

STUDY OF PREVALENCE AND PATTERN OF ANAEMIA IN HYPOTHYROIDISMS. Periasamy¹, G. Prabhu², S. Balamurugan³, Aleemsarwar⁴¹Reader, Department of General Medicine, Rajah Muthiah Medical College.²Reader, Department of General Medicine, Rajah Muthiah Medical College.³Pharm.D (Internship), Department of Pharmacy Practice, Annamalai University.⁴Pharm.D (Internship), Department of Pharmacy Practice, Annamalai University.**ABSTRACT****BACKGROUND**

Hypothyroidism can cause a wide variety of haematological disorders and anaemia could be its first manifestation. Numerous mechanisms are involved in the pathogenesis of this anaemia that can be microcytic, macrocytic and normocytic. Microcytic anaemia is usually ascribed to malabsorption of iron and loss of iron by menorrhagia. Macrocytic anaemia is caused by malabsorption of vitamin B12, folic acid, pernicious anaemia and inadequate nutrition. Normocytic anaemia is characterised by reticulopenia, hypoplasia of erythroid lineage, decreased level of erythropoietin; mainly regular erythrocyte survival. We designed this study to investigate the incidence of anaemia and its morphological pattern in hypothyroidism patients in rural population.

AIM AND OBJECTIVE

This study is designed to investigate the incidence of anaemia and its morphological pattern in hypothyroidism patients in rural population.

METHODS AND MATERIALS

A prospective observational study was done in patients treated with evidence of hypothyroidism in RMMCH from February 2016 to May 2016. Patients with age >18 years, both genders on treatment with hypothyroidism and newly diagnosed were included. Patients with secondary cause for anaemia, malignancy, CKD and evidence of blood loss were excluded. A detailed clinical history and blood count with smear study was done after obtaining informed consent.

RESULT

In our present study, female predominance was 82% with more common age group between 31-40 years at 36%. Incidence of anaemia was found to be 70% where microcytic hypochromic anaemia was present in 34 patients (68 %) followed by macrocytic anaemia in 14 patients (28%) and normocytic normochromic anaemia in 2 patients (4%).

CONCLUSION

Incidence of anaemia was found to be 70% in hypothyroidism. Microcytic hypochromic anaemia was commonest type of anaemia in hypothyroid patients in rural population.

KEYWORDS

Anaemia, Hypothyroidism.

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INTRODUCTION

Anaemia is one of the common disorders affecting Indian population which may be further influenced by hypothyroidism. The prevalence of hypothyroidism differs from country to country and ranges from 2-5% of the population all over the world, which may increase up to 20% after 60 years of age.^[1] In India, a recent study reported prevalence of hypothyroidism as 3.9% and sub-clinical hypothyroidism as 9.4% in adults.^[2] Thyroid disorders affect females more than males.^[1,3,4] Thyroid hormones are essential for the normal development, differentiation, metabolic

balance, and physiological function of virtually all tissues.^[5] and thyroid function disorders are among the most common endocrine diseases.^[6,7,8,9] Thyroid disorders are associated with haematological abnormalities and anaemia is the most prevalent disorder.^[1,10,11,12,13] Anaemia has been defined in 20-60% of the patients with hypothyroidism.^[3,4,11] Hypothyroidism leads to deceleration of metabolic activity in the body. Almost all organ systems are affected and the severity of signs and symptoms depends on the age of occurrence and deficiency status of hormones. The most frequently encountered anaemia type is normochromic normocytic anaemia. Because, the reason of this is the bone marrow repression due to thyroid hormone deficiency which also causes defective erythropoietin production arising from the reduction in need of oxygen.^(14,15) Hypothyroidism can cause a wide variety of haematological disorders and anaemia could be its first manifestation. Numerous mechanisms are involved in the pathogenesis of these anaemias that can be microcytic, macrocytic and normocytic. Microcytic anaemia is usually ascribed to malabsorption of iron and loss of iron by menorrhagia.

