

Original article

Hematological profile of patients with Acromegaly in Iraq

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ABSTRACT

Background: Acromegaly is a disease characterized by growth hormone and insulin like growth factor hypersecretion due mostly to pituitary somatotrophic adenoma. The diagnosis of Acromegaly is usually delayed for years exposing patients to slowly evolving chronic complications.

Objectives: To explore the value of performing peripheral blood examination as routine work up in monitoring Iraqi patients with Acromegaly.

Patients and Methods: This study was conducted on 38 patients with Acromegaly attending the national center for diabetes research and management. Peripheral blood indices were done by hematological analyzer and blood film stained by Gemisa stain for proper cells morphology done at hematological unit in Iraqi center for cancer and genetics research.

Results: The patients examined showed higher values compared with control group in platelets indices (MPV and PDW) that were statistically non-significant. The monocyte count was significantly lower in patients compared by control group ($p < 0.05$). Two patients were found to suffer from thrombocytopenia. One male with mild thrombocytopenia, the second is female with moderate thrombocytopenia. One female with moderate iron deficiency anemia.

Conclusion: Peripheral blood exam in patients with Acromegaly is highly indicated, low cost and valuable in follow up patients.

Keywords: acromegaly, hematological profile

Introduction

Acromegaly is a disease characterized by growth hormone (GH) and insulin like growth factor-1 (IGF-1) hyper secretion due to in most cases to a pituitary

somatotropic adenoma ⁽¹⁾. The diagnosis of acromegaly is usually delayed four years, exposing patients to slowly evolving chronic complication ⁽²⁾. Diabetes mellitus (DM) and

cardio vascular events are one recognized^(2,3). Peripheral white blood cells (WBC) count has been shown to be associated with type 2 diabetes and coronary arteries distend (CAD).⁽⁴⁾

Peripheral blood leucocytes are composed of granulocytes monocytes as well as lymphocytes.⁽⁵⁾ Leucocyte can be activated by advanced glycation and products, oxidative stress and cytokines in the state of hyperglycemia.⁽⁶⁾

Leucocyte may be activated by tumor necrosis factor α (TNF- α), transforming growth factor - β 1 (TGF- β 1) to participate in the pathogenesis of diabetic microvascular and macrovascular complications. Elevated differential cell count neutrophils, monocytes and eosinophils also predict the future incident of CAD.⁽⁷⁾ Anemia is an independent risk factor for the development of cardiac morbidity and mortality⁽⁸⁾. Decreased hemoglobin levels are known to be associated with an increased risk of coronary atherosclerosis due to increase in blood flow and shear stress resulting in endothelial damage and vessel wall thickness^(9,10,11,12).

The aim of our study is to evaluate the peripheral blood finding in Iraqi acromegaly patients on octreotide.

Patients and Methods:

Patients with acromegaly who entered a disease management program at center for diabetic from the period of October 2013 to October 2014. We prospectively analyzed (38) patients Male (22) and Female (16) with acromegaly receiving octreotide LAR (Novartis) and control group (20) person matched with age and gender of the patients group.

The present study was approved by the human research ethics committee of our center and informed consent was obtained from each patient included in our data. Each patient participated in a detailed history. All of the patients underwent complete physical and medical examination (height, weight, blood pressure, ECG, chest x-rays).

For the study (2 ml) of venous blood was collected in EDTA tubes, the full blood cell indices (Hb, PCV, RBC counts, MCV, MCH, MCHC, RDW-CV, RDW-SD, WBC count, Neutrophils, Lymphocytes and Monocytes count, platelets count, MPV, PDW and PCT) were performed on (Mindray 3000) hematology analyzer working on principle of light scattering. The counter was maintained according to the manual instructions of manufacturer.

Blood smear were performed using Giemsa stain for proper differential WBC

count and cell morphology. The test was preformed within one hour from blood collection. The test was done at hematological unit at Iraqi center for cancer and medical genetic research.

Statistical Analysis:

All Values were expressed as mean \pm SD. Comparison between control and patients when performed using two tailed students t-test and were corridors significant if the obtained P value was lower than 0.05.

Results:

A total 38 patients Male (22) and Female (16) with age range (25- 70) years were included in the present study. Table (1) clearly demonstrated that the lymphocytes count of the acromegaly patients mean (2.4 ± 0.6) were non- significant ($P > 0.05$) as compared to the control group mean (2.6 ± 0.5). While the monocyte count of the patients group mean (0.3 ± 0.1) was significantly lower than the control group mean (0.5 ± 0.1) with P value of (< 0.05).

Regarding red cell indices the Hemoglobin of patients mean (13.7 ± 1.9) was higher than control group mean (13.4 ± 1.4) However, non-significant different was noticed. Considering the platelet indices in table (1) revealed that MPV of patients is

higher than control group. The PDW of patients (14.7 ± 0.2) were higher than the control (14.1 ± 0.6). However non – significant difference were found.

Our data revealed that 16 patients out 38 patients included in our study suffering from diabetes mellitus representing (42%) of all acromegaly patients examined.

Table (2) showed comparison between diabetics group (16 acromegaly patients) and non -diabetic group (22 acromegaly patients). In spite of non-significant difference in the platelets indices (MPV and PDW) however the diabetic group that mean Value of MPV (9.9 ± 0.7) higher than that of non-diabetic group (9.6 ± 0.6) similar by the mean value of PDW in diabetic group (14.8 ± 0.2) higher than that of non-diabetic group (14.7 ± 0.2).

Two patients were found to have thrombocytopenia, the 40 years Male with hypertension, while the second is 57 years Female had co morbidity of hypertension, thyrotoxicosis, and diabetes.

