



RESEARCH ARTICLE

STUDY OF THYROID PROFILE IN GERIATRIC AND NON GERIARTIC DIABETES MELLITUS

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Manuscript Info

Manuscript History

Received: 28 February 2022

Final Accepted: 31 March 2022

Published: April 2022

Key words:-

Thyroid Profile, Geriatric Patients, Diabetes Mellitus

Abstract

Introduction: In clinical practice, diabetes mellitus (DM) and thyroid diseases are very common endocrine disorders. These are commonly affected by each other and association between both conditions have long been reported.

Objective: To Study correlation and association between Thyroid disorder and Diabetes mellitus in geriatric and non geriatric age group patients. To study correlation between TSH and HBA1C in previously diagnosed Diabetes Mellitus patients.

Method: The study includes 80 patients in geriatric age groups with type 2 diabetes mellitus visiting the Medicine out patients department. Thyroid profile were assayed A in type 2 diabetic patients.

Results: It was noted that thyroid dysfunction was prevalent in 41(51.25%) A out of the 80 geriatric age group patients with 31(38.75%) being hypothyroidism, 7 (8.7%) having subclinical hypothyroidism and 3 (3.7%) having a hyperthyroid state.

Conclusion: The study shows that screening should be strongly recommended for all type 2 diabetics to rule out thyroid dysfunction in patients with increasing age.

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Introduction:-

It has been noted that in the Indian population, incidence of thyroid disorder is common in Indian population and its incidence rises with advancing age¹.

The thyroid is one organ which helps to maintain the orchestra of the body². Its abnormality can range from an asymptomatic phase and can be as deadly as a seizure disorder or cardiac dysfunction.

In order to screen for the presence of thyroid disorder the routinely performed investigations are the biochemical markers of the thyroid gland function namely the TSH (thyroid stimulating hormone, free T3 and free T4. These laboratory parameters are relatively inexpensive and quite reliable³.

The studies have also suggested that it is better to screen for thyroid dysfunction in the diabetic patients on an annual basis as they are more prone for thyroid disorders⁴

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There are various studies that have shown a finding that a higher than normal prevalence of thyroid disorders in type 2 diabetic patients, of which hypothyroidism is the commonest disorder

When all thyroid disorders are considered, hypothyroidism is the commonest thyroid disorder in the overall adult population and more so in the elderly women. It is frequently autoimmune in nature and usually has a clinical presentation of primary atrophic hypothyroidism or Hashimoto's thyroiditis.⁵

India has a vast amount of aging population that has been increasing over the past few decades as a result of improvement in the economic status of individuals and the better health care facilities that are available⁶. With the increase in the aging population, there has been a rise in the prevalence of diseases of chronic nature like hypertension and diabetes mellitus⁶.

Diabetes mellitus is a disease which was known since the time people knew about medicine .it has been described in literature even before 2000 years⁷.

Owing to this we at the Sri Aurobindo medical college Indore , Madhya Pradesh India decided to evaluate the occurrence of thyroid dysfunction in patients who have been diagnosed with diabetes mellitus and also to compare the level of thyroid dysfunction in the younger and the older population .

Aims and Objective:-

Aim:

To assess the prevalence of thyroid dysfunction in previously diagnosed diabetes mellitus in geriatric and non geriatric patients

Objective:-

To Study correlation and association between Thyroid disorder and Diabetes mellitus in geriatric and non geriatric age group patients.

To study correlation between TSH and HBA1C in previously diagnosed Diabetes Mellitus patients.

Review Of Literature:-

1) Epidemiology

Diabetes mellitus is the commonest endocrine disorder that affects mankind. Diabetes mellitus is a disease that is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease⁸. The present scenario is such that, India has topped the world with the maximum number of individuals that have been affected by with diabetes mellitus⁸. Diabetes is a common disease affecting about 14.8% in rural and 19.7% in urban dwellers in India⁶.

2) Diabetes Mellitus

The criteria for diagnosis of diabetes are:

Diabetes can be diagnosed by the presence of the typical signs and symptoms of diabetes mellitus and evident rise of the blood glucose levels in the fasting state above 140 mg/dl, or the venous plasma glucose level more than 200 mg/dl exactly after 2 hours following a 75-g oral glucose challenge⁷. The relation of thyroid disorders and diabetes mellitus.

Thyroid gland is considered as one of the prime endocrine organs that is responsible for managing and coordinating almost every system in the body. One of the problems associated with thyroid is its enlargement referred to as the goiter⁹.

3) Anatomical considerations

The thyroid gland is a butterfly shaped gland that is situated in the anterior part of the neck occupying the region in front of the tracheal rings C2 to C4. The thyroid gland has its origin from the floor of the mouth at the level of foramen caecum where it begins as a cluster of cells then through the duct which traverses into the region of the neck after passing through the hyoid bone¹⁰.

Histology of thyroid gland:

The thyroid gland is surrounded by a capsule which has a thin layer of connective tissue. From this thyroid capsule there are various septa that extend into the parenchyma of the gland of the thyroid gland does dividing it into many lobules.