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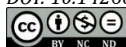
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Macrocytic anaemia is caused by malabsorption of vitamin B12, folic acid, pernicious anaemia and inadequate nutrition. Normocytic anaemia is characterised by reticulopenia, hypoplasia of erythroid lineage, decreased level of erythropoietin, mainly regular erythrocyte survival. We designed this study to investigate the incidence of anaemia and its morphological pattern in hypothyroidism patients in rural population.

AIM AND OBJECTIVE

To study the incidence of anaemia and its morphological pattern in hypothyroid patients in rural population.

MATERIALS AND METHODS

The present study was conducted at Rajah Muthiah Medical College Hospital from February 2016 to May 2016. A total number of 50 patients were enrolled after getting the informed consent. Anaemia has been defined as hemoglobin less than 13 g/dL in male and less than 12 g/dL in female.

Data was collected from the patient's case sheet in Rajah Muthiah Medical College Hospital, Annamalai University. Initially, we recorded demographic information (name, sex, age, etc.), the presence of anaemia in hypothyroidism and its complications, past history of all enrolled subjects. Thyroid function tests were performed using an electrochemiluminescence assay. The normal reference ranges for FT3, FT4 and TSH in our hospital's clinical laboratory were 1.4-4.4 pg/mL, 0.7-2.0 ng/dL, and 0.30-5.5 μ IU/mL respectively. A detailed clinical history and blood count with smear study was done. Statistics analysis was used to describe the baseline characteristics. The data collected was statistically analysed. Complete blood count (CBC) is analysed in automated analyser and peripheral smears were done by the Leishman stain.

Inclusion Criteria

All patients on treatment for hypothyroidism age more than 18 years of both gender, newly diagnosed patients were included. Patients with comorbidities such as hypertension, diabetes mellitus, obesity and dyslipidaemia were included in the study.

Exclusion Criteria

Patients with age <18 years, alcoholic, malignancy, blood loss, CKD, secondary cause for anaemia, chronic renal failure and pregnant females were excluded from the study.

RESULTS

In this study, blood parameters of 50 patients with hypothyroidism were investigated. The mean age of patient was 37.2 ± 14.7 years and varied between 18 to 85 years. 50 out of 41 were female (82%) and 9 were male (18%). 50 patients were enrolled in our study, majority of patients having comorbid conditions of hypertension (34%) followed by diabetes mellitus (38%), dyslipidaemia (22%) and obesity (6%). Hb level for defining the anaemia in female and male were <12 g/dL and <13 g/dL, respectively. The haemoglobin level was found to be between >7 to 11 g/dL for 6 male & 29 female patients and more than 11 g/dL was observed in 15 (3 male and 12 female). Highest number of population of 35 (6 males and 29 females) was seen in the range between <7-11 g/dL. This also was supported by female predominance.

Anaemia was morphologically classified and the frequency of Microcytic, Macrocytic and Normocytic anaemia for each male and female patient was determined. Microcytic Hypochromic anaemia was present in 68% of patients, Macrocytic hyperchromic anaemia was found in 28% and normocytic normochromic anaemia was present in 4% respectively.

Sl. No	Age	No. of Patients	% of Patients
1	18-30 years	9	18
2	31-40 years	22	44
3	41-50 years	8	16
4	51-60 years	7	14
5	61-70 years	2	4
6	>70 years	2	4
Total		50	100

Table 1: Age wise Distribution

Risk factors	No. of Patients	% of Patients
Hypertension	11	22
Diabetic mellitus	10	20
Dyslipidaemia	9	18
Obesity	3	6
HTN +DM	12	24
HTN+DM + Dyslipidaemia	5	10
Total	50	100

Table 2: Risk factors of Anaemia in Hypothyroidism

Haemoglobin Levels	Male	% of Patients	Female	% of Patients
<7	0	0	1	2
7-9	4	8	12	24
9-11	2	4	16	32
>11	3	6	12	24
Total	9	18%	41	82%

