

INTRODUCTION

Thyroid hormones have a wide variety of functions in every organ system. They play a crucial role in regulating important functions such as cardiac contractility, vascular tone, water, electrolyte balance and normal function of the central nervous system.^[1] Hypothyroidism is more common in females than males^[1] and may present in subclinical form. Hypothyroidism may result in myocardial depression, decreased spontaneous ventilation, abnormal baroreceptor function, reduced plasma volume, anemia, hypoglycemia, hyponatremia and impaired drug metabolism.^[1,2] Elective surgical procedures should not be undertaken in the presence of untreated hypothyroidism. Thyroid supplements should be given pre-operatively to hypothyroid patients before emergency surgery.^[1,2]

CASE REPORT

A 50-year-old female patient was brought to surgical emergency department with the chief complaints of pain in the abdomen since 1 month and constipation since 5 days. She was a known case of hypothyroidism since 4 years on tablet levothyroxine (T₄) 100 µg once daily (OD) on irregular treatment. On presentation, patient was stuporose (Grady coma scale: Grade II), with Glasgow coma scale (GCS) score of 11(E₂M₅V₄).

The patient was immediately shifted to intensive care unit (ICU) with oxygen. Arterial blood gas (ABG) analysis revealed pH of 7.36 with PO₂ of 86 mmHg, PCO₂ of 38 mmHg with normal bicarbonate. General physical examination revealed generalized non-pitting oedema and pallor, and other physical findings were unremarkable. Clinical examination revealed tense abdomen with restricted chest movements. Blood investigations revealed haemoglobin of 9.4 g/dl, haematocrit 28.9%, serum T3-0.7 ng/ml (normal range - 0.7-2.0 ng/ml), T4-2.7 µg/dl (normal range 4.5 µg/dl to 11.0 µg/dl) and thyroid stimulating hormone (TSH) of 73.5 µIU/ml (normal range - 0.4-4.2 µIU/ml). Abdomino-pelvic ultrasound revealed few dilated bowel loops in the lower abdomen. Case was posted for emergency laparotomy. Patient was not responding to verbal commands; the thyromental distance was 5.5 cm with short neck, pulse rate 78 bpm, respiratory rate of 18/min and blood pressure (BP), 150/90 mmHg.

Informed high risk consent was obtained from the

A case of subacute intestinal obstruction with overt hypothyroidism in stupor scheduled for emergency laparotomy

patient attenders and normal saline was started. Monitoring included pulse oximeter, non-invasive BP, electrocardiogram, urine output and temperature. Under strict aseptic precautions epidural space was identified in T7 - T8 interspace with the loss of resistance technique, an 18 G epidural catheter was inserted and activated using inj. lignocaine 2% with adrenaline (1:200000) 12 ml and injection tramadol (50 mg/ml) 2 ml. Adequate blockade was tested with pin prick and blockade achieved up to T₄ level. Intraoperative haemodynamics were within normal limits throughout the course of surgery and ABG was within normal limits with pH of 7.35. Intraoperative surgical findings were left sided tuboovarian mass with 50-60 ml of pus in mass with dilated large bowel. In view of non-availability of intravenous (IV) levothyronine (T3), tablet levothyroxine-T4 200 µg was mixed in sterile normal saline and injected into the jejuno - ileal junction intraoperatively [Figure 1].

Postoperatively, the patient was shifted to ICU for observation and analgesia. Tablet levothyroxine (T4) 100 µg OD was administered via Ryle's tube. Analgesia was maintained with epidural infusion of inj. bupivacaine 0.125% at the rate of 5 ml/h for 48 h. Subsequent analgesia was maintained with inj. paracetamol 1 g IV infusion 8th hourly. Thyroid function test on first post-operative day revealed serum T3-0.8 ng/ml (normal range - 0.7-2.0 ng/ml), T4-5.2 µg/dl (normal range 4.5 µg/dl to 11.0 µg/dl) and TSH of 38 µIU/ml (normal range - 0.4-4.2 µIU/ml). On post-operative day 3, patient was conscious, alert, oriented and was obeying oral commands and was shifted to ward.



Figure 1: Levothyroxine injection in jejunum

DISCUSSION

Hypothyroidism is characterized by abnormally low thyroid hormone production. Hypothyroidism is more common in females than males^[1] and may present in an overt or subclinical form. The latter has an elevated serum level of TSH as the only positive finding in an apparently healthy individual. No study has analyzed anaesthetic Requirements of hypothyroid patients, but by clinical observation they have been found to be more sensitive to anaesthetic drugs and sedatives owing to factors such as reduced cardiac output, decreased blood volume, abnormal baro-receptor function, decreased hepatic metabolism and diminished renal excretion.^[2] They can be extremely sensitive to narcotics and sedatives. Sedatives and hypnotic drugs may precipitate myxoedema coma in a hypothyroid patient.^[2]

The gastrointestinal dysfunction accompanying hypothyroidism may significantly complicate the management of the postoperative patient. Atony and hypomotility of the gastrointestinal tract are well described entities in these patients who may develop paralytic or “myxoedema ileus.”^[3,4] Rarely megacolon^[3,4] can develop, which in childhood can mimic Hirschprung's disease.

The stress of surgery has a direct effect on the thyroid axis with alteration in concentrations of TSH and T3. Patients undergoing surgery will manifest the classic euthyroid sick syndrome.^[5,6] Total T3 is decreased 30 min after induction of anaesthesia and remains low for at least the first 24 h postoperatively. Observed alterations in serum total T4 will vary depending on the type of anaesthesia, with an increase associated with general anaesthesia, whereas a slight decrease in T4 is seen with epidural anaesthesia.^[7] Serum TSH concentrations remain unchanged with the exception of an increase seen at the time hypothermia induction (in cardiac surgery).^[7] Should the response of TSH to thyrotrophic releasing hormone be assessed, it will be seen to be somewhat blunted and cortisol has been implicated as at least one of the causative factors for these changes. Surgery induces an increase in serum cortisol, which may precede the changes seen in the thyroid axis, suggesting a possible causal relationship.^[7] Due to lack of availability of IV triiodothyronine (T3), IV treatment was not possible and hence levothyroxine was administered into jejunum. In general, about 70-80% of the administered T4 is absorbed in the proximal small intestine (jejunum).^[8]

Regional anaesthesia is preferred technique over general anaesthesia in hypothyroid cases.^[2] In view of decreased consciousness, delayed recovery was anticipated under general anaesthesia technique. Hence the contemplated technique for this patient was thoracic epidural anaesthesia. The haemodynamic changes under epidural anaesthesia occur in a graded manner which are easier to manage. Thoracic epidural anaesthesia is particularly effective for reducing pain after thoracic and upper abdominal surgery and likely permits major surgical procedures to be performed on patients with moderate to severe comorbid diseases especially so hypothyroid cases.

CONCLUSION

Uncontrolled hypothyroid cases presenting for an emergency procedure need utmost precaution in view of precipitation of myxoedemic coma. Meticulous titration of drugs and appropriate anaesthetic technique leads to a good outcome in such cases.

Anand T Talikoti, Shrirang Rao, M Ravi, H Priyamargavi

Department of Anaesthesiology and Critical Care, Sri Devaraj Urs Medical College, SDUAHER, Deemed University, Tamaka, Kolar, Karnataka, India

Address for correspondence:

Dr. Anand T Talikoti,
Q. No. J3, Housing Layout, Sri Devaraj Urs Medical College,
Tamaka, Kolar, Karnataka, India.
E-mail: drttanand@yahoo.com

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