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Anaemic Profile in Diabetic Patients.

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ABSTRACT

Diabetes is a chronic disease that represents a heterogeneous group of metabolic disorders that includes hyperglycaemia & is a major cause of morbidity & mortality all over the world. Anaemia is a common blood disorder. It is an increasingly recognized entity in patients with diabetes mellitus. It is considered as a key indicator of chronic kidney disease, eye disease, and an important cardiovascular risk factor. This was a cross-sectional study involving the patient attending the special diabetic OPD in Madha Medical College & Research Institute, Chennai. Sample size of 70 type II diabetic patients aged between 40 to 60 years was selected. the increased duration of diabetes predisposes to anaemia. The peripheral smear analysis shows the 55% normal smear & 45% presents with anaemia. In that 45%,24% is normocytic normochromic ,18% is microcytic hypochromic& 3% is megaloblastic. Therefore, the normocytic normochromic anaemia is more prevalent followed by microcytic hypochromic. A small fraction of megaloblastic anaemia was also identified. Thus, anaemia is a public health problem in the diabetes patients. Evaluation of anaemia should be considered in the routine management of persons with diabetes and should be treated to minimize the risk of complications.

Keywords: Anaemia, Types, Duration, Diabetes

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INTRODUCTION

Diabetes is a chronic disease that represents a heterogeneous group of metabolic disorders that includes hyperglycaemia & is a major cause of morbidity & mortality all over the world [1]. Anaemia is a common blood disorder [2]. It is an increasingly recognized entity in patients with diabetes mellitus [3]. It is considered as a key indicator of chronic kidney disease, eye disease, and an important cardiovascular risk factor [4].

Diabetes are twice as likely to have anaemia, compared to those with similar degree of renal impairment from other causes [1]. Nevertheless, there is an increasing number of diabetic patients without renal impairment who are anaemic.

However, various hypotheses have been proposed including tubulo-interstitial disease, chronic renal hypoxia, hyperglycaemia, systemic inflammation, symptomatic autonomic neuropathy causing efferent denervation of the kidney & loss of erythropoietin production, altered iron metabolism, inhibition of erythropoietin release & drugs [2]. Anaemia is associated with the increased risk of vascular complications of diabetes including nephropathy, retinopathy, neuropathy, impaired wound healing & macrovascular disease [5]. Anaemia along with diabetes is an alarming condition because of increased risk of developing eye disease, heart disease, or a stroke [11].

MATERIALS AND METHODOLOGY

This was a cross-sectional study involving the patient attending the special diabetic OPD in Madha Medical College & Research Institute, Chennai. Sample size of 70 type II diabetic patients aged between 40 to 60 years was selected. Type I diabetes mellitus & the gestational diabetes were excluded from the study. Blood glucose levels were measured using God Pod method by Erba. The patient were considered as diabetic if he/she had the fasting blood glucose >126 mg/dl, postprandial blood glucose >140mg/dl & random blood glucose >200mg/dl. While the presence of anaemia was diagnosed by WHO criteria as haemoglobin level <13gm/dl for men &<12gm/dl for women. Blood samples were collected from the subjects by the trained phlebotomists under aseptic conditions by standard phlebotomy technique. Blood samples were collected into sodium fluoride &tripotassium ethylenediamine tetraacetic acid anticoagulants for haemoglobin, mean corpuscular volume, mean corpuscular haemoglobin, mean corpuscular haemoglobin concentration measurements respectively.

Complete blood count was done by sysmex. Peripheral smear was studied for identifying the different types of anaemia. To assess the kidney function, urea & creatinine levels were measured. The history of heart burn, abdominal bloating, malena, early fullness while eating meals was noted down by oral questioning.

