

PERIPHERAL BLOOD FINDINGS IN THYROTOXICOSIS

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SUMMARY: Peripheral blood findings (Hematocrit, white blood cell count, platelet count and formula) were evaluated in 116 patients with thyrotoxicosis and compared with controls. Mean hematocrit (39%) was within normal limits although it was lower than controls. White blood cell count (6109/cumm) was also within normal limits. Percentage and number of neutrophils in patients (50.4%-3113/cumm) were lower than controls (69.6%-4013/cumm). However percentage and number of lymphocytes in patients (43.9%-2669/cumm) were higher than controls (27%-1560). 73% of the patients had atypical mononuclear cells in their peripheral blood smears. These parameters were not different between diffuse and nodular thyrotoxicosis. Platelet count below 150000/cumm was found in only 3 cases.

Key Words: Thyrotoxicosis, neutropenia, Lymphocytosis, thrombocytopenia.

INTRODUCTION

It is known that some changes occur in peripheral cells in thyrotoxicosis. For example both of anemia and polycytemia may occur (2). Chronic blood loss and hypoacidity which are frequent in thyrotoxicosis may cause hypochromic anemia. Megaloblastic anemia is associated with folate consumption or pernicious anemia which seen 3% of cases of thyrotoxicosis (2). The decreased red cell survival or abnormal iron utilization may contribute anemia (1).

Data about the white blood cell count is contradictory, neutropenia and at least relative lymphocytosis are seen in 10% of the cases with thyrotoxicosis (1). Caro found clear increase in lymphocytes, Kocher found relative or absolute lymphocytosis with relative or absolute neutropenia which was named Kocher's blood picture (4). These findings were confirmed in two large series but De Quervain found that these findings were not different from controls (4). Generally accepted notion is

mild or moderate absolute lymphocytosis and it may be higher than 50% (2). There is no relationship between the disease severity and lymphocytosis (4). In some cases virocytes seen in viral diseases are observed (2). Herts and Lerman defined absolute and relative monocytosis, and eosinophilia has been defined (2, 4). Lymphocytosis and eosinophilia has been attributed to relative adrenocortical dysfunction (2).

On the other thyrotoxicosis-thrombocytopenia connection is well known and it is estimated that there is Graves disease in 8-14% of the patients with idiopathic thrombocytopenic purpura (3, 5). In one study it has been shown that 43% of the untreated hyperthyroid cases have platelet count below 150.000/cumm (5).

MATERIALS AND METHODS

Our study group was consisted of 116 patients thyrotoxicosis and control group was consisted of 50 healthy persons. History, physical examination, T₃-T₄ and thyroid scanning were evaluated. T₃ and T₄ were measured with radio immunoassay. Normal limits for T₃ is 0,7-2 ng/ml and 4-12 µg/dl for T₄ in our

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laboratory. If there is no nodule in thyroid scanning it was evaluated as diffuse, if there is only one nodule it was evaluated as solitary and if there is more than one nodule it was evaluated as multi-nodular goitre. Hematocrit, white blood cell count and platelet count were measured with routine methods. Peripheral blood smears were stained with giemsa and differential was made by counting 100 cells.

Statistical analysis was performed with F and t tests.

RESULTS

The number of the patients with thyrotoxicosis was 116; 91 of them were females and 25 of them were males. The mean age of the patients, T₃ and T₄ values and the number of the diffuse and nodular cases were shown in Table 1.

Hematological parameters which included hematocrit, white cell count, lymphocyte and neutrophil counts and differential and comparison of these with controls were shown in Table 2. There was statistically significant difference in hematocrit between patients and controls. Hct was below 33% in 8 cases that the cause of anemia was iron deficiency anemia due to gastrointestinal or genitourinary blood loss.

