



Anaesthetic Approach in a Case with Hypothyroidis

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Authors' contributions

This work was carried out in collaboration between both authors. Authors EB and SO designed the study, wrote the protocol and wrote the first draft of the manuscript. Both authors managed the analyses of the study and the literature searches. Both authors read and approved the final manuscript.

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Case Report

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ABSTRACT

In anaesthesia practice, patients with thyroid gland and the other endocrine pathologies are frequently experienced. Multiple organs as well as cardiovascular system are influenced in patients with thyroid gland dysfunction during the urgent surgery. We aimed to present our anaesthetic experience for orthopaedic surgery in a case whose hypothyroidism had been recognised initially during preoperative assessment. In a 48-year-old male patient, an orthopaedic surgery was scheduled for the right ankle lateral malleolar dislocation fracture result from falling into home. His medical history was unremarkable. On the physical examination; general condition was good, consciousness was open. He was cooperated but depressed. Skin was cold, dry and rough. Also, there was the rough face appearance, enlarged tongue and swelling around the eyes. According the preoperative evaluation, TSH was >100 uIU/ml, free T4 was <0.04 ng/dl and free T3 was 1.30 pg/ml. Without premedication usage, a spiral needle was inserted at once to subarachnoid gap within range of L4-5 on the right lateral position. 0.5 % hyperbaric bupivacaine of 10 mg (2 ml) was given following free CSF outflow. Surgery started when sensorial block was reach to T10 level. No any cardiovascular or respiratory complication was seen during the about 1.5-hour surgery or one-hour postoperative period. The patient was assessed by internal medicine department and polyclinic control was recommended. Then, the patient was discharged on the fourth day of

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surgery. As a conclusion, we suggest that if surgical region is suitable, spinal anaesthesia implemented with low dose local anaesthetic agent may be a safety method in hypothyroidic cases needed urgent surgery to not wait for euthyroidic condition.

Keywords: Hypothyroidism; anesthesia; spinal; orthopaedic surgery.

1. INTRODUCTION

Thyroid disease is the second common endocrine disorder encountered during the perioperative period. It is seen in approximately 1% of adult population. Female/Male ratio is between 5:1 and 10:1. Hypothyroidism may be congenital or secondary to thyroid gland impairment (surgery, radio-iodine or radiation) or hypophysis gland disorder [1].

Hypothyroidism which emerges due to decreased thyroid hormone level in blood is a major concomitant health problem which become very important for the perianaesthetic period [2]. Elective surgery should be planned if euthyroidism can be achieved in patients diagnosed with hypothyroidism. No any risk excess has been reported for perioperative morbidity in these patients [3].

Cardiovascular system effects of hypothyroidism include decreased cardiac output as well as impaired cardiac contractility, increased peripheral vascular resistance, decreased systolic blood pressure, increased diastolic blood pressure and bradycardia [4]. Also, pericardial effusion, cardiomyopathy, peripheral oedema may be seen. Constipation, lack of appetite, delayed gastric discharge with adynamic ileus [1] in gastrointestinal system and cold intolerance, somnolence, decreased sweating, hypothermia and weight gain in metabolic system are seen. In respiratory system, superficial and slow breathing and impaired hypoxic and hypercapnic ventilator management are seen. Respiratory distress may develop by increasing the sensitivity to sedative and anaesthetic agents due to retarded drug metabolism. In neuromuscular system, memory impairment, decreased deep tendon reflex, fatigue, physical activity deterioration and muscle weakness as well as skin drying, voice thickening or slowed speaking and falter have been reported [2]. Anaesthesiologists may frequently encounter cases with untreated hypothyroidism. In this report, we aimed to present our anaesthesia practice for an urgent orthopaedic surgery in a case with severe hypothyroidism and to review the current literature.

2. CASE REPORT

A 48-year-old man weighted 112 kg and heighted 183 cm with a history of right lateral malleolar dislocation fracture was hospitalized for surgery. His medical history was unremarkable. According to the preoperative laboratory assessment, TSH was >100 uIU/ml, free T4 was <0.4 ng/dl and free T3 was 1.30 pg/ml. There was no any abnormality in the other blood count, coagulation and biochemical tests.

During the preoperative assessment, general condition was good, consciousness was open and the patient was cooperated. His skin was cold, dry and rough. Also, there was rough face appearance, enlarged tongue and swelling around the eyes. On physical examination, lung voice was normal, heart was rhythmic, heart rate was 78/min, tension was 120/70 mmHg. Laboratory parameters were as shown in Table 1.

