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Thyroid dysfunction in type 2 DM patients with microvascular complications

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Abstract
In 2010, the prevalence of DM in the United Sates was estimated to be 0.2% in individuals aged <20 years and 11.3% in individuals aged >20 years. In individuals aged >65 years, the prevalence of DM was 26.9%. The prevalence is similar in men and women throughout most age ranges (11.8% and 10.8%, respectively, in individuals aged >20 years). Patients were examined for presence of diabetes mellitus according to ADA criteria for diagnosis of diabetes mellitus.
All diabetic patients were then subjected to estimation of BMI, HbA1C, Serum cholesterol, Serum triglyceride, HDL, VLDL and LDL levels. Then all the patients were evaluated for thyroid dysfunction by testing thyroid profile (T3, T4, TSH and anti TPO Ab). Among 110 diabetes patients in the present study, 33 patients had microvascular complications, of which 8 patients had thyroid dysfunction. There was no significant association present between these two groups (p value was 1.00).

Keywords: HbA1C, ADA criteria, HDL

Introduction
Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia resulting from defects in insulin secretion, insulin action, or both [1].
The worldwide prevalence of DM has risen dramatically over the past two decades, from an estimated 30 million cases in 1985 to 285 million in 2010. Based on current trends, the International Diabetes Federation projects that 438 million individuals will have diabetes by the year 2030 [1].
Although the prevalence of both type 1 and type 2 DM is increasing worldwide, the 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 [1].
In 2010, the prevalence of diabetes ranged from 11.6 to 30.9% in the 10 countries with the highest prevalence (Naurua, United Arab Emigrates, Saudi Arabia, Mauritius, Bahrain, Reunion, Kuwait, Oman, Tonga, Malaysia-in descending prevalence [1].
In 2010, the prevalence of DM in the United Sates was estimated to be 0.2% in individuals aged <20 years and 11.3% in individuals aged >20 years. In individuals aged >65 years, the prevalence of DM was 26.9%
The prevalence is similar in men and women throughout most age ranges (11.8% and 10.8%, respectively, in individuals aged >20 years). Worldwide estimates project that in 2030 the greatest number of individuals with diabetes will be aged 45–64 years [1].
Nowhere is the diabetes epidemic more pronounced than in India as the World Health Organization (WHO) reports show that 32 million people had diabetes in the year 2000 [2]. The International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025 [3].
The histopathological hallmark of diabetic microangiopathy is thickening of capillary basement membrane, with associated increase in vascular permeability throughout the body [4]. The increased vascular permeability, allows extravasation of plasma proteins that accumulate as periodic acid Schiff - positive deposits in the vessel walls. The basement membrane thickening, brought about by the extracellular matrix elaboration occurs in many tissues, including retinal capillaries and the vasa nervorum [5].

Moreover, the increased coagulability of the blood, along with the adhesion of platelets and leukocytes to the endothelial surface leads to microthrombus formation and luminal occlusion. The progressive narrowing and blockage of diabetic microvascular lumina are accompanied by loss of microvascular cells in the retina, glomerulus and vasa nervorum [6].

Methodology

The data for the purpose of study were collected in a predesigned Proforma. The Patient or his/her attendant was fully informed about the study and their informed consent was taken prior to the study.

All the cases of newly diagnosed type 2 diabetes mellitus who had attended and/or were admitted in the Department of Medicine and Diabetic Clinic, were taken up for the study.

After considering the inclusion and exclusion criteria, a total number of 110 eligible cases were taken up for the study.

Method of collection of data was done by taking detailed clinical history regarding diabetes mellitus (onset, duration), any history of long term illness, any previous thyroid dysfunction, previous history of any kind of drug therapy, whether the patient was on insulin or oral hypoglycemic drugs was sought. A thorough clinical examination including vitals, general physical examination, systemic examination and investigations was carried out. Biochemical investigations were carried out using proper aseptic precautions for collecting blood.

Patients were examined for presence of diabetes mellitus according to ADA criteria for diagnosis of diabetes mellitus.

All diabetic patients were then subjected to estimation of BMI, HbA1C, Serum cholesterol, Serum triglyceride, HDL, VLDL and LDL levels.

