HYPERTHYROIDISM, CAUSE OF PANCYTOPENIA IN A SURGICAL PATIENT, A RARE PRESENTATION

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KEY WORDS

Hyperthyroidism, Pancytopenia
ABSTRACT

Pancytopenia is a rare complication of hyperthyroidism. Various mechanisms have been described such as immunological, bone marrow suppression. The possibility of hyperthyroidism must be considered in patients with unexplained pancytopenia. Various cases have been described that have shown the association between hyperthyroidism and pancytopenia.

This report describes a 62yr female who presented to the emergency department of Tribhuvan University Teaching Hospital, Kathmandu, Nepal with a history of fall injury. On further investigations to explain her symptoms she was found to have pancytopenia and deranged thyroid functions. The possible cause of her pancytopenia was most likely hyperthyroidism as it resolved after treatment of hyperthyroidism.

Though the definite mechanism regarding the association of pancytopenia with hyperthyroidism hasn’t been described, various cases have been described in the literature. Any patient with unexplained pancytopenia should undergo thyroid function tests to rule out hyperthyroidism.

INTRODUCTION/BACKGROUND

Atypical manifestations of hyperthyroidism include hematological, cardiovascular, dermatological manifestations. Hyperthyroidism can be associated with various hematological disorders. Especially single lineage abnormalities such as anemia (34%), leukopenia (5.8%), thrombocytopenia (3.3%) are reported, but pancytopenia is a rare presentation of hyperthyroidism\(^1,2,5,6\). The suspected etiologic mechanisms include ineffective hematopoiesis, reduction in blood cell life span, autoimmune process\(^3,4\), toxicity of thyroid hormone.
CASE DESCRIPTION

A 62 year old female presented to the emergency room in November 2013 with history of fall from one storey building. The patient had sustained impact over the trunk region and now had pain abdomen. On clinical examination her blood pressure was 90/60mmHg, pulse rate was 110/min, temperature was 98.6 degree Farenheit and respiratory rate was 20/min. She was pale and had diffuse nodular enlargement of the thyroid glands. Pansystolic murmur was present over the mitral and tricuspid regions. Fine basal crepitations was heard over both lung fields. Left upper quadrant tenderness was also present.

A complete blood count analysis was done in the emergency and the results showed pancytopenia with hemoglobin of 7.4gm/dl (normal: 12-16 gm/dl), WBC count of 3400/ μl (normal: 4000-11,000/ μl) and platelet count of 91,000/ μl (normal 1,50,000-4,00,000/ μl).Electrocardiography in the emergency showed multiple ventricular premature complexes. Ultrasound of the abdomen showed splenic laceration with splenic hematoma extending up to the hilum. Contrast enhanced computed tomography of the abdomen showed findings consistent with grade II splenic injury.

Under the impression of grade II splenic injury with pancytopenia, the patient was admitted to the intensive care unit for conservative management and further workup.

From history, patient is a non-vegetarian. She is a smoker with a pack year of 40. No fever or signs of gastrointestinal bleeding was present. Ultrasound of the neck in the surgical intensive care unit showed multiple heteroechoic nodules with calcification in both lobes of thyroid, findings suggestive of multinodular goiter. Echocardiography showed severe tricuspid regurgitation and mitral regurgitation. Bone marrow aspiration showed mixed normocellular and a few hypercellular marrow fragments. Absolute retics and peripheral blood smear were normal. Hormonal studies showed features suggestive of hyperthyroidism. (Table 1)
The patient's hemoglobin improved with two units of packed cells transfusion but the WBC and platelet count didn’t improve. On the third day of admission, she developed a temperature of 102 degree Fahrenheit, pulse rate of 150-160/min, respiratory rate of 30/min and saturation of 75-80% at 5L/min of oxygen via face mask. On examination the patient was agitated and had diffuse crepitations over both lung fields. On ECG monitoring she had multiple VPCs per minute. With the impression of thyroid storm, the patient was started on hydrocortisone, oral propranolol 40mg q6hrly (intravenous preparation not available), and oral carbimazole 10mg q8hrly (propylthiouracil was not used due to deranged liver functions). After 24 hours the patient's pulse rate stabilized between 80-100 bpm, temperature was 99 degree farenheit and there were only few VPCs per minute. Propranolol was gradually tapered over a period of one week and her pulse rate stabilized at 60 to 80 bpm. After two weeks of starting carbimazole, her WBC and platelet counts started improving and became normal at discharge (Table 2). The chest crepitations decreased and the patient was gradually weaned from oxygen. She was maintaining saturation of 88 – 90% in room air at the time of discharge.

The patient was advised for the need of radionuclide thyroid scan and further treatment after that but she refused to undergo any further investigations.

**DISCUSSION**

Our patient has multinodular goiter (most likely toxic but radionuclide scanning wasn’t done) with thyrotoxicosis, complicated with thyroid storm, bicytopenia and arrhythmias. All these symptoms resolved after treatment of the thyrotoxicosis. The anemia of our patient was likely due to the combined effects of both splenic injury and thyrotoxicosis. Decreased WBC and platelet count was most likely due to thyrotoxicosis as these resolved with treatment of the problem. The bone marrow of our patient showed mixed normocellular and few hypercellular fragments. Thus, the bone marrow failure disorders, such as aplastic
anemia and myelodysplasia could be ruled out. Drug-induced pancytopenia was also unlikely since patient never took any drug prior to hospital visit. The peripheral blood did not show any typical features of vitamin B12 deficiency such as macrocytosis or neutrophil hypersegmentation. This patient developed features of thyroid storm on the third day of admission and after bone marrow aspiration was done. Initially we thought that sepsis could be the cause but most of the symptoms and signs pointed towards thyroid storm as the more obvious cause. Besides her symptoms and signs improved with propranolol and antithyroid medications.

The pathogenesis of pancytopenia in hyperthyroidism is still poorly understood. Immunological mechanisms have been suggested to be involved in the reduction of the life-span of blood cells and platelets\textsuperscript{4}. Two patients were reported by Duquenne et al. who showed signs of macrophage activation with eosinophilia in their bone marrow, which were compatible with an immuno-allergy reaction\textsuperscript{4}. In addition, antineutrophil antibodies and antiplatelet antibodies have been detected in the serum of patients with thyrotoxicosis\textsuperscript{7,8}. Shaw and Mehta reported a case of post-bone marrow transplant pancytopenia which was related to hyperthyroidism\textsuperscript{9}. They thus postulated that thyroid hormone may have a direct effect on hematopoiesis at a stage earlier than erythropoietic stem cell differentiation, disturb maturation and differentiation of the pluripotent stem cells\textsuperscript{9}. A reduced marrow granulocyte reserve has also been described in association with hyperthyroidism and attributed to the direct toxicity of the thyroid hormones\textsuperscript{10}. Raina et al. described a case of pancytopenia with hypercellular bone marrow related to Graves’ disease\textsuperscript{6}.

In conclusion, pancytopenia can be a possible manifestation of hyperthyroidism. Although the exact mechanism is still unclear, recovery from hyperthyroidism is associated with resolution of pancytopenia. Thus any patient with unexplained pancytopenia should be investigated to rule out hyperthyroidism.
CONSENT

Written informed consent was obtained from the patient for publication of this Case report and any accompanying images.

AUTHORS’ CONTRIBUTION

PJ, BG carried out the conception and design of the study. PJ, RB, RK acquired the data. YPS gave the final approval. All the authors are accountable in all aspects of the work.

REFERENCES


Article within a journal

TABLES AND FIGURES

Table 1: Thyroid Function Test at Admission
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Table 2: Investigations at admission and improvement of pancytopenia with treatment
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