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Case Report of Thyroid Storm with no precipitating Illness

KEYWORDS: fever with delirium, exophthalmos, sinus tachycardia, scoring system, Propylthiouracil

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ABSTRACT

A 45 yr old female presented with delirium and shortness of breath of acute onset. She was a known hypertensive and on regular anti hypertensive medication. On examination Patient was febrile and having tachycardia, exopthalomos and swelling over front of the neck moving with deglutition.ECG was normal at the time admission except for sinus tachycardia. Laboratory evaluation revealed excess thyroid hormone levels and other causes of metabolic encephalopathy (Serum Electrolytes are normal, RBS are normoglycemic, Urea was Normal) have been ruled out. Patient was diagnosed as a case of Thyroid storm based on the scoring system.With high doses of Propylthiouracil patient responded well and recovered without any cardiac manifestations and patient was discharged with maintenance antithyroid drugs.

INTRODUCTION :

Objective of presenting this case of thyroid storm, is that it can occur in a case of undiagnosed and untreated thyrotoxicosis subject without any precipitating cause such as acute illness or surgery. Prompt therapy with anti thyroid drugs and supporting care will prevent mortality from cardiac causes which may precipitate in the event of delayed treatment or delayed presentation to health facility.

CASE HISTORY :

A 45 year old Female patient by name Malleswari resident of Vijayawada presented to Causality of Siddhartha Medical College ,Vijayawada with Chief Complaints of altered sensorium since 4 days and shortness of breath since 4 days. h/o Fever present, No h/o Vomitings, Loose stools No h/o trauma, convulsions No h/o weakness of limbs No h/o Headache ,

H/o palpitations present, No h/o chest pain

No Jaundice, No clubbing, No cyanosis, No Pedal Odema/ No Generalized Lymphadenopathy .

Vital Data : Pulse : 124/Min, Regular

BP 150/80 mm of Hg.

Patient is Febrile, Temp is 104°*F*

RR 22/Min ,Thoracoabdominal

Syst Exam : CVS : S_1 S_2 + , Tachycardia +; Rs : B/L NVBS .

H/o Shortness Of Breath – Acute onset with NYHA Grade 2 static ,

Patient has no similar complaints in the past

Patient is knowno HTN since 4 months and asthmatic since 7yrs on inhalers

Patient takes mixed diet and belongs to low socioeconomic group

Examination Findings include :

Patient Drowsy not following oral commands

Head to Toe : Pallor+, Exopthalmos + ,

Butterfly shaped swelling present over front of neck , Moving with deglutition. CNS : Pt drowsy , Not following oral commands Plantar B/L Flexor.

Lab Findings : RBS : 130 mg/dl, Haemoglobin 11g/dl,

SGOT- 22 IU, SGPT -20 IU ALP -35 IU ;

Sr Creatinine : 2.0. CHEST XRAY : Normal Findings ECG : Sinus Tachycardia with LV

THYROID PROFILE: T3 - 6.51ng/ml (0.8 – 2.0ng/dl) , T4- 24.86 µg/dl (Normal 5.1 to 14.1 µg/dl),

TSH - 0.008 (0.4 to 4.5 mIU/mL) ;

USG Neck : showing both lobes of thyroid and isthmus are enlarged s/o thyroidomegaly with heterogeneous nodules measuring 2.5x1cm in left lobe thyroid. Impression: Diffuse thyromegaly with nodule in left lobe

Patient improved with Propylthiouracil and Propranolol and hydrocortisone.

After 5 days - T4 levels came down to 9.41

Burch and Wartofsky have delineated a point system assessing degrees of dysfunction in various systems (thermoregulatory, central nervous, gastrointestinal, and cardiovascular). Scoring system: A score of 45 or greater is highly suggestive of thyroid storm; a score of 25–44 is suggestive of impending storm, and a score below 25 is unlikely to

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represent thyroid storm.

Our subject had a score of 50 points (temperature, 15; central nervous system effects, 20; cardiovascular dysfunction, 15; and according to the diagnostic criteria (Table 1); these data were indicative of ***a thyroid storm.***

Emergency therapy was initiated. Patient was given Oral Propyl thiouracil (PTU)600mg loading dose followed by 300mg three times a day and Beta-antagonist, Propranolol 40mg qid, dose adjusted to control tachycardia and potassium iodide (5 drops SSKI every 6 h) , Hydrocortisone IV ,50 mg every 6hrly.

Patient improved with anti thyroid drugs ,beta blocker and hydrocortisone and patient in due course didn't develop any cardiovascular abnormalities patient was discharged in satisfactory condition

Cause of Thyroid excess in our case is Grave's disease. As Graves disease is evident from the clinical features diffuse goitre on palpation, ophthalmopathy and laboratory confirmation of excess thyroid.

