
Anemia profile in a sample of Iraqi type 2 diabetic patients without renal impairment

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Abstract

Background: Anemia is an increasingly recognized entity in patients with diabetes mellitus, for whom it constitutes an additional burden.

Objective of the study: To throw a light on anemia profile in a sample of type 2 diabetic patients without renal impairment.

Methods & Materials: In a cross sectional study a sample include 123 patients which were collected from primary health care center in Baghdad. At each routine visit, In addition to Hb level standard indices were recorded from blood testing, including creatinine, urea, postprandial blood glucose and urine examination in addition to blood film. Patients were classified as anemic as per the WHO criteria, in male less than 13 g/dl and in non pregnant female less than 12g/dl. The prevalence and types of anemia were identified.

Results: During the period of study, a total of 123 patients with type 2 diabetes, male represent 54 (43.9%) and female represent 69 (56.1%). Thirty nine percent (39%) had anemia. prevalence of anemia was higher in men than in women (27.6 % vs. 11.3%). blood film of 48 anemic patients shows that 77.1 % with normochromic normocytic anemia, and 22.9% with hypochromic microcytic anemia.

Conclusion: Anemia was relatively common in patients attending routine outpatient, and it's more common in males than females.

Recommendation: Routine Screening for anemia in the diabetes out-patient clinic, including those without renal impairment is vital.

Keyword: Anemia, Type 2 diabetes, renal impairment

Introduction

World Health Organization statistics identify 150 million people with diabetes mellitus worldwide and suggest that this figure may double by 2025.

However, whether anemia may be worsened and/or directly, at least in part, caused by diabetes is not clearly elucidated yet ^[1].

Anemia is a below-normal level of hemoglobin or hematocrit ^[2]. Studies show that having Anemia along with diabetes may increase the likelihood of developing diabetic eye disease, developing heart disease or having a stroke. ^[3] People who have both diabetes and Anemia are more likely to die earlier than those who have diabetes but not anemia. ^[4]

High death rates are even more common in anemic people with diabetes who also have heart failure and/or kidney disease. ^[5] While managing Anemia may be life saving in some circumstances, treatment has not proven to guarantee a longer lifespan. Anemia can cause commonly recognized forms of morbidity such as fatigue and exertional breathlessness, but in patients with diabetes anemia has also been found to be an independent risk factor for diabetic retinopathy. Many factors have been suggested as the reason for the earlier onset of anemia in patients with diabetes, including severe symptomatic autonomic neuropathy, causing efferent sympathetic denervation of the kidney and loss of appropriate erythropoietin production; damage to the

renal interstitium; systemic inflammation; and inhibition of erythropoietin release. It has also been shown that a normochromic, normocytic anemia can occur before evidence of renal impairment is present ^[6].

Current American Diabetes Association recommendations for standards of care of people with diabetes do recommend annual screening for the presence of anemia ^[7].

Anemia associated with deficiency of erythropoietin has been reported to occur early in diabetic nephropathy ^[8] and anemia has been reported to be associated with more rapid progression of renal disease in diabetes. Furthermore, treatment of anemia in subjects with diabetes has been associated with reported benefits ^[9]. For this we highlighting the importance of awareness of anemia in patients with diabetes.

Aim of the study

To throw a light on anemia profile in a sample of type 2 diabetic patients without renal impairment.

Methods & Materials

The study designed as cross sectional; the sample included 123 diabetic patients collected from a primary health care center in Baghdad during their routine visit during the period: October 2009 to May 2010 according to the following inclusion criteria:

1. Type 2 diabetic patient on oral hypoglycemic with duration less than 5 years.
2. Normal serum creatinine levels (men ≤ 1.5 mg/dl and women ≤ 1.4 mg/dl)¹⁰
3. Creatinine clearance > 90 ml/min (According to Cockcroft-Gault equation)

Creatinine clearance (ml/min) = $140 - \text{age} \times \text{weight (Kg)} / 72 \times \text{S. Creatinine mg/dl}$.

Multiply by 0.85 for women¹⁰.

4. Negative urine for protein.

While the exclusion criteria include:

1. Pregnant female.
2. Female with abnormal menstrual bleeding.
3. History of overt blood loss.
4. Overt cause of anemia.

At each routine visit, In addition to Hb level, standard indices were recorded from blood testing, including S. Creatinine, B. urea, postprandial blood glucose, urine examination and blood film to determine the type of anemia. Patients were classified as anemic as per the WHO criteria, in male less than 13 g/dl and in non- pregnant female less than 12g/dl .weight for each patient were obtained to complete the calculation of creatinine clearance equation. Statistical analyses were performed using the

statistical software (SPSS for Windows, ver.17). The results were expressed as mean $\pm$ SD.

Results

The total patients with type 2 diabetes is 123, male 54 (43.9%) and female 69 (56.1%).Thirty nine percent (39%) had anemia (Hb < 12 g/dl for women and < 13 g/dl for men). prevalence of anemia was higher in men than in women (27.6 % vs. 11.4%) (Figure1).

