



Hypothyroidism in patients with type 2 diabetes mellitus attending Jorhat Medical College Hospital -a hospital based study.

KEYWORDS

Type 2 Diabetes Mellitus; Hypothyroidism

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ABSTRACT **Aims:-** To evaluate hypothyroidism and risk factors associated with it in patients with type 2 diabetes mellitus attending Jorhat Medical College Hospital.

Study design:- It was a hospital based case control study, conducted upon 50 known cases with type 2 diabetes mellitus attending Jorhat Medical College Hospital during the six months of study period (1st september 2015 to 31st march 2016). Sample size included 50 cases and 50 age & sex matched non diabetic healthy controls without any apparent thyroid disorder.

Results:- Altered thyroid function were significantly higher among female cases than controls ($p=0.01$). Hypothyroidism and subclinical hypothyroidism was significantly more among cases than controls, ($p=0.0018$) and ($p=0.0021$) respectively. Hypothyroidism were found to be significantly more among the females cases than controls ($p=0.003$). Sex wise comparison subclinical hypothyroidism of male and female among cases and controls were statistically significant ($p=0.0005$) and (0.0029) respectively.

Introduction:- All over the world the prevalence of type 2 diabetes has increased in a alarming rate in past two decades. On the basis of the current trends it has been speculated that >360 million individuals will have diabetes by the year 2030. According to WHO, there were 31.7 million persons with diabetes in India in 2000 and this number is likely to be increased up to 71.4 million in 2030.^[1]

The clinical relationship between diabetes mellitus and thyroid function is becoming more widely recognized with hypothyroidism among diabetes mellitus patient. Taking account of this strong link American Diabetes Association (ADA) has passed a guideline. According to that people with diabetes mellitus must be checked periodically for thyroid dysfunction.^[2] As clinical relationship between diabetes mellitus and thyroid function is becoming more widely recognized with hypothyroidism among patients with diabetes mellitus. So this study is aimed at to assess the presence of hypothyroidism among patients with type 2 diabetes mellitus attending Jorhat Medical College Hospital.

Materials and Methods:-

It was a hospital based case control study, conducted upon known cases with type 2 diabetes mellitus under treatment either on oral hypoglycemic agents or insulin attending Jorhat Medical College Hospital during the six months of study period (1st september 2015 to 31st march 2016). A total of 50 confirmed cases (male=30, female=20) of type 2 diabetes mellitus of age group 40 to 65 years were taken as cases and compared with 50 (male=27, female=23) apparently healthy randomly selected controls.

Type 2 DM patients were diagnosed as per guidelines of American Diabetes Association for diagnosis of Diabetes Mellitus having fasting blood sugar ≥ 126 mg/dl (7.0mmol/L) or a 2hour plasma glucose level of 200 mg /dl or higher during a 75 gm OGTT or a random plasma glucose of 200 mg/dl (11.1 mmol/L) or higher in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis.^[3] Known cases with thyroid disorder, patient taking medications effecting thyroid hormone levels, pregnant women and type 1 diabetic patient were excluded from the study.

Sample collection:-

Under aseptic and antiseptic condition 5 ml of the blood sample collected from anticubital vein of each of the subjects. The whole blood samples were allowed to clot and for serum separation blood sample was centrifuged at 4000 rpm for 15 minutes.

Analysis of the sample:-

All sample were processed according to existing standard laboratory guidelines after using institutional guidelines for quality control. Fasting and post prandial glucose is tested using GOD /POD^[4,5] method and T_3 , T_4 , and TSH are tested in Access Immuno Assay Systems (Beckman Coulter)^[6-10]

Data analysis:-

Statistical analysis of the data's were done using Microsoft excel.

Results:-

In our study, on comparison of altered thyroid function among cases and controls (**Table 1**), P value was found to be statistically significant ie $p=0.0121$. Comparing the hypothyroidism and subclinical hypothyroidism among cases and controls, (**Table 2**), 5 cases were hypothyroid, controls were nil ($p=0.0012$), 8 cases and 5 controls were of subclinical hypothyroidism ($p=0.0001$). Sex wise comparison of hypothyroidism among cases and controls, (**Table 3**), 1 male case and 4 female cases were hypothyroid, controls were nil (p values 0.0001 and 0.0017 respectively). Sex wise comparison of subclinical hypothyroidism among cases and controls, (**Table 4**), 2 male cases and 4 male controls ($p=0.0005$) and 6 female cases and 1 female controls ($p=0.0029$) were of subclinical hypothyroidism. Over all 36 (72%) cases were euthyroid and 14 (28%) cases had thyroid disorders. Among the cases with thyroid disorders 8 ie (57.143%) had subclinical hypothyroidism, 5 ie (35.714%) had hypothyroidism and 1 ie (7.142%) had subclinical hyperthyroidism. Occurrence of thyroid disorders was significantly higher among cases in comparison with controls. In sex wise distribution of hypothyroidism among cases, 10 were female and 3 male ($p=0.0265$).

Table- 1) Comparison altered thyroid function among cases and controls

Cases(n=50)	Controls(n=50)	P value
14	5	0.0121

Table- 2) Comparison of spectrum of hypothyroidism and subclinical hypothyroidism among cases and controls

Type of altered thyroid activity	Cases	Controls	P value
Hypothyroidism	5	0	0.0012
Subclinical hypothyroidism	8	5	0.0001

Table- 3. Sex wise comparison of hypothyroidism among cases and controls

Study Subjects	Cases (n=50)	Controls(n=50)	P value
Male	1	0	0.0001
Female	4	0	0.0017

Table:- 4.Sex wise comparison of subclinical hypothyroidism among cases and controls

Sex	Cases(n=50)	Controls(n=50)	P value
Male	2	4	0.0005
Female	6	1	0.0029

Discussion:-

The world wide researchers have found that there is increased incidence of cases of thyroid dysfunction among the patients suffering from T2 DM. These endocrinopathies influence each other in multiple ways. Poorly controlled diabetes mellitus may affect thyroid metabolism as uncontrolled hyperglycemia alters plasma triiodothyronine (T3) and in part thyroxine (T4) levels.^[11]

In a study by Hage M, *et al.* (2011) studies have found that diabetes and thyroid disorders tend to coexist.^[12] However, in type 2 diabetic patients, the presence of the highly frequent sub-clinical forms of hyperthyroidism and hypothyroidism should be ruled out since they may be associated with higher cardiovascular risk.^[13]

The worldwide prevalence of type 2 DM is rising much more rapidly, presumably because of increasing obesity, reduced activity levels as countries become more industrialized, and the aging of the population.^[14]

In the present study when the sex wise comparison of altered thyroid function was done on males and females among cases, out of 50 cases 4 were male and 10 were females. When 10 female cases with altered thyroid function was compared with the controls, p values was found to be statistically significant (p=0.004). This signifies that female gender with T2DM is at risk for development of thyroid disorder in comparison to male.

Conclusion:-

From the above study we can conclude that statistically significant number of cases with Type 2 Diabetes Mellitus had thyroid disorder. Hypothyroidism was more common in the age group 45-65 year, elderly females were mostly affected.

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