Pancytopenia with cellular bone marrow related to Graves’ hyperthyroidism

Sir,

Thyrotoxicosis affects hematopoiesis in several ways, although clinically important abnormalities are rare. Pancytopenia is a rare but serious complication of thyrotoxicosis. A case of Graves’ hyperthyroidism associated with pancytopenia and cellular bone marrow is described.

A 27-year-old male was admitted with history of progressive weight loss for 6 months, increased stool frequency of normal consistency for 5 months and easy fatigability for 2 months. History of episodic palpitations and sweating was present for 1 month. His appetite was normal. There was no significant past history of any illness. General physical examination revealed pallor and tachycardia with a pulse...
rate of 104/min. Wide pulse pressure (70 mmHg) was recorded on blood pressure measurement. Postural hand tremor was present. Examination of neck revealed diffuse thymomegaly, and bruit was present. Means-Lerman scratch was heard. Rest of the examination was within normal limits. On hematological investigations, pancytopenia was observed. The results of serial hemogram done are shown in Table 1. RBC morphology on peripheral smear revealed predominantly normocytic normochromic cell population with few microcytes showing mild hypochromia. Bone marrow aspirate was particulate and cellular with M:E ratio of 2:1. Erythropoiesis was predominantly normoblastic with occasional micronormoblasts also seen. Myelopoiesis and megalakaryocytes were normal. Biochemistry profile and chest X-ray were normal. Sinus tachycardia was observed on ECG and echocardiography was normal. Thyroid function test showed T3 level to be 495.2 ng/dl (normal 70–204), T4 level 25.3 µg/dl (normal 5.2–12.5) and thyroid stimulating hormone (TSH) activity to be 0.01 uIU/ml (normal 0.35–5.5). Thyroid ultrasound revealed both lobes of thyroid enlarged and heterogeneous in echotexture. Color Doppler of thyroid gland showed highly increased inferno type of vascularity. Thyroid scan (99m Tc04) showed enlargement of both lobes of thyroid with increased homogenous tracer uptake. No photopenic areas were appreciated in the gland. The diagnosis of Graves’ hyperthyroidism was based on the clinical features, biochemical manifestations of hyperthyroidism and laboratory features. Patient was put on carbimazole (30 mg/day) and antibiotic cover based on the clinical features, biochemical manifestations of the gland. The diagnosis of Graves’ hyperthyroidism was based on the clinical features, biochemical manifestations of hyperthyroidism and laboratory features. Patient was put on carbimazole (30 mg/day) and antibiotic cover for neutropenia. No vitamin supplements were given with the treatment of thyrotoxicosis. With the resolution of thyrotoxic state and return to euthyroid status, the hematological parameters also returned to normal as shown in Table 1.

Pancytopenia is a serious hematological disorder that, apart from primary marrow failure, may be secondary to several other conditions. These include infection, radiation, drugs (especially cytotoxic drugs), and certain metabolic diseases.[1] Pancytopenia is a rare but severe complication of thyrotoxicosis.[2] Few case reports have been recorded in literature.[1,3] Single lineage abnormalities related to hyperthyroidism are more commonly reported than pancytopenia. Although the mechanism of pancytopenia in patients with hyperthyroidism is unclear, it might be related to the reduced life span of whole blood components partially due to the autoimmune mechanism and/or disturbances in maturation and differentiation of the pluripotent stem cells. Organ sequestration as in hypersplenism is also a known mechanism.[4,5] The fact that pancytopenia resolved with reversal of hyperthyroidism provides ample testimony to the casual relationship between the two conditions. It is concluded that (1) a hematologic evaluation of all patients with Graves’ disease should be performed before administering antithyroid drugs, (2) antithyroid drugs may be administered to patients with pancytopenia and bone marrow hypercellularity, but a reevaluation of the bone marrow must be done if there is no recovery of the peripheral blood cell count when euthyroid state is achieved and (3) a thyroid evaluation of patients with pancytopenia should be done, even if no related symptoms are present.

**Table 1: Serial hemogram before and after treatment**

| Parameter         | Day of admission | 3 days later | 4 weeks after treatment |
|-------------------|------------------|-------------|-------------------------|
| Hemoglobin (gm%)  | 9.5              | 9.5         | 12.5                    |
| MCV (80–100 fl)   | 88               | 86          | 90                      |
| MCH (25–32 pg)    | 27.6             | 25          | 28.5                    |
| MCHC (28–36 g/dl) | 29.4             | 29          | 32.4                    |
| RDW-CV (<15.5%)   | 14.6             | 14          | 14.2                    |
| TLC (cells/mm³)   | 2400             | 2390        | 6400                    |
| DLC               |                  |             |                         |
| Polymorphs        | 62               | 61          | 60                      |
| Lymphocytes       | 37               | 33          | 38                      |
| Monocytes         | 1                | 3           | 1                       |
| Eosinophils       | 0                | 3           | 1                       |
| Platelets (per mm³)| 80,000         | 59,000     | 167,000                 |
| ESR (mm 1st hour)| 12               | 15          | 13                      |

MCV: Mean corpuscular volume, MCH: Mean corpuscular hemoglobin, MCHC: Mean corpuscular hemoglobin concentration, RDW-CV: Red cell distribution width coefficient variation, TLC: Total leucocyte count, DLC: Differential leucocyte count.

**References**

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**Letters to the Editor**

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