Table 3: Haemoglobin Levels

Types of Anaemia	Male	Female
Microcytic hypochromic	5 (10%)	29 (58%)
Macrocytic hyperchromic	4 (8%)	10 (20%)
Normocytic normochromic	0 (0%)	2 (4%)
Total	9 (18%)	41 (82%)

Table 4: Frequency of Anaemia in patients with Hypothyroidism

DISCUSSION

According to the WHO data, anaemia prevalence is 24.8% throughout the world and it is seen more frequently in underdeveloped countries.⁽¹⁶⁾ Anaemia is a severe public health problem in India, which may be precipitated by conditions such as hypothyroidism. In order to carry out the treatment of the patient with anaemia correctly, it is necessary to determine aetiological cause. The adverse effect of hypothyroidism on the haematological system can be anaemia development.⁽⁵⁾ The present study was carried out from February 2016 to May 2016 in RMMCH, a 1200-bedded multispecialty tertiary care teaching hospital located in South Arcot district. In our study, we examined this relationship of hypothyroidism with anaemia. A total of 50 patients enrolled in the study. Out of which 9 patients were male and 41 were female patients.

Similar to the study conducted by Mitrakazemic-Jahromi et al. in which a total of 70 patients 14 patients were male (20%)

and 56 were female (80%).⁽¹⁷⁾ In our study, it was found that maximum patients affected were female group under the age of 31-40 years (22 patients). The mean haemoglobin level in our study is 10.11 g/dL, is similar to the study conducted by G. Michael Felker, 4951 patients for this study. Anaemia was present in 1946 (39%) and absent in 3005 (61%), the mean Hb in this study 12.8 g/dL.⁽¹⁸⁾ In our study, anaemia frequency in male and female patients was found to be 18% and 82%, respectively. Incidence of anaemia was found to be 70% in hypothyroidism, similar to the study conducted by Chanchal Das et al. Prevalence of anaemia in subclinical and overt hypothyroid groups was 26.6% and 73.2% respectively.⁽¹⁹⁾ and other study conducted by Mehmet et al. Anaemia frequency in overt hypothyroid and subclinical hypothyroid groups was determined to be 43% and 39% respectively.⁽⁴⁾

Among the comorbid conditions, diabetes mellitus, hypertension and dyslipidaemia incidence was high among the study group. In patients suffering from anaemia in hypothyroidism, microcytic hypochromic is the highest underlying cause for the condition of which 58% are female and 10% are male, followed by macrocytic hyperchromic of which 8% are male and 20% female and normocytic normochromic of which 4% are female but no male patients. Similar to the study conducted by Chanchal Das et al in which a total of 60 patients, 26 patients (43.3%) had microcytic hypochromic anaemia.⁽¹⁹⁾ and other study conducted by Larson found that 52% (13 out of 25) of his patients of hypothyroidism had iron deficiency anaemia, based on the finding of a low determination of serum iron.⁽²⁰⁾ In our study, the most frequently encountered anaemia type is microcytic hypochromic anaemia. Iron deficiency anaemia largely due to menorrhagia occurring as a result of various hormonal instability and malabsorption observed in hypothyroidism. Similar to the study the most frequently encountered anaemia type is normochromic normocytic anaemia. Because the reason of this is the bone marrow repression due to thyroid hormone deficiency which also causes defective erythropoietin production arising from the reduction in need of oxygen (Fein HG et al).⁽²¹⁾

CONCLUSION

Hypothyroidism is the most common endocrinal disorder with variety of presentations. It has a detrimental effect on erythropoiesis which leads to depleted body iron store and anaemia. As women are most common sufferers of hypothyroidism even with adequate iodine intake there should be mass screening for thyroid function along with haematological parameters for early detection and intervention. Also, microcytic anaemia is the most common type of anaemia in hypothyroid patients. So, it is suggested that prompt and early recognition and treatment of hypothyroid is needed to prevent the risk of developing anaemia.

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