Functions of the thyroid gland:-

The thyroid gland acts as a master of orchestra controlling almost all organs in the body. Every cell in the body is likely the target of thyroid hormones. While not essential for life, the thyroid hormones have intense effects a lot of important physiological events that take place in the body like the development, growth, and metabolism¹¹

Material And Methods:-**Place Of Study :**

Sri Aurobindo medical college and Post Graduate Institute, Hospital, Indore India .

Duration Of Study:

18 Months (After approval from ethics committee)

Study Design :

The present study was an observational study.

Methodology:-**1. Source of data:**

Patients both male and female who came seeking medical attention at Sri Aurobindo medical college and Post Graduate Institute, Hospital, during the period of study, the test subjects patients having diabetes mellitus and healthy individuals (Controls) coming for regular health check-up with no co morbidities detected were included in this study as controls.

2. The chosen criteria Inclusion Criteria

- a. Age below 60 years is considered as non geriatric age group and greater than & equal to 60 years of age was considered geriatric age group in this study.
- b. According to the WHO age classification (1963) people aged 45 –59 are considered ‘middle aged’ and those above the age of 60 years are considered to be GERIATRICALS.
- c. Patient with Diabetes Mellitus.
- d. Patients with raised HBA1C level.
- e. Patients with elevated TSH level with raised blood sugars.
- f. Healthy individuals coming for executive health check-up as controls were included in the study.

Exclusion Criteria:-

1. Patients not giving written consent.
2. Patient only having Thyroid disorder.
3. Statistical Analysis Plan

A descriptive analysis of the population was carried out. The categorical or dichotomous variables were expressed as absolute values and percentages, and will be compared with Pearson test. The continuous variables with a normal distribution were described as the mean (+/-SD).

Variables were compared using Student T test/ANOVA test and those which who not present a Gaussian distribution were compared with the Mann-Whitney U test.

The correlation between two quantitative variables was carried out by using KARL PEARSON'S/ SPEARMEN'S coefficient of correlation.

Logistic relation was used to know the significant prediction. A P value less than .05 was considered statistically

Significant whereas a p value > 0.05 was taken as non-significant difference.

Result:-**Table 1:- Age.**

AGE	FREQUENCY	PERCENTAGE
31-40 YEARS	15	7.50%
41-50 YEARS	36	18.00%
51-60 YEARS	49	24.50%
61-70 YEARS	64	32.00%
71-80 YEARS	36	18.00%
GROUP	STATISTIC	AGE
OVERALL	MEAN	59.19
	SD	6.49
NON - GERIATRIC	MEAN	49.6
	SD	8.15
GERIATRIC	MEAN	68.78
	SD	4.83
PAIRED T TEST	P VALUE	<0.001
SIGNIFICANCE	vhs	

In the present study we noted that the overall mean age of the studycases was 59.19 years SD + 6.49 years. In the non -geriatric age group the mean age was 49.6 years SD + 8.15 years and in the geriatric age group the mean age was 68.78 years SD + 4.83 years. The commonest age group in the study was between the age of 61-70 years with of the study population .the age group in the present study ranged between the age of 30 years and 79 years .

Table 2:- Fbs

GROUP	STATISTIC	FBS in mg / dl
OVERALL	MEAN	194.16
	SD	77.93
GERIATRIC	MEAN	211.01
	SD	94.86923
NON-GERIATRIC	MEAN	177.30
	SD	60.99
PAIRED T TEST PVALUE		
	T TEST	0.00
SIGNIFICANCE	VHS	

In the present study we noted that the overall mean fasting blood sugarswere 194.16 mg/dl SD + 77.93 , in the geriatric group the mean fasting blood sugars were 211.01 mg/dl SD + 94.87 mg/dl and in theNon-geriatric group the mean fasting blood sugars were 177.30 mg/dl SD + 60.99 mg/dl

Table 3:- PPBS

GROUP	STATISTIC	PPBS
OVERALL	MEAN	259.2 4
	SD	106.1 7

GERIATRIC	MEAN	278.4 0
	SD	126.0 3
NON-GERIATRIC	MEAN	240.0 8
	SD	78.38
PAIRED T TEST P VALUE	T TEST	0.08
SIGNIFICANCE	T TEST	NS

In the present study we noted that the overall mean post-prandial bloodsugars were 259.24 mg/dl SD + 106.17 , in the geriatric group mean post-prandial blood sugars were 278 mg/dl SD + 126 mg/dl and in The Nongeriatric group the mean post-prandial blood sugars were 240mg/dl SD + 78 mg/dl.

Glycosylated Hemoglobin (Hba1c)

Table 4:- Glycosylated Hemoglobin

GROUP	STATISTIC	HBA1C
OVERALL	MEAN	9.34
	SD	2.69
GERIATRIC	MEAN	9.92
	SD	3.13
NON-GERIATRIC	MEAN	8.76
	SD	2.03
PAIRED T TEST PVALUE	T TEST	0.04
SIGNIFICANCE	S	

In the present study we noted that the overall mean glycosylatedhemoglobin were 9.34 % SD + 2.69 % , in the geriatric group the mean glycosylated hemoglobin were 9.92% SD + 3.13 % and in the Non-geriatric group the mean glycosylated hemoglobin were 8.76 % SD +2.03 % . In the present study we noted that the control of sugars were better in the younger population as compared to the geriatric group which was significant p= 0.04.