Then all the patients were evaluated for thyroid dysfunction by testing thyroid profile (T3, T4, TSH and anti TPO Ab).

Selection criteria

Inclusion criteria

- Newly diagnosed Type 2 Diabetes mellitus (Newly diagnosed-arbitrary fixed at or < 6 months)
- Age at or above 20 yrs.

Exclusion criteria

- Patients age less than 20 years,
- Patients of Type 2 Diabetes Mellitus already diagnosed with or without treatment of > 6 months,
- Diabetes mellitus other than Type 2 Diabetes mellitus,
- Patients who are on drugs known to interfere with thyroid hormones.
- Patients with:
- Gestational Diabetes Mellitus,
- Fibrocalculous Pancreatitis,
- Pancreatitis and
- Steroid induced Diabetes
- Unconsented cases
- Patients with Infections, trauma
- Patients with preexisting liver disease
- All those who had proven thyroid disorder and on treatment.

Results

Table 1: Comparison of mean of FBS, PPBS and BMI

	Thyroid Function	Range	Mean ± S.D.	p value
FBS (mg/dl)	Euthyroid	110—620	192.15 ± 81.95	0.3047
	Thyroid Dysfunction	126—302	175.08 ± 34.66	
PPBS (mg/dl)	Euthyroid	146—655	303.01 ± 95.54	0.2384
	Thyroid Dysfunction	181—543	278.77 ± 74.50	
BMI (Kg/m^2)	Euthyroid	20—32	25.63 ± 2.72	0.9609
	Thyroid Dysfunction	22.76—32	25.38 ± 2.46	

Above table shows that the mean FBS of euthyroid diabetic patients (192.15±81.95) was higher than the mean FBS of diabetes patients with thyroid dysfunction (175.08±34.66) but this difference was not statistically significant.(p value was 0.3047) Mean PPBS of the euthyroid diabetic patients was 303.01(±95.54) and Mean PPBS of diabetes patients with thyroid dysfunction was 278.77(±74.50). But this difference was not statistically significant (p value was 0.2384).Mean BMI of euthyroid diabetic patients was 25.63(±2.72).Mean BMI of diabetes patients with thyroid dysfunction was 25.38(±2.46). But this difference was not statistically significant (p value was 0.9609).

Table 2: Thyroid dysfunction in type 2 DM patients with microvascular complications

Diabetes mellitus complications	total	euthyroid		thyroid dysfunction	
	n	n	%	n	%
Retinopathy	8	5	62.50	3	37.50
Nephropathy	19	14	73.68	5	26.32
Neuropathy	30	23	76.67	7	23.33

Above table shows that, 8 patients had retinopathy of which 3(37.50%) had thyroid dysfunction, 19 patients had nephropathy, of which 5 had thyroid dysfunction and neuropathy was present in 30 patients, of which 7 had thyroid dysfunction.

Table 3: Spectrum of thyroid dysfunction in patients with diabetic microvascular complications

Diabetes Mellitus Complications	Total	Subclinical Hypothyroidism		Hypothyroidism		Hyperthyroidism	
	n	n	%	n	%	n	%
Retinopathy	3	2	66.67	0	0.00	1	33.33
Nephropathy	5	3	60.00	1	20.00	1	20.00
Neuropathy	7	5	71.43	0	0.00	2	28.57

Above table shows that retinopathy was present in 3 diabetic patients with thyroid dysfunction of which 2 had subclinical hypothyroidism and 1 had hyperthyroidism. Nephropathy was present in 5 diabetic patients with thyroid dysfunction, of which 3 patients had subclinical hypothyroidism, 1 had hypothyroidism and 1 had hyperthyroidism. Neuropathy was present in 7 diabetic patients with thyroid dysfunction, of which 5 had subclinical hypothyroidism and 2 had hyperthyroidism.

Table 4: Correlation of thyroid dysfunction with microvascular complications in type 2 DM

Complications	Total	Euthyroid		Thyroid dysfunction	
	n	n	%	n	%
DM with Microvascular Complications	33	25	75.76	8	24.24
No Complications	77	59	76.62	18	23.38
TOTAL	110	84	76.36	26	23.64

Above table shows that, out of 110 diabetes patients in the present study, 33 patients had microvascular complications, of which 8 patients had thyroid dysfunction. There was no significant association present between these two groups (p value was 1.00).