White blood cell count was not different between patients and controls. WBC count was between 2600-10000/cumm (mean 6109) and was lower than 3600/cumm in 9 cases. PMN leukocyte count was between 1000-7800/cumm (mean 3111) and PMN per-

centage was between 15-81% (mean 50%). PMN count and percentage were statistically different from controls (p<0.004) while total WBC count was not different (p<0.3209) between patients and controls. Lymphocyte percentage was between 14-83 (mean 43%) and was different between patients and controls (p<0.001). Lymphocyte count was between 835-6179/cumm (mean 2669) and was different between patients and controls. In addition there was no difference in lymphocyte and neutrophil counts and percentage between diffuse and nodular groups.

A typical mononuclear cells were detected in 73% of the patients. However these cells were seen in only 2 of the controls.

Platelet count was normal in all but 3 cases. In these 3 cases platelet count was below 150000/cumm (30.000-80.000-112.000).

DISCUSSION

The mean hematocrit level in patients with thyrotoxicosis was within normal limits but lower than the controls. The cause of this diversity was the anemia of the 8 patients and the cause of anemia was gastrointestinal and/or genitourinary blood loss. So that the anemia of these 8 patients was not associated with thyrotoxicosis. Megaloblastic anemia which is suggested as frequent in thyrotoxicosis was not determined in our cases, besides thyrotoxicosis was not determined in our patients with megaloblastic anemia.

Table 1

| | Diffuse | Toxic multinodular | Solitary nodular | Total |
|------------------------|-----------|--------------------|------------------|-----------|
| Number of the cases | 87 | 10 | 19 | 116 |
| Mean age | 34 | 40 | 46 | 37 |
| T ₃ (ng/ml) | 4.6±1.6 | 3.5±1.8 | 2.7± 1.2 | 4.2±1.6 |
| T ₄ (g/dl) | 18.9± 3.9 | 17.0± 4.1 | 18.6±7.6 | 18.7± 4.7 |

Table 2

| | Diffuse | Solitary nodular | Multinodular | Total (patient) | Statistical analysis (patient) | Control | Statistical analysis Patient-Control |
|------------------|---------------|------------------|---------------|-----------------|--------------------------------|---------|--------------------------------------|
| Hematocrit | 39.1±5.1 | 40.0±4.00 | 39.3±3.60 | 39.2±4.80 | p 0.2797 | 43.60 | p 0.000 |
| WBC/cumm. | 6058±1912 | 6163±2161 | 6449±2183 | 6109±1976 | p 0.1841 | 5759 | 0.3209 |
| Neutrophil (%) | 50.4±11.8 | 51.5±14.0 | 48.0±17.4 | 50.4±12.8 | p 0.2551 | 69.60 | 0.000 |
| Neutrophil count | 3093.3±1220.0 | 3232.4±1678.8 | 3035.7±1202.0 | 3111.1±1302.6 | p 0.1072 | 40.13 | 0.0004 |
| Lymphocyte (%) | 43.6±11.8 | 43.5±14.2 | 42.2±17.1 | 43.9±12.7 | p 0.3604 | 27.0 p | 0.000 |
| Lymphocyte count | 2635.8±1080.5 | 2606.8±1084.7 | 3082.9±1504.0 | 2669.5±1120.8 | p 0.7498 | 156.0 | 0.00 |

Neutrophil and lymphocyte values were compatible with Kocher's blood picture (4). But all of the cases followed by Kocher were Basedow while our 29 cases had toxic nodular guatr and differential of WBC was not different between nodular and diffuse thyrotoxicosis. This point was interesting for us.

On the other hand only 3 cases (2.58%) had thrombocytopenia and thrombocytopenia ratio was lower than the literature data which is reported between 8-14% in patients with idiopathic thrombocytopenic purpura. Besides we studied T₃-T₄ levels in patients with idiopathic thrombocytopenic purpura and we did not find thyrotoxicosis in these patients. But we found thyrotoxicosis in 3 thrombocytopenic cases secondary to chronic Lymphocytic leukemia (6).

From these results we conclude that 1) Lymphocytosis encountered in Graves disease may not be related with autoimmune phenomenon as suggested it may be due to the direct effect of thyroid hormone, 2) Thrombocytopenia is not a very common finding in thyrotoxicosis.

At the end we can say that further studies about this matter must be done.

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