Table 1. Laboratory results of the patient

Free T3= 1.30 pg/ml (range:1.71-3.71 pg/ml)
Free T4 < 0.4 ng/dl (range:0.70-1.48 ng/dl)
TSH >100 uIU/ml (range:0.35-4.94 uIU/ml)
Hemoglobin= 13.3
Hematocrit= 39.3
Platelet =213000
Prothrombin =11.6
INR =1.04

The patient was assessed preoperatively by internal medicine department. Levothyroxine sodium of 1.4-1.8 mcg/kg/day for 6-8 weeks was initiated. In control thyroid function tests 15 days after the treatment, TSH was 96.7 uIU/ml, fT4 was 0.69 ng/dl and fT3 was 2.47 pg/ml. Because of the patient's current condition, spinal anaesthesia was scheduled for urgent surgery for bimalleolar ankle dislocation fracture. The patient was taken into the operation room following the informed consent was obtained. Non-invasive blood pressure (BP), heart rate (HR), peripheral oxygen saturation were monitored during the surgery. Vascular access was ensured using 22 gauge needle. No

premedication was implemented. %9 NaCl of 10 ml kg⁻¹ was given 20 min before the surgery for prehydration. On the right side position, subaracnoid gap was reached by a spinal needle at the level of L4-5 [no:25 (Egemen, Turkey)]. %0.5 hyperbaric bupivacaine (2 ml) of 10 mg was injected after free CSF inflow was seen. Then, the patient was positioned on supine and head level was increased to 200.4 L/min nasal oxygen was started. Sensorial block was evaluated by pinprick test and operation was started when sensorial block had reach to T10 level. No any cardiovascular or respiratory complication was seen during the 1.5-hour surgery or 1-hour postoperative period. After the surgery, the patient was assessed by internal medicine and polyclinic control was recommended. Then, the patient was discharged on the fourth day of postoperative period.

3. DISCUSSION

Hypothyroidism is an important clinical situation which develops result from thyroid hormone deficiency due to autoimmune disorder (hashimoto thyroiditis),thyroidectomy, treatment with radioactive iodine or antityroid drugs, iodine deficiency and hypotalamo-hypophyseal axis impairment (secondary hypothyroidism) [5].

According to basal TSH level, the hypothyroidism is separated as; Subclinical, moderate and severe hypothyroidism. [5] In severe hypothyroidism, serum TSH level is significantly higher and free T4 level is depressed. There are studies emphasizing that elective operations should be postponed due to high anesthetic and surgical risk in these cases. [6-8]. In these patients, increased sensitivity to anesthetic agents, myocardial function depression, hypoglycemia, anemia, hyponatremia, temperature regulation and impairment of hepatic drug metabolism, postoperative ventilatory insufficiency cause vital problems [9,10]. In our case, we preferred spinal anesthesia with low-dose local anesthesia to minimize the complications of anesthesia due to the convenience of the operation site and the absence of obstruction to regional anesthesia in our case. Özkardeşler et al. pointed out that the general anesthesia technique combined with the epidural anesthesia applied with the minimum drug doses in the case where they are published, may be an appropriate option [11].

Weinberg et al. and Ladenson et al. have reported that elective operation should be

delayed because of increased mortality and morbidity rates of severe hypothyroidism [11-13]. However, Graham et al. have reported that there is no consensus about surgery planning time for mild or moderate hypothyroidism with regard to anaesthesia practice. It have been reported that regional anaesthesia carrying out by low-dose local anaesthetic which replaces the intravascular volume may be a suitable choice for cases with hypothyroidism if surgical area is appropriate [2,14].

Kelsaka et al. practiced the combined spinal-epidural anaesthesia in a case with hypothyroidism as well as ovarian carcinoma and they declared that if urgent abdominal or lower extremity surgery is needed and euthyroidic status could not be waited, regional anaesthesia is favourable in patients who have high risk for general anaesthesia [15].

In studies compared the thyroid hormone level changes in patient received epidural anaesthesia together with general anaesthesia or only general anaesthesia, it was found that T3 levels decreased but T4 levels did not change significantly in both groups during the operation. Also, it was noted that while TSH level did not change in patients received epidural anaesthesia, it increased compared to preoperative levels in patients received general anaesthesia [16]. Therefore, spinal, epidural or thiopental anaesthesia are preferred in patients with thyroid function disorders because of low effects of these methods on thyroid hormones [17-19].

In another study compared the plasma T3 levels of patients received general anaesthesia or epidural anaesthesia, authors have reported that T3 levels decreased in group received general anaesthesia there was no T3 level change in group received epidural anaesthesia [20].

4. CONCLUSION

As a conclusion, we decided that spinal anaesthesia using with low-dose local anaesthetic is a safety method in hypothyroid cases needed urgent surgery if surgical area is suitable.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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