RESULTS

	0-3	3.1 to6	6.1 to 9	>9.1
■ No.	31	21	5	7
■ Hb	14	12	3	5
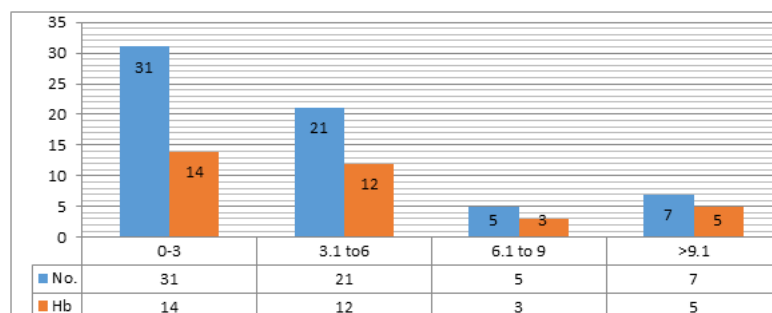
Figure 1: Duration of Diabetes with Anaemia

With the obtained result Fig. 1 shows that as the duration of diabetes increases, the haemoglobin level decreases. Therefore, the increased duration of diabetes predisposes to anaemia. Thus it shows that up to 3 years only 45% of the patient is anaemic, then from 3.1 to 6 years anaemic range increases to 57%, from 6.1 to 9 years it is 60% & more than, 9 years it is 71%.
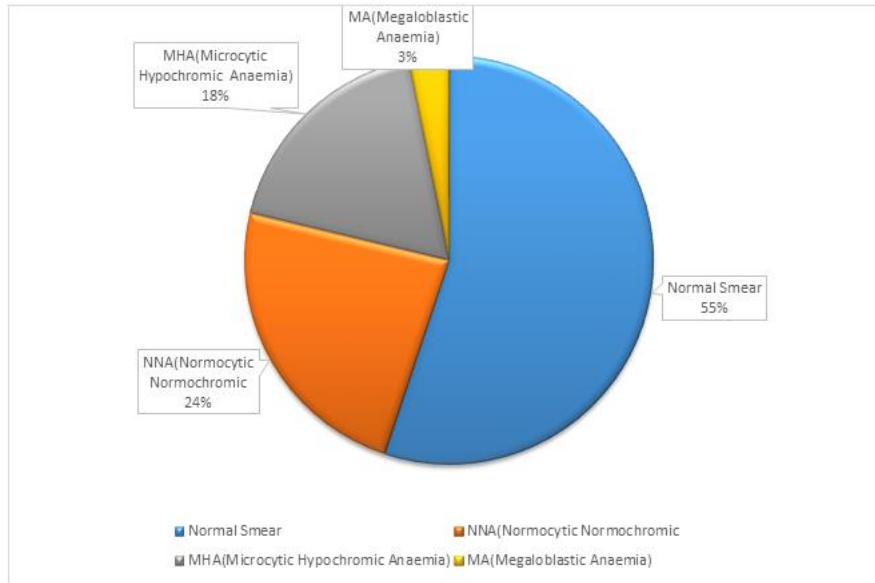
Figure 2: Peripheral smear analysis in diabetic patients

The peripheral smear analysis for these patients shows   55%   normal smear, & 45% presents with anaemia as shown in Fig.2. In that 45%, 24% is normocytic normochromic, 18% is microcytic hypochromic & 3% is megaloblastic. Among the diabetic patients presenting with anaemia, 53% is normocytic normochromic anaemia, 40%   is microcytic hypochromic anaemia & 7% is Megaloblastic anaemia. Therefore, normocytic normochromic type is found to be most prevalent followed by microcytic hypochromic type. A small fraction of megaloblastic anaemia was also identified.