DIAGNOSTIC CRITERIA OF THYROID STORM – SCORING

Gastrointestinal-hepatic dysfunction		Heart Failure		Precipitant History	
Moderate	10	Mild :	5	Negative	0
Diarrhoea		Pedal edema	Positive		
Nausea/vomiting		Moderate :	10	Positive	10
Abdominal Pain		Bibasilar Rales			
Severe	20				
Unexplained Jaundice		Severe :	15		
40.0 and above		Pulmonary edema			

Thermoregulatoty dysunction		Central Nervous System Effects		Cardio Vascular Dysfuntion	
Temperature (°C)		Mild :	10	Tachycardia	
37.2 to 37.7	5	Agitation		99 to 109	5
37.8 to 38.2	10	Moderate :	20	110 to 119	10
38.3 to 38.8	15	Delirium, Psychosis		120 to 129	15
38.9 to 39.2	20	Extreme Lethargy		130 to 139	20
39.3 to 39.9	25	Severe :	30	>140	25
40.0 and above	30	Seizure,Coma			

DISCUSSION

A thyroid storm is a rare condition affecting 1%–2% of patients with hyperthyroidism. It is a life-threatening condition and is reported to have a fatality rate of 50%–90% if left untreated or 20%–30% if treated. The mortality rate due to thyroid storm ranges from 20 to 30%.

Thyrotoxic crisis, or *thyroid storm*, is rare and presents as a life-threatening exacerbation of hyperthyroidism, accompanied by fever, delirium, seizures, coma, vomiting, diarrhoea, and jaundice. The mortality rate due to cardiac failure, arrhythmia, or hyperthermia as high as 30%, even with treatment.

Thyrotoxic crisis is usually precipitated by acute illness (e.g., stroke, infection, trauma, diabetic ketoacidosis), surgery (especially on the thyroid), or radioiodine treatment of a patient with partially treated or untreated hyperthyroidism. Management requires intensive monitoring and supportive care, identification and treatment of the precipitating cause, and measures that reduce thyroid hormone synthesis. Extreme hyperpyrexia over 40°C predominates in clinical presentation, which also includes tremor, nausea, vomiting, dehydration, diarrhoea, prostration, central nervous system disturbances (agitation, somnolence, coma), and cardiovascular symptoms (tachycardia, rapid atrial fibrillation and congestive heart failure).

It has been reported that a thyroid storm may affect the heart owing to early repolarization and coronary artery spasms . The effects of thyroid hormones on the heart are as follows: accelerated protein and messenger RNA synthesis in myocardial cells; Na–K adenylpyrophosphatase (ATPase) hyperactivity; increased Ca_2^+ transport; an increased number of β-receptors; a reduced refractory phase; and a low stimulus threshold.

Treatment : Emergency therapy is indicated when Thyroid storm is present or when hyperthyroidism exacerbates heart failure or an acute coronary syndrome. It includes rapid inhibition of thyroid hormone synthesis(and conversion of T4 to tri- iodo thyronine[T3])by the thionamide PTU; inhibition of thyroid hormone secretion by iodine; and inhibition of cardiovascular effects by beta-adrenergic antagonists. Administering glucocorticoids to decrease peripheral conversion of T4 to T3. This may also be useful in preventing relative adrenal insufficiency due to hyperthyroidism. Large doses of propylthiouracil (600 mg loading dose and 200–300 mg every 6 h) should be given orally or by nasogastric tube or per rectum; the drug's inhibitory action on T4 - T3 conversion makes it the antithyroid drug of choice. One hour after the first dose of propylthiouracil, stable iodide is given to block thyroid hormone synthesis via the ***Wolff-Chaikoff effect*** (the delay allows the antithyroid drug to prevent the excess iodine from being incorporated into new hormone). A saturated solution of potassium iodide (5 drops SSKI every 6 h), or ipodate or iopanoic acid (500 mg per 12 h), may be given orally. (Sodium iodide, 0.25 g IV every 6 h, is an alternative but is not generally available.) Propranolol should also be given to reduce tachycardia and other adrenergic manifestations (40–60 mg PO every 4 h; or 2 mg IV every 4 h). Although other -adrenergic blockers like esmolol can be used, high doses of propranolol decrease T4 - T3 conversion, and

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the doses can be easily adjusted. Caution is needed to avoid acute negative inotropic effects, but controlling the heart rate is important, as some patients develop a form of high-output heart failure. Additional therapeutic measures include glucocorticoids, antibiotics if infection is present, cooling, oxygen, and intravenous fluids. Plasma freeT4 should be measured every 3 to 7 days. When free T4 approaches the normal range, the doses of PTU and iodine should be gradually decreased. Iodine can usually be stopped at the time of hospital discharge ,and radioactive iodine(RAI) therapy for Grave's disease or toxic multinodular goiter can be scheduled 2 to 3 weeks later.If long term thionamide therapy is chosen instead of RAI, PTU should be stopped and methimazole used instead. Prompt treatment and Supportive care prevented our subject from landing into any of serious systemic complications as reported before.

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