

CASE REPORT

Hyperthyroidism with Pulmonary Hypertension for Emergency Caesarean Section – A Rare Case

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Abstract:

Recent studies have suggested an association between Pulmonary Arterial Hypertension (PAH) and thyroid disease. This combination is however rare during pregnancy. Here is a case of uncontrolled hyperthyroidism with severe PAH presenting during the third trimester. Due to impeding fetal distress patient was taken for delivery via caesarean section. Under a cover of Propylthiouracil (PTU) and beta blockers, epidural anaesthesia was given to avoid substantial hemodynamic variations which may induce sudden right ventricular insufficiency. Uneventful intraoperative and postoperative course ensured good maternal outcome.

Keywords: Epidural Anaesthesia, Uncontrolled Hyperthyroidism, Pulmonary Arterial Hypertension, Emergency Caesarean Section

Introduction:

Thyroid disorders have been included as one of the causes of Pulmonary Arterial Hypertension (PAH) with unclear multifactorial mechanisms in 5th world symposium on PAH. Possible mechanisms include-autoimmune phenomenon associated with endothelial damage or dysfunction, increase in cardiac output resulting in endothelial damage, increased metabolism of intrinsic pulmonary vasodilators (prostacyclin and nitric oxide), decreased metabolism of vasoconstrictors (serotonin, endothelin-1 and thromboxane), and stimulation of the sympathetic nervous system causing pulmonary vasoconstriction [1]. Pregnancy in women with pulmonary hypertension stresses the already compromised cardiovascular system and is associated with very

high peripartum mortality. Here is a unique case of uncontrolled hyperthyroidism and severe PAH in pregnancy further complicated with pregnancy induced hypertension, anaemia and fetal distress for emergency caesarean section.

Case Report:

A 28 year G₂P₁L₁ with 32 weeks pregnancy was referred to the hospital with complaints of breathlessness at rest and palpitations since 1 week. On examination her heart rate was 120 beats per minute and blood pressure was 150/100 mmHg. Pallor, exophthalmos, tremors on outstretched hand were noted. A palpable murmur was felt in mitral area with occasional basal crepitations and S₃ gallop on auscultation. The physician advised urgent thyroid function tests, electrocardiogram and 2D ECHO with other routine investigations.

Her TFTs were as follows:

Free T3: 14.75 (Normal: 2.0-3.3 pg/ml)

Free T4: 7.77 (Normal: 0.7-1.2ng/dl)

TSH: 0.002 (Normal: 0.27- 4.20 mcU/ml)

ECG showed sinus tachycardia of 120 beats per minute. Echocardiogram revealed: Severe PAH of 60 mmHg, thin rim of pericardial effusion, dilated right atrium and ventricle, moderate mitral and tricuspid regurgitation, normal left ventricular systolic function and ejection fraction of 0.6. Rest blood investigations were normal except hemoglobin of 6.7gm%.

The physician started her on oral labetalol 10 mg twice daily, metoprolol 12.5mg twice daily,

propylthiouracil 50 mg twice daily and asked for a cardiology reference along with Rheumatoid Arthritis (RA) factor and Antinucleotide Antigen (ANA) to rule out connective tissue disorders.

The cardiologist added digoxin 0.25mg once daily for 5 days a week (5/7) and furosemide 40 mg twice daily. He also advised blood transfusion (Hemoglobin 6.7), Computed Tomographic Pulmonary Angiography (CTPA) and High Resolution Computed Tomography (HRCT) (after delivery).

After this initial optimization of symptoms, the patient underwent an ultrasonography which showed "fetoplacental insufficiency with brain sparing effect".

It was decided to take her for an urgent caesarean section and the anaesthetist was called upon. Propylthiouracil 200 mg and Propranolol 40 mg orally were administered before surgery as per physician's advice. Baseline blood gas analysis with electrolytes was normal.

Keeping the 'semi-emergency' nature of the surgery in mind our plan was to give a graded epidural block with back up of general anaesthesia kept ready.

Epidural catheter was placed at L2-3 interspace and test dose of 3cc 2% Lignocaine was given (Adrenaline was avoided to avoid precipitation of tachyarrhythmias in an already tachycardiac patient). Total 8cc of 0.5% Bupivacaine and 7 cc of 2% Lignocaine were given in graded fashion and a sensory level of T8 was achieved.

Surgery was started. The patient complained of pain during stretching of the recti which she tolerated after reassurance. Male baby was delivered weighing 1800g, but was shifted to NICU due to poor APGAR score (4 at 5 min). Injection Oxytocin 20 units in 500ml RL was started immediately after delivery. Fentanyl 25 µg IV and 25 µg epidurally were given to potentiate

the analgesia.

Surgery lasted about an hour with a blood loss of ~600ml which was replaced with 1500ml of lactated ringers. Intraoperative urine output was 100ml.

Patient was shifted to ICU for further monitoring with Epidural catheter in situ for postoperative analgesia. PTU 50 mg twice daily, Metoprolol, Frusemide and Digoxin were continued. After 24 hours of observation, as patient was asymptomatic with stable vitals, she was shifted to the ward. Epidural catheter was removed after 24 hour.