DISCUSSION

Anaemia is common in diabetics than general population [6]. Anaemia predisposes to hypoxic insult which may potentially contribute to different complications of diabetes. Studies are on record to show that albuminuria and retinopathy, two microvascular complications of diabetes are associated with anaemia [6]. Anaemia has a negative impact on patient survival, and is considered to be an important cardiovascular risk factor. Understanding the pathogenesis of anaemia associated with diabetes & may therefore lead to opportunities for developing interventions to optimize outcomes in these patients [7]. This cross-sectional study involves the smaller population with 45% of the diabetic patients presents with anaemia in contrast to the previous study reports 15.3% & 19.6% [8] Poorly controlled diabetes has the increased susceptibility to impaired erythropoietin production & release as a result of diabetic autonomic neuropathy [9]. Erythropoietin production & release is regulated in part by autonomic nervous system, suggesting that erythropoietin production could be prematurely impaired in patients with poor glycaemic control with diabetic autonomic neuropathy [10]. The majority of the study population had normocytic normochromic, mild anaemia similar to a recent study in Hong-Kong, while fewer had microcytic & megaloblastic anaemia [11].

In our study, about 53% of the patients presents with normocytic normochromic anaemia. This supports the hypotheses of hypo proliferative anaemia due to deficiency of erythropoietin to have the most dominating influence [12]. In a study anaemia was found to be a common problem to diabetic patients with albuminuria or reduced renal function [13]. This study demonstrated that anaemia is an early and common complication of diabetes and those patients at greater risk of anaemia could be readily identified. A previous study on diabetic patients with normal renal functions has shown that longstanding poorly controlled diabetes is associated with normocytic normochromic anaemia [14]. However, it has been established that diabetic autonomic neuropathy is a complication of poor glycaemic control [14]. The factors associated with poor glycaemic control among patients with type II diabetes are chronic diabetes, higher BMI, hypercholesterolemia, elevated LDL, patients who do not follow dietary regimens, do not practice any physical activity, all these factors were reported in one of the previous study [1].

Previous studies on diabetic patients have shown that long standing poorly controlled diabetes is associated with normocytic normochromic anaemia & precedes the clinical evidence of renal impairment [15]. Microcytic hypochromic anaemia, which made up 16% of the study population was primarily due to iron deficiency, impaired intestinal absorption, & increased risk of bleeding from platelet dysfunction. Iron deficiency anaemia is strongly linked to the upregulation of inflammatory cytokines & defective tissue responsiveness to erythropoietin inhibiting iron transport from tissue stores to erythroblast [16]. In our study 40% had microcytic hypochromic anaemia.

Metformin, the drug of choice for type II diabetes, is known to interfere with the absorption of vitamin B12, leading to B_{12} deficiency, causing megaloblastic anaemia [17]. 7% of our diabetic patients showed megaloblastic anaemia.

CONCLUSION

From the obtained result, it is concluded that as the duration of diabetes increases, the haemoglobin level decreases. Therefore, the increased duration of diabetes predisposes to anaemia. The peripheral smear analysis shows the 55% normal smear & 45% presents with anaemia. In that 45%,24% is normocytic normochromic ,18% is microcytic hypochromic& 3% is megaloblastic. Therefore, the normocytic normochromic anaemia is more prevalent followed by microcytic hypochromic. A small fraction of megaloblastic anaemia was also identified. Thus, anaemia is a public health problem in the diabetes patients. Evaluation of anaemia should be considered in the routine management of persons with diabetes and should be treated to minimize the risk of complications. Addressing anaemia in diabetic individuals may have a potential to make a great impact in managing these microvascular problems of anaemia. Management of diabetes at tertiary level should include mandatory routine haematological tests at follow-up visits enabling aggressive correction of anaemia to prevent other diabetic complications. It is known that early identification and correction of anaemia will benefit these patients. Therefore, there is need for proper diabetic care and management for diabetic patients, who have limited food choices and are more vulnerable to anaemia. The physician should recommend to iron & vitamin supplements & take nutritious iron-rich food. Besides patients should be motivated to use the medications as prescribed, continuous education should be recommended to encourage physical activity and diet regimen adherence. Correction of anaemia may have a significant role in prevention of other diabetic complications.

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