Only one female with 44 years old complains of moderate iron deficiency anemia Hb (8.1 g/dl), iron status were performed iron (85 mg/dl) total iron binding capacity (688 mg/dl) transferrin saturation (12.35 %) moreover the ferritin (10 ng/ml).

Table 1: Means of hematological parameters in Acromegaly patients and controls

Parameters	Acromegaly (n=38)		Control (n=20)		P.value
	Mean ± SD		Mean ± SD		
WBC	7.4	1.7	7.7	1.1	N.S
Neutrophil (N)	4.5	1.3	4.5	0.8	N.S
Lymphocytes (L)	2.4	0.6	2.6	0.5	N.S
Monocytes (M)	0.3	0.1	0.5	0.1	P < 0.05
Hb	13.7	1.9	13.4	1.4	N.S
PCV	41.4	5.1	40.8	3.1	N.S
Red blood cells (RBC)	5.2	1.5	4.8	0.2	N.S
MCV	83.2	6.3	81.7	4.7	N.S
MCH	28.3	2.7	28.8	3.2	N.S
MCHC	329.7	52.2	322.3	26.8	N.S
RDW(CV)	13.3	1.1	13.9	1.8	N.S
RDW(SD)	37.2	4.9	36.8	1.9	N.S
Platelets (PLT)	236.8	62.1	236.2	62.4	N.S
MPV	9.7	0.6	9.3	0.6	N.S
PDW	14.7	0.2	14.1	0.6	N.S
PCT	0.2	0.05	0.3	0.05	N.S

N.S: Non-significant.

Table 2: Means of hematological parameters in Diabetic acromegaly patients and Non diabetic acromegaly

Parameters	Diabetic Acromegaly (n=16)		Non Diabetic Acromegaly (n=22)		P.value
	Mean ± SD		Mean ± SD		
WBC	8.0	2.0	7.0	1.5	N.S
Neutrophil (N)	10.9	16.3	9.6	17.0	N.S
Lymphocytes (L)	7.4	13.1	5.1	8.9	N.S
Monocytes (M)	0.9	1.6	0.6	1.1	N.S
Hb	13.9	1.4	13.5	2.2	N.S
PCV	42.1	4.1	40.9	5.7	N.S
Red blood cells (RBC)	5.6	2.3	5.0	0.4	N.S
MCV	84.6	4.2	82.3	7.5	N.S
MCH	28.9	1.6	27.8	3.2	N.S
MCHC	320.1	78.5	336.7	16.7	N.S
RDW(CV)	19.8	27.2	13.5	1.4	N.S
RDW(SD)	36.2	1.9	38.0	6.2	N.S
Platelets (PLT)	223.7	64.8	246.4	59.8	N.S
MPV	9.9	0.7	9.6	0.5	N.S
PDW	14.8	0.2	14.7	0.2	N.S
PCT	0.2	0.1	0.2	0.05	N.S

Discussion:

Our data revealed that all acromegaly patients that (MCV) values within normal limit, moreover, non-significant differences in MCV values in both the patients and control groups were noticed. It is well known that octreotide LAR has an effect on vitamin B₁₂ metabolism (manual instruction of the drug) Arising in MCV value precedes the anemia by months and non-macrocytic anemia never results from vitamin B₁₂ deficiency unless coexistence of iron deficiency or thalassemia traits ^(13, 14, 15).

In megaloblastic anemia because of the progressive nature of gradual replacement of normocytic cells with macrocytic progeny of megaloblastic bone marrow, the earliest change in red cell indices is an increase in (RDW) that reflects an increase in anisocytosis of red cells ⁽¹⁶⁾ however, an increase in RDW is also found in iron deficiency anemia and thalassemia traits which are prevalent in our population ^(17,18) regarding the WBC count, the present study showed that the value of WBC in acromegaly group is non- significantly difference with control .

The monocytes count is significantly lower in the patients group compared with the control group (P<0.05).

The WBC count is regarded as inflammatory marker; these findings indicate that the inflammatory system is not chronically active in the acromegaly patients.

Also a study conducted by potter et al (2008) when they found that both inflammatory markers, (C-reactive protein) (CRP) level and leucocytes count were similar in patients and controls recently groups, another study performed by Verheist etal (2012) showed that high sensitive c-reactive protein is significantly lower in acromegaly patients compared with the control group ^(19,20).

In fact, growth hormone and insulin like growth factor excess induces a specific cardiomyopathy. Rhythm disturbances and valve dysfunction are also frequent in acromegaly but the coronary artery disease is less than expected which had associated with inflammatory process ^(21, 22). The present study identify that the platelets indices the MPV and PDW showed that both are higher in patients groups compared with the control groups. An increase in MPV value is regarded as an independent risk factor for thromboembolism, stroke and myocardial infarction.⁽²³⁾.

Recent study in India showed that both MPV and PDW are significantly higher

in diabetic patients compared with the control group⁽²⁴⁾.

The present study showed that (42%) of acromegaly patients had diabetes mellitus, however, when we compare the both platelets indices (MPV and PDW) between the diabetic acromegaly patients and the non-diabetic acromegaly patients a non-significant difference were identified. In spite of higher values in both platelets indices in diabetic group than mean value (9.9) non diabetic groups mean value (9.3) this could be explain that the sample size of the patient is small to have a realistic result.

This study showed two patients suffering from thrombocytopenia, the cause of thrombocytopenia could not be identify and further investigation are needed to clarify the causative agent, only one acromegaly female found to have moderate iron deficiency anemia because of menorrhagia which could be due to hormonal disturbances.

Further studies are recommended to include plasma FVIII, fibrinogen level and high sensitive C - reactive protein with WBC count and differential count as inflammatory markers in acromegaly patients in conclusion peripheral blood examination acromegaly patients is highly indicated, low cost test and valuable in follow up acromegaly patients.

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