

CASE REPORT

ANAESTHETIC IMPLICATIONS FOR PARTURIENT WITH GESTATIONAL DIABETES MELLITUS, THYROTOXICOSIS AND HYPERTENSION

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ABSTRACT: The presence of co-morbidities during pregnancy can pose numerous challenges to the attending anesthesiologist during operative deliveries. We describe a case of a parturient who had conceived after five years of married life presenting with gestational diabetes and thyrotoxicosis coming for emergency lower segment caesarean section.

KEYWORDS: Gestational diabetes, Thyrotoxicosis, Lower segment Caesarean section.

INTRODUCTION: Pregnancy leads to complex metabolic changes in the mother, which affect the function of her endocrine system. Altered carbohydrate homeostasis may cause overt diabetes or abnormal glucose tolerance in predisposed individuals.¹ Pregnancy also affects thyroid function and thyroid hormone metabolism.² Therefore, the interaction of pregnancy, diabetes mellitus and thyroid disease requires special consideration during operative interventions because of the increased risks to the well-being of the mother and the fetus.

CASE REPORT: A 27 yr old primigravida who had conceived after five years was posted for emergency caesarean section. She was of 36 weeks gestation, LMP was 18/8/13 with EDD-13/6/14.

She had regular ANC visits. In the second trimester (16 weeks of gestation) she was detected to have hyperglycemia (FBS-150mg%; PPBS- 207mg%) and HbA_{1c} of 8.08%. She was diagnosed to have gestational diabetes mellitus (GDM) and was started on Insulin for control of blood sugars. She was asked to review in 15 days.

On review, she was screened for thyroid function tests and was found to have Thyrotoxicosis. TSH-0.005 microIU/ml (0.27-5 microIU/ml); T₃-304.9ng/ml (0.7-2.0ng/ml); T₄-18.1ug/ml (4.5-14ug/ml). She was started on propylthiouracil 50mg every 6 hourly and continued on insulin. She was reviewed regularly. Her antenatal scans showed single live fetus with growth corresponding to dates and no anomalies.

At completion of 36 weeks of gestation, she was admitted to hospital. She was found to have hypertension and was started on labetalol. Her sugars were in good control (FBS-88mg%; HbA_{1c}-6.74%). And her thyroid profile was suggestive of fair control with T₃ and T₄ in normal range. T₃-2.40ng/ml (0.7-2.0ng/ml); T₄-13.59ug/ml (4.5-14ug/ml) with TSH of 5 micro IU/ml (0.27-5microIU/ml).

On examination: Her weight was 85kgs, height was 158cms, had bilateral pitting edema. Pulse was 88/min; blood pressure was 160/100mmHg. Her thyroid was normal on palpation, respiratory and cardiovascular systems were normal.

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She was opted for regional anesthesia, under sterile aseptic precautions, in left lateral position lumbar puncture was done. 2.2ml of bupivacaine 0.5% (H) was injected adequate block was obtained. LSCS was performed and a live baby was extracted. Vitals and blood sugars were monitored.

Baby weighed 3.06kg, was shifted to nursery for care.

DISCUSSION: GDM is defined as glucose intolerance with onset or first recognition during pregnancy.³

Gestational diabetes mellitus (GDM) develops in 2-14% of pregnancies.^{2, 4}

The initiating factor is likely to be increased peripheral insulin resistance, but in an attempt to overcome the increased insulin resistance, relative pancreatic insufficiency develops. The pathology of GDM is similar to type-2 diabetes.⁵

The high blood sugars in the first trimester increase the risk of first trimester loss and congenital anomalies.^{6,7} Neonatal macrosomia and shoulder dystocia occur with increased frequency.⁸

So the treatment should focus on excellent glycaemia control and avoidance of severe hypoglycemia, stabilization and monitoring of complications, and fetal surveillance.⁹

Hyperthyroidism complicates about 0.4% of pregnancies² and most common cause is Graves' disease which constitutes 85% of cases.¹⁰

Women having uncontrolled hyperthyroidism have fivefold greater risk of developing severe preeclampsia. There is also increased risk of fetal loss, low birth weight, prematurity, and placental abruption.¹¹