Discussion:

Patients presenting with uncontrolled hyperthyroidism in their late pregnancies is quite common in our country. Incidence of pregnancy with hyperthyroidism ranges from 0.6% (overt) to 1.8% (subclinical) [2] while pulmonary hypertension in pregnant patient carries high mortality rates between 30-56% [3]. PAH is usually classified as severe when mean pulmonary arterial pressure is more than 45 mmHg [4].

There have been reports of coexistence of hyperthyroidism and PAH [5, 6]. Pregnancy with hyperthyroidism with PAH is all the more rare, especially in an emergency scenario like ours.

Yang *et al.* (2005) [7] reported two cases of pregnancy complicated with congestive heart failure and pulmonary edema due to hyperthyroidism. Both patients did not receive treatment for hyperthyroidism during pregnancy, and sought clinical help during the third trimester.

Echocardiography revealed mild pulmonary hypertension without any structural cardiac abnormality. The clinical problems were resolved by medical management (PTU, Propranolol, Frusemide) before delivery. Both patients delivered vaginally at 38 weeks.

Mathot *et al.* (2014) [8] reported a 13 weeks pregnant patient with Graves' disease with progressive dyspnoea existing for 4–6 weeks. Blood tests showed severe thyrotoxicosis and transthoracic echocardiography suggested severe pulmonary hypertension which was thought to be secondary to thyrotoxicosis. PAH was carefully monitored for 1 month. No changes in pulmonary artery pressure were found despite immediate treatment with Propylthiouracil and β -blockade. The authors anticipated that the normalisation of pulmonary artery pressure would not occur during this pregnancy and that the risk of complications would remain high. Termination of pregnancy took place at the gestational age of 16 weeks. In follow-up with ECHO after 3 months of treatment the pulmonary artery pressure remained high. They concluded that thyrotoxicosis is associated with pulmonary hypertension and after normalization of free T4 levels, PAH can resolve.

Schroder *et al.* (2014) [9] presented a case of thyrotoxicosis and pulmonary hypertension (>60 mmHg) in the setting of molar pregnancy of 21 weeks (HCG levels 1,164,078 mIU/ml). The patient underwent surgical evacuation of pregnancy via abdominal hysterotomy for severe preeclampsia. Postoperative thyroid function tests returned to normal with conservative measures within one week. Serial echocardiography showed complete normalization of estimated pulmonary artery pressures within 4 months of pregnancy resolution. Structural abnormality also normalized. They concluded that her PH was caused by thyrotoxicosis induced by her elevated HCG levels.

Sabah *et al.* (2014) [10] reported a 28 weeks pregnant patient who presented with severe systemic hypertension, bi-ventricular heart failure and severe pulmonary hypertension with a moderately enlarged thyroid gland. The patient improved following the administration of high

dose intravenous diuretics and delivered vaginally twenty four hours later. On evaluation her echocardiography showed severe pulmonary hypertension (pulmonary arterial systolic pressure of 73 mm Hg) septal and anterior wall hypokinesia. Thyroid function tests revealed a biochemically hyperthyroid state and positive anti-thyroid peroxidase antibodies was found. 99m Technetium pertechnetate thyroid scans demonstrated diffuse toxic goiter as evidenced by an enlarged thyroid gland with intense radiotracer concentration all over the gland. The clinical and biochemical findings confirmed the diagnosis of Graves' disease.

Regional anaesthesia is preferred in cases of uncontrolled hyperthyroidism for emergency caesarean [11, 12] as the patient remains awake which helps in early detection of thyroid storm and also avoids the hemodynamic effects of laryngoscopy and intubation in already tachycardiac patients.

A review of literature of cases of pregnancy with PAH, with or without treatment, revealed a changing trend in terms of preference of anaesthesia technique from general anaesthesia to regional anaesthesia for caesarean section [13-16]. The goals of anaesthetic management of such patients include avoiding further increase in PVR, avoiding marked decrease in venous return, avoid marked reduction in SVR and avoid myocardial depression.

Our patient, in addition, had co morbidities of PIH, anemia, and had impending fetal death, besides the risk of digoxin toxicity. Keeping all these factors in mind and the emergency nature of the surgery, we opted for a regional technique i.e. epidural anaesthesia.

With epidural we ensured an awake patient, relatively stable hemodynamics (avoids hypertensive response during intubation and extubation,

avoids unpredictable decrease in pulmonary blood flow with mechanical ventilation, effects of volatile anaesthetics on cardiac contractility are avoided, controlled hypotension if venous return is maintained) and definitive postoperative analgesia.

Conclusion:

This is a unique case of hyperthyroidism, severe pulmonary hypertension and pre-eclampsia in late

pregnancy for emergency caesarean section. Thyrotoxicosis may be associated with pulmonary hypertension and should raise a high index of suspicion. Such cases can be successfully done under epidural anaesthesia, keeping a backup plan of general anaesthesia. Our experience of intraoperative use of pulmonary vasodilators is also limited and needs to be sought for.

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