

**PERIOPERATIVE MANAGEMENT OF PATIENT WITH COEXISTING GRAVE'S  
DISEASE AND DIABETES MELLITUS TYPE I****\*Dr Sushama Raghunath Tandale, Dr Hemlata Iyer, Dr Sarika Wadhwa**

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Article Received on 06/03/2016

Article Revised on 27/03/2016

Article Accepted on 18/04/2016

**ABSTRACT**

Grave's disease and type I diabetes mellitus are clinical disorder of autoimmune origin. Both these diseases shares similarity in their clinical presentation. Their simultaneous occurrence can complicate diagnosis as well as management of each other. Hence anesthetist managing the patients with hyperthyroidism should be aware of possible coexistence of type I diabetes mellitus. Preoperative optimization of hyperthyroidism and hyperglycemia is the key for uneventful intraoperative course.

**KEYWORDS:** hyperthyroidism and hyperglycemia.**INTRODUCTION**

Grave's disease is characterized by antibodies against thyroid receptor and thyroid immunoglobulins which stimulate the thyroid growth, hormone secretion and increase in vascularity.<sup>[1, 2]</sup> Clinical diagnosis requires the presence of triad which includes hyperthyroidism, exophthalmos and dermopathy.<sup>[1,3,4]</sup> Type I diabetes mellitus occurs due to destruction of beta cells of pancrea which results in lack of insulin.<sup>[1]</sup> Both these conditions are autoimmune in origin where one gland results in hypersecretion of hormone where as other gland results in hyposecretion of hormones .these patients are likely to develop autoimmune polyglandular syndrome. Other associated findings with this syndrome are pernicious anemia, myasthenia gravis, sclerosis, vitiligo, rheumatoid arthritis<sup>4</sup>.here we report perioperative management of coexisting grave's disease and type I diabetes mellitus for thyroidectomy.

**CASE HISTORY**

38 year old male, weighing 35 kg with thyroid swelling was referred to our institute for management of exaggerated symptoms of hyperthyroidism. He was on regular treatment with T Neomercazole 40 mg and T Propranolol 60 mg since three years for hyperthyroidism with well control of symptoms. Patient noticed exaggeration of symptoms over four months (nervousness, significant weight loss, heat intolerance, heaviness in lower limbs, increased appetite and increase urinary frequency) with recent finding of proptosis in both eyes and indurated muscle consistency in both lower limbs with muscle atrophy. On general examination, pulse rate was 96 bpm, regular rhythm and volume. Cardiac auscultatory findings revealed ejection systolic murmur grade II in mitral area with

unremarkable respiratory examination. Local examination revealed thyroid swelling measuring 6×8 cm, without airway compromise and retrosternal extension.

Patient was advised complete hemogram, biochemical test and Electrocardiogram which were unremarkable. Echocardiography revealed moderate mitral regurgitation, dilated left atrium and ventricle with pulmonary hypertension. X ray neck AP and lateral view revealed normal tracheal anatomy. His thyroid function test revealed normal free T<sub>3</sub> (6.2 pmol/L), T<sub>4</sub> (18.4 pmol/L) and highly suppressed TSH level (0.02 uIU/ml) with positive anti TPO and anti TG antibodies. Random blood sugar was 550 mg/dl with urine sugar 3+and urine ketone negative. Glycosylated hemoglobin level was 13%.

Treating physician increased the daily dose of oral neomercazole and propranolol to 60 mg and 80 mg respectively. patient was started on sliding scale of subcutaneous insulin injection for control of hyperglycemia (daily requirement 85-90 units).He showed considerable symptomatic improvement and repeat thyroid function test revealed normal free T<sub>3</sub> (3.6 pmol/L), T<sub>4</sub> (12 pmol/L) and highly suppressed TSH level (0.038 uIU/ml) after two weeks of therapy.

Patient was advised radioiodine therapy for treatment of Grave's disease but he refused the same. Hence thyroidectomy was planned.

Patient was asked to continue with T neomercazole and propranolol along with omission of subcutaneous insulin on day of surgery. Anxiolysis was attained with Injection

midazolam 1 mg IV. Baseline parameter revealed heart rate 79 bpm, BP 130/70 mm/hg, spo<sub>2</sub>99% on room air and temperature 37.4°C. Second wide bore Intravenous access was secured. Drugs like Lignocaine, Dopamine, Steroid, Neomercazole, Esmolol, Insulin, cold intravenous fluid with defibrillator and difficult airway cart were kept ready.

Patient was induced with injection fentanyl 70 mcg, thiopentone 150 mg and Vecuronium 4 mg followed by Injection lignocaine 50 mg IV. Patient was intubated with 8.5 cuffed flexometalic tube followed by 14 Fr orogastric tube insertion.

Intraoperative course was uneventful. Base line HGT was 130 mg/dl. Patient was maintained on glucose insulin drip (500 ml of 5% DNS and 12 units of insulin) in titrated dose to maintain HGT in range of 130-180 mg/dl throughout procedure. Near total thyroidectomy was done with preservation of bilateral recurrent laryngeal nerve and part of parathyroid gland. Intraoperative blood loss was 900 ml, replaced with 500 ml of colloid and one unit of packed cell volume and urine output was 350 ml. IV Injection Fentanyl upto 100 mcg, Paracetamol 1 gm and wound infiltration with 0.25% bupivacaine was given for analgesia. Post extubation laryngoscopy revealed bilateral vocal cord movement. Patient was shifted to intensive care unit for further management. Antithyroid drug and beta blocker were continued in postoperative period. Serum calcium level was monitored and necessary supplement was given. Patient was discharged home on post-operative day 8.