THYROID STIMULATING HORMONE -TSH 0.5 to 6.0 mIU/L)

Table 5:- Thyroid Stimulating Hormone.

GROUP	STATISTIC	TSH 0.5 to 6.0 mIU/L.
OVERALL	MEAN	3.89
	SD	4.57
NON -GERIATRIC	MEAN	4.63
	SD	5.15
	MEAN	5.86

GERIATRIC	SD	4.91
PAIRED T TEST P VALUE	T TEST	0.002
SIGNIFICANCE	S	

In the present study we noted that the overall mean levels of thyroid stimulating hormone were 3.89 mIU/L SD + 4.57 mIU/L, in the non-geriatric group the mean levels of thyroid stimulating hormone were 4.63 mIU/L SD + 5.15 mIU/L and in the geriatric group the mean levels of thyroid stimulating hormone were 5.86 mIU/L SD + 4.91 mIU/L. In the present study we noted that the thyroid stimulating hormone levels were higher in the older population as compared to the non-geriatric group which was significant $p=0.002$.

Subclinical Hypothyroidism

Table 6:- Subclinical Hypothyroidism.

Group	TSH	Frequency	Percent
non-geriatric (100 CASES)	Subclinical hypothyroid	16	16%
	Total hypothyroid	26	26%
Geriatric (100 CASES)	Subclinical hypothyroid	20	20%
	Total hypothyroid	31	31%
Overall (200 CASES)	Subclinical hypothyroid	36/200	18%
	Total hypothyroid	57/200	28.5%

In the non-geriatric age group we had 16% who were subclinical hypothyroid. In the geriatric age group we had 20% who were subclinical hypothyroid. Overall we had 18% who were subclinical hypothyroid.

Discussion:-

Thyroid dysfunction in diabetes in the study was as follows -

In the non-geriatric age group we had 2% who were hyperthyroid, 72% were euthyroid and 26% who were hypothyroid. In the geriatric age group we had 3% who were hyperthyroid, 66% who were euthyroid and 31% who were hypothyroid. In the present study we noted that the overall mean levels of thyroid stimulating hormone were 3.89 mg/dl SD + 4.57, in the non-geriatric group the mean levels of thyroid stimulating hormone were 4.63 mg/dl SD + 5.15 mg/dl and in the geriatric group the mean levels of thyroid stimulating hormone were 5.86 mg/dl SD + 4.54 mg/dl. In the present study we noted that the thyroid stimulating hormone levels were higher in the older population as compared to the non-geriatric group which was significant $p=0.002$.

The disease diabetes mellitus itself has a higher prevalence in males as compared to the females with the male to female ratio being (1.57:1), and this trend was same in both the study groups non-geriatric (1.8:1), and geriatric (1.68:1).

Al-Wazzan HT et al studies showed that the prevalence of thyroid dysfunction in T2DM was 12.9%. Subclinical hypothyroidism was the commonest abnormality (45.1%), followed by hypothyroidism (20.1%), subclinical hyperthyroidism (13.2%) and hyperthyroidism in (5.9%)¹² these findings are similar to three present study.¹³

Thyroid dysfunction was more in females.¹⁴ this finding is similar to the present study.

Ardekani AM et al stated that Hypothyroidism was the commonest followed by subclinical hypothyroidism and hyperthyroidism. we also had similar findings¹⁵

Ibrahim N Elebrashy et al stated that Hypothyroidism was found in 45.2% of patients (5.49 ± 3.37 μ IU/mL) versus 11.1% of controls (1.79 ± 1.21 μ IU/mL) ($P < 0.001$).¹⁶

Subclinical Hypothyroid:-

In the non-geriatric age group we had 16% who were subclinical hypothyroid. In the geriatric age group we had 20% who were subclinical hypothyroid. Overall we had 18% out of 200 cases who were subclinical hypothyroid in the study.

Ramasamy et al 10% were subclinical Navneet Agrawal noted subclinical hypothyroidism was noted in 15.2%.¹⁷ Ravishankar et al at Hosakote, Bangalore noted that thyroid dysfunction Sub-clinical hypothyroidism were elderly diabetics 18.2% were female.¹⁸ Swamy RM et al studies found that the prevalence of sub clinical hypothyroidism was (31.03%).¹⁹

Conclusion:-

The disease diabetes mellitus itself has a higher prevalence in males as compared to the females with the male to female ratio being (1.57:1), and this trend was same in both the study groups non-geriatric (1.8:1), and geriatric (1.68:1).

There is a linear increase with the prevalence of thyroid disorders with age with a $r = 0.67$ and $p > 0.05$.

The incidence of thyroid dysfunction also increased with age As compared to the non-geriatric group which was the incidence higher in older age group

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