A median Hb level was 13 g/dl (range 12.7-16.8) and 12.6 g/dl (range 10.9-15.5) in males and females respectively. Mean hemoglobin concentration in male was 13.3 g/dl and in female 13.4 g/dl. The median patient age was 60 year for males and 45 year for females. All patients have normal renal function at time of study; the mean B. urea is 36.6 mg/dl, mean S. Creatinine is 0.93 mg/dl and the mean Creatinine clearance 108 ml/min (Table 1 and 2).

Blood film of 48 anemic patients shows that 77.1 % with normochromic normocytic anemia, and 22.9% with hypochromic microcytic anemia (Figure 2).

For the females with RBS less than 180 mg/dl only 4.34% were anemic comparing with 15.9% with RBS more than 180 mg/dl. While in male 22.2% were anemic with RBS less than 180 mg/dl comparing with 40.7%.

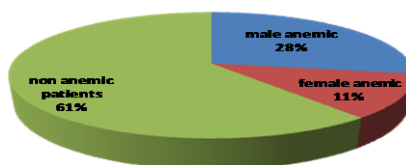


Figure (1,)

Table (1) Data for total group (N=123) expressed as (mean $\pm$ SD).

variable	Mean $\pm$ SD	
Age (year)	51.4797	10.49383
RBS (mg/dl)	207.8455	68.70536
UREA (mg/dl)	36.6504	7.69392
CREATININE (mg/dl)	0.93	0.20718
Hb (g/dl)	13.1203	1.64436
Creatinine clearance ml/min	108.3	3.54

Table (2) Gender specific distribution of variables expressed as (mean $\pm$ SD).

variable	Mean $\pm$ SD	
	MALE	FEMALE
Age (year)	48.57 $\pm$ 12.030	44.45 $\pm$ 7.321
RBS (mg/dl)	218.8298 $\pm$ 69.32166	206.0725 $\pm$ 66.09070
CREATININE (mg/dl)	0.9319 $\pm$ 0.21780	0.93 $\pm$ 0.20520
UREA (mg/dl)	37.7021 $\pm$ 8.10506	36.5072 $\pm$ 7.50024
Hb(g/dl)	13.3745 $\pm$ 1.68193	13.4768 $\pm$ 1.67193

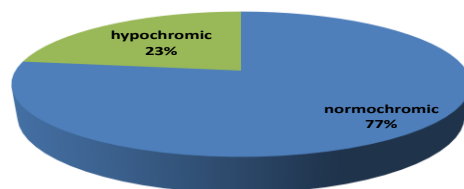


Figure (2) distribution of anemia according to types

Discussion

This cross sectional study found that, Thirty nine percent (39%) had unrecognized anemia (Hb <12 g/dl for women and <13 g/dl for men as by WHO).

(The prevalence of anemia in other cross-sectional studies of patients with diabetes is of 14 to 23%).

The mean age was 51.4 years (range 20-78 year).

This prevalence is two to three times lesser than for patients with comparable diabetes and renal impairment and two to three times more than anemia in general population^[11].

The measured prevalence of anemia varies depending on both the sample studied and the definitions used.

One of the largest studies that are most comparable to our study is the Third NHANES population-based sample of 15,419 participants from the general public in the USA. This study defined anemia as Hb level <13g/dl in men and <12g/dl in women which is the same for WHO definition ,and found that at the age of 60 years and with maintained renal function (estimated GFR of 90 ml/min per 1.73m²) the prevalence of anemia is 31%^[12]. It should be noted that our study did not aim to determine the cause of the anemia.

Prevalence of anemia was higher in men than in women (27.6 % vs. 11.3%). In other study, 8 of the 45 male patients (17.8%) and 2 of the 17 female patients (11.8%) were classified as anemic^[13]. Of the women in our sample, 29% were aged 50 years and above were therefore likely to be menopausal.

Gender was considered as a significant influencing factor for the prevalence of anemia in the general population^[14].

At time of study 63% of the patients were with poor glycemic control with postprandial blood sugar level more than 180 mg/dl.

This study showed that of 48 anemic patients 77.1 % had normochromic normocytic anemia, and 22.9% had hypochromic microcytic anemia. Anemia is an important and frequent component of diabetic nephropathy that may begin early in the course of the chronic renal disease of diabetics^[15].

The relatively high prevalence of anemia amongst those with apparently normal renal function, as measured by serum creatinine, suggests that such screening should not be limited to those with overt nephropathy.

Conclusion

Anemia is a common accompaniment to diabetes. Additional factors present in diabetes rather than renal impairment may contribute to the development of anemia in patients with diabetes.

Anemia was relatively common in patients attending for routine outpatient diabetes clinic, and it's more common in males than females.

Recommendation

Routine Screening in the diabetes out-patient clinic, including those without renal impairment for anemia is vital.

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