Thyroid dysfunction may affect carbohydrate metabolism and worsen glucose control, precipitating severe ketoacidosis or hypoglycemia. Thyroid hormones increase glucose absorption from the gastrointestinal tract, enhance hepatic gluconeogenesis, deplete glycogen stores, and increase insulin degradation. As a result thyroid hormones have a diabetogenic effect, and can cause abnormal glucose tolerance. Underlying diabetes may be unmasked by thyrotoxicosis, and pre-existing diabetes aggravated. Insulin requirement is increased and the tendency for ketoacidosis is higher.¹²

The mainstays of treatment for thyrotoxicosis are the antithyroid drugs. The two main drugs are propylthiouracil (PTU) and methimazole.¹³ Propylthiouracil is the drug of choice for treatment of thyrotoxicosis in pregnancy.

Beta blockers help in controlling the sympathetic manifestations.

The use of iodides should be avoided in pregnancy because of the risk of neonatal goiter and hypothyroidism.¹³

Radioactive iodine should never be given during pregnancy.¹³

ANAESTHETIC IMPLICATIONS:

- Pregnancy associated with co-morbid factors like gestational diabetes mellitus, thyrotoxicosis, gestational hypertension and obesity poses a challenge to Anaesthesiologist during operative interventions.

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- Important aspect in diabetic parturient involves the adequate control of blood sugar so as to prevent the occurrence of neonatal hypoglycaemia.^{14, 15}
- There exists a high association of Diabetes Mellitus with other co-morbid diseases such as HTN, CAD, pre-eclampsia, renal dysfunction, autonomic neuropathy and so many others.¹⁶
- General anaesthesia (GA) is more hazardous in these patients due to high probability of difficult airway management due to limited atlanto-occipital joint extension, exaggerated and unpredictable response to stress during intubation and impaired counter regulatory responses to fluctuating blood sugar levels.¹⁷
- Management of diabetes is challenging as the requirement of insulin increases two-fold near term gestation. So perioperative status has to be optimized with appropriate insulin regimen taking care not to induce hypoglycaemia with aggressive control of hyperglycemia.¹⁸
- Regional anaesthesia is much safer than GA as responses to hypoglycemia are blunted in these patients and are difficult to diagnose under GA whereas during regional anaesthesia (RA) patient will be able to convey the things verbally.^{16, 19, 20}
- The drawback in DM patients with autonomic neuropathy receiving RA includes exaggerated sympathetic response due to autonomic imbalance.
- Hyperthyroidism may precipitate heart failure, and thyroid storm may occur during labour and delivery in a thyrotoxic woman.
- A thorough evaluation of cardiac status is mandatory during the pre-anesthetic examination to exclude any cardiac involvement.²¹
- It's mandatory to make patients euthyroid before taking up for surgery. In elective cases, it may take 6-8 weeks. In emergency cases, the use of beta blocker, iodate, cortisol, or dexamethasone and PTU is usually necessary.
- The anaesthesiologist should be prepared to manage thyroid storm, especially in patients with uncontrolled or poorly controlled disease who present for emergency surgery.
- Anticholinergic drugs (i, e., atropine) should be avoided since they may precipitate tachycardia and alter heat regulating mechanisms.
- Intraoperatively, drugs that stimulate the SNS should be avoided (i, e., ketamine, pancuronium,)
- Eye protection is important for patients with proptosis.
- Muscle relaxants should be chosen based on their interaction with the SNS and their haemodynamic effects.
- Reversal of muscle relaxants should include glycopyrrolate instead of atropine in combination with an acetylcholinesterase inhibitor.
- For treatment of intraoperative hypotension, a direct acting vasopressor is preferred (phenylephrine). Ephedrine, epinephrine, norepinephrine and dopamine are avoided or administered in extremely low doses to avoid exaggerated haemodynamic responses.
- Regional anaesthesia is preferred and performed safely. Epinephrine containing local anaesthetics should be avoided. Fluids and phenylephrine are used.
- Ideally all these cases should be taken up in a tertiary care centers with intensive care unit (ICU) back-up facilities especially in developing nations.²²

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CONCLUSION: Endocrine disorders carry significant maternal and fetal risks during pregnancy. However, risks can be reduced by timely diagnosis, optimizing treatment, and involving a multidisciplinary team in patient care. Communication between obstetrician, anesthesiologist and endocrinologist is of utmost importance.

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Monitor showing vitals



Photo showing baby being delivered

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Photo showing spinal

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