## DISCUSSION

Worsening of hyperthyroid symptoms (with ongoing medical therapy) and newly developed ophthalmopathy, dermopathy with raised antithyroid antibody titer supports the diagnosis of grave's disease in our patient. Hyperthyroid symptoms like increase appetite, increase ingestion of cold water due to heat intolerance, increase urination and use of beta blocker must have masked clinical features of diabetes in our patient. This highlights the difficulty in distinguishing the symptoms of the two conditions from each other at the onset of diabetes on history taking. 15-30% of patients with type I diabetes mellitus known to have coexisting autoimmune thyroid disease.<sup>[5]</sup> Its association is more frequent in patients with positive anti TPO antibody, female gender and old age.<sup>[6]</sup> Hyperthyroid state precipitates diabetic ketoacidosis and uncontrolled hyperglycemia is a trigger for thyroid storm.<sup>[7, 8]</sup> Early detection of antibodies and latent organ dysfunction may help physician to start appropriate and timely treatment to avoid end stage organ disease.<sup>[5]</sup> Hence such patient should be screened for presence of diabetes mellitus in preoperative period. Thyroidectomy was planned as it achieves euthyroid state faster and is treatment of choice in grave's ophthalmopathy despite of ongoing Antithyroid medication.<sup>[9]</sup> Blood sugar was controlled with subcutaneous insulin on sliding scale in preoperative

period. Anaesthesia concerns in our patients were presence of Grave's disease and type I diabetes mellitus, mitral regurgitation, eye proptosis and vascular thyroid gland.

Preoperative Neomercazole helps to decrease synthesis of T4 and TSH receptor antibody thus enhance remission of disease but it requires 6 to 8 weeks of therapy due to large store of drugs in gland.<sup>[1,3]</sup> High incidence of relapse is noted with its use. Propranolol helps in reducing sympathetic activity and vascularity of gland thus allowing safe mobilization in shorter time.<sup>[10]</sup> Premedication with glycopyrrolate was avoided because it interfere heat regulating (sweating) mechanism and cause tachycardia.<sup>[1,5]</sup> Thiopentone sodium was used for induction due to its antithyroid property.<sup>[3]</sup> Injection lignocaine was used to blunt cardiovascular response to intubation and laryngoscopy.<sup>[1,3]</sup> Anaesthesia was maintained with Sevoflurane due to less myocardial depression and arrhythmia potential.<sup>[1]</sup> Nonkinkable flexometalic tube was chosen for intubation as tracheal manipulation may results in compression of tube. Care was taken to avoid bradycardia, rise in systemic vascular resistance and anesthetic agent induced myocardial depression as it helped in reducing fraction of regurgitant volume in our patient with mitral regurgitation.<sup>[1]</sup> Orogastric tube was inserted for administration for neomercazole in emergency intraoperative use. Warming devices (with inbuilt cooling mode at 32°C) were instituted prior for emergency intraoperative use. Eyes were lubricated with methyl cellulose eye drops and padding was done with cotton gauze. Incision site infiltration with adrenaline was withheld. Depth of anaesthesia and analgesia was maintained to avoid sympathetic response. Injection glycopyrrolate was preferred over atropine during reversal. Neomercazole, beta blocker and calcium were continued in immediate postoperative period as surgery do not results in immediate resolution of symptoms.

## CONCLUSION

Patients with Grave's disease should be screened for presence of type I diabetes mellitus. Presence of anti TPO antibody, female gender and old age in Grave's disease patient has frequent association with type I diabetes mellitus. If untreated, both these condition can complicate the course of disease. Preoperative optimization of hyperglycemia and hyperthyroidism results in good outcome.

## REFERENCES

1. Roberta L Katherine E M. Stoelting's Anaesthesia and co-existing disease 5<sup>th</sup> ed.
2. Sass E, Michael B, Sandy B, Jeremy H, John N, Ed Waters. Anesthesia case Management for Thyroidectomy. AANA Journal 2010; 78(2): 151-160.
3. Miller R D, Lars I E. Miller's Anaesthesia. 7<sup>th</sup> ed elsevier.

4. Cruz A, Akaishi PM, Vargas MA, de Paula SA. Association between thyroid autoimmune dysfunction and non-thyroid autoimmune diseases. *ophthal plast reconstr surg* 2007; 23(2): 104-8.
5. Van den D, Eenkhon V, Van Gaal L, De Block C. Type I Diabetes Mellitus and Autoimmune polyglandular syndrome: clinical review. *Neth J Med* 2009; 67(11): 376-87.
6. Sharifi F, Ghasemi L, Mousavinasab L. Thyroid function and antithyroid antibody in Iranian patient with type I diabetes mellitus: influence of age and sex. *Iran J Allergy Asthma Immunol* 2008; 7(1): 31-6.
7. Ahmad FA, Mukhopadhyay B. Simultaneous Presentation of Type I Diabetes and grave's disease. *Scott med j* 2011; 56(1): 59.
8. Erica O, Naoki H, Mariko S, Natsumi M, Ryo I, Rika Set al. Thyroid storm associated with grave's disease covered by diabetic ketoacidosis: A Case Report *Thyroid Res* 2011; 4:8.
9. Alsanea O, Clark OH. Treatment of Grave's Disease: the advantages of surgery. *endocrinol metab clin north am.* 2000; 29(2): 321-37.
10. Tay S, Khoo E, Tancharoen C, Lee I. Beta-blockers and the thyrotoxic patient for thyroid and non-thyroid surgery: A clinical review. *OA Anaesthetics* 2013 Mar 01; 1(1): 5.