Discussion

Diabetic microvascular complications were present in 33 patients, of which 8 patients had thyroid disorders. 3 diabetic patients with thyroid dysfunction had retinopathy of which 2 were sub- clinical hypothyroid and 1 had hyperthyroid. All the 3 patients had NPDR. 5 diabetic patients with thyroid dysfunction had nephropathy of which 3 had subclinical hypothyroidism, 1 had overt hypothyroid, and 1 had overt hyperthyroidism.

Our findings of diabetic complications like retinopathy and nephropathy were more among sub- clinical hypothyroid patients. Our study results were similar to the study by Yang JK *et al.* [7]. who compared 127 type 2 diabetic patients with SCH and 200 randomly selected euthyroid type 2 diabetic patients and showed that severe retinopathy was significantly higher in the SCH group than in the euthyroid group.

Chen H S *et al.* [8] studied 588 Taiwanese type 2 diabetic patients with sub-clinical hypothyroidism and compared with euthyroid patients. In the cross-sectional analysis, they found that sub-clinical hypothyroidism was associated with a higher frequency of nephropathy. Also they found that after 4 years, sub-clinical hypothyroidism was associated with a higher rate of incident cardiovascular events in patients with type 2 diabetes [8].

In the present study, the mean FBS, PPBS and Hba1c levels were higher in diabetic euthyroid patients than in diabetic patients with thyroid dysfunction, but this difference was not statistically significant. Our study findings slightly deviated from other studies although these differences were not statistically significant.

Diez JJ *et al.* [9] shows that the mean FBS, PPBS and Hba1c levels are slightly higher in diabetics with thyroid dysfunction than diabetic euthyroids although this difference was not statistically significant.

Also in our study we found that hyperthyroid patients had poor glycemic control than other groups. This finding was comparable to study done by R Satish, V Mohan [10].

Conclusion

In the present study, out of 110 diabetes patients, 33 patients had microvascular complications of which 8 patients had thyroid dysfunction.

Total 8 diabetic patients had retinopathy of which 3 had thyroid dysfunction but all of them had NPDR. 19 patients had nephropathy of which 5 had thyroid dysfunction and neuropathy was present in 30 patients of which 7 had thyroid dysfunction.

References

1. Frier BM, Fisher M. Diabetes Mellitus. In: College NR, Walker BR, Ralston SH (eds.) Davidson's Principles and Practice of Medicine. 21st ed.: Elsevier; 2010, Pp. 795-834.
2. Giacco F, Brownlee M. Pathogenesis of Microvascular Complications. In: Holt R *et al*. (eds.) Textbook of Diabetes, 4th edition. Blackwell Publishing, 2010, pp. 698-709.
3. The DCCT Research Group: The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. N Engl J Med 1993;329:977–986.
4. U.K. Prospective Diabetes Study Group: study 16.overview of 6 years therapy of type 2 diabetes: A progressive disease. Diabetes 1994;44:1249-58
5. Barton M, Haudenschild CC, d'Uscio LV, Shaw S, Munter K, Luscher TF. Endothelin ETA receptor blockade restores NO mediated endothelial function and inhibits atherosclerosis in apolipoprotein E- defi cient mice. Proc Natl Acad Sci USA 1998;95:14367-14372.
6. Hassan GS, Douglas SA, Ohlstein EH, Giaid A. Expression of urotensin - II in human coronary atherosclerosis. Peptides 2005;26:2464-2472.
7. Yang JK, Liu W, Shi J, Li YB. An association between subclinical hypothyroidism and sight-threatening diabetic retinopathy In type 2 diabetic patients. Diabetes Care 2010; 33: 1018–20.
8. Chen HS, Wu TE, Jap TS. Subclinical hypothyroidism is a risk factor for nephropathy and cardiovascular diseases in type 2 diabetic patients. Diabet Med 2007;24:1336-44.
9. Díez JJ, Sánchez P, Iglesias P. Prevalence of thyroid dysfunction in patients with type 2 diabetes. Exp. Clin Endocrinol Diabetes 2011;119:201-7.
10. Satish R, Mohan V. Diabetes and Thyroid Diseases-Review. Int. J Diab. Dev. Countries 2003;23:120-123