent, while avoiding the development of an inconclusive fetal status. The patient was given 2 fluid therapy with an intravenous route. During and after cesarean delivery, intravenous fluid requirements can vary greatly. The fluid given consists of lactated Ringer's solution or a similar crystalloid solution with 5 percent dextrose. Typically, at least 2 L will be infused during surgery. Blood loss in an uncomplicated cesarean delivery is approximately 1,000 mL. Average-sized women with a hematocrit of 30 percent or more and with normal

expanded blood and extracellular fluid volumes most commonly tolerate blood loss up to 2000 mL without difficulty. (Mayhew, D., et all, 2019).

This patient was not given methylergometrine which is generally given to patients undergoing Caesarean section with the consideration that methylergometrine is an ergot alkaloid which also has an effect on vascular smooth muscle and the mechanism of action on alpha-adrenergic receptors of the uterine blood vessels which causes a vasoconstrictive effect, which in hyperthyroid patients who already have a heavy cardiac workload which is mainly seen in increased cardiac output and heart failure so that it affects the patient's condition outside the context of Sectio Caesarea · (PAPDI. Perioperative Medicine, 2007), (Katzung, BG, et all, 2012), (Fayed, M., et all, 2021). During pre- to post-operative evaluation, the patient did not show signs or symptoms of hyperthyroidism (in a euthyroid state). If the history and physical examination strongly suspect the presence of hyperthyroid symptoms, then in addition to the routine preoperative examination, a thyroid function examination (fT4) is also carried out. Elevated fT4 concentrations indicate thyrotoxicosis. Surgery is safe to carry out if the patient has reached a euthyroid condition clinically and laboratoryly, even though he has not yet achieved remission, considering that it takes quite a long time to achieve remission. (PAPDI. Perioperative Medicine, 2007) The patient's final operative condition showed good vital signs with an Alderete Score of 11 and was eligible to move to the treatment room from the recovery room. Patients receiving spinal anesthesia should be monitored, especially for blood pressure.

4. CONCLUSION

The conclusions that can be drawn from the preparation of this case report are:

1. Hyperthyroidism is a condition in which the thyroid gland synthesizes and secretes excessive amounts of thyroid hormone.
2. Hyperthyroidism needs special attention in anesthesia because of the risks that can arise, especially thyroid crisis and drugs that cannot be given, especially adrenergic agonists.
3. In terms of managing hyperthyroidism during the surgical process, surgery is safe to carry out if the patient has reached a euthyroid condition clinically and laboratoryly, even though he has not yet achieved remission.
4. In the case of Sectio Caesarea surgery, the use of methylergometrine maleate is not recommended for mothers who are complicated by hyperthyroidism.

BIBLIOGRAPHY

Bereda, G. (2022). Hyperthyroidism: Definition, causes, pathophysiology, and management. *ResearchGate*. https://www.researchgate.net/publication/360457855

Butterworth, J. F., Mackey, D. C., & Wasnick, J. D. (2018). *Morgan and Mikhail's clinical anesthesiology* (6th ed.). [Publisher Information if available]. https://t.me/Anesthesia_Books

Cunningham, F. G., Leveno, K. J., Bloom, S. L., Spong, C. Y., Dashe, J. S., Hoffman, B. L., & Casey, B. M. (Eds.). (2018). *Williams obstetrics* (25th ed.). McGraw-Hill Education.

Ebrie, A. M., Mokhlesi, B., Chan, V. W., & Abou-Khalil, S. (2022). Hemodynamic and analgesic effect of intrathecal fentanyl with bupivacaine in patients undergoing elective cesarean section: A prospective cohort study. *PLoS One, 17*(5), e0267657. https://doi.org/10.1371/journal.pone.0267657

Fayed, M., Buffington, B., Ibrahim, R., Attali, A. Y., & Younger, J. (2021). Methylergometrine induced myocardial infarction in the setting of a cesarean delivery. *Cureus, 13*(10), e20068. https://doi.org/10.7759/cureus.20068

Gardner, D. G., & Shoback, D. (2018). *Greenspan's basic and clinical endocrinology*. McGraw-Hill Education.

Jameson, J. L., Kasper, D. L., Longo, D. L., Fauci, A. S., Hauser, S. L., Jameson, J. L., & Loscalzo, J. (Eds.). (2018). *Harrison's principles of internal medicine* (20th ed.). McGraw-Hill Education.

Katzung, B. G., Masters, S. B., & Trevor, A. J. (2012). *Basic & clinical pharmacology* (12th ed.). EGC Medical Books.

Mayhew, D., Mendonca, V., & Murthy, B. S. (2019). A review of ASA physical status – historical perspectives and modern developments. *Anaesthesia, 74*(3), 373–379. https://doi.org/10.1111/anae.14569

PAPDI. (2007). *Perioperative medicine: Evaluation and management in the field of internal medicine*. [Publisher Information if available].

PAPDI. (2017). *Internal medicine clinical practice guide*. [Publisher Information if available].

Rehatta, N. M., Hanindoto, E., & Tantri, A. R. (2019). *Anesthesiology and intensive therapy: KATI-PERDATIN textbook*. [Publisher Information if available].

Taylor, P. N., Albrecht, D., Scholz, A., & Gutierrez, B. (2018). Global epidemiology of hyperthyroidism and hypothyroidism. *Nature Reviews Endocrinology, 14*(5), 301–316. https://doi.org/10.1038/nrendo.2018.18