



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2019; 8(2): 274-276
© 2019 TPI
www.thepharmajournal.com
Received: 08-12-2018
Accepted: 10-01-2019

Ashoke Kr Saha
Assistant Professor,
Department of Biochemistry,
North Bengal Medical College,
West Bengal, India

Rajarshi Kayal
Researcher, Techno India
University, EM-4/1, Sector-V,
Salt Lake, Kolkata, West Bengal
India.

Krishanu Banik
Assistant Professor,
Department of Medicine,
College of Medicine and JNM
Hospital, the WBUHS, Kalyani,
Nadia, West Bengal, India

Seuli Roy Adak
Associate Professor,
Department of Biochemistry,
North Bengal Medical College,
West Bengal, India

Saheli Kayal
Assistant Teacher, Birla Bharati,
Taratolla, Santoshpore New
Road, Near Nature Park, P. O.-
Bidhangarh, Kolkata, West
Bengal, India

Correspondence
Rajarshi Kayal
Researcher, Techno India
University, EM-4/1, Sector-V,
Salt Lake, Kolkata, West Bengal
India.

Prevalence of thyroid dysfunction with type 2 DM patients aged below 40 years: A cross sectional study in a tertiary care hospital

Ashoke Kr Saha, Rajarshi Kayal, Krishanu Banik, Seuli Roy Adak and Saheli Kayal

Abstract

Diabetic mellitus (DM) and thyroid dysfunction are the two most common endocrine disorders in clinical practice. In several studies, thyroid dysfunction and type 2 DM are associated and this association has been reported and first published in 1979. The prevalence of thyroid disorder in general population is ranging from 6.6% to 13.4%. In diabetic patients, the prevalence is still greater and varies from 10 to 24%. However, fewer studies have estimated higher prevalence of 31% to 46.5% respectively. Screening of thyroid disorder especially subclinical hypothyroidism in patients with type 2 DM is important because most patients are asymptomatic and is one of the leading causes of death worldwide due to complications.

Keywords: Thyroid dysfunction, tertiary care hospital, diabetic mellitus

Introduction

Diabetes mellitus is one of the modern pandemics and an important health problem world wide. DM, on long term, is associated with vascular complications increasing morbidity and mortality among untreated diabetic patients. It is evident from the recent studies that thyroid dysfunction is the new addition to the complications of diabetes mellitus [1, 2, 3, 4]. Thyroid disorders are also very common in the general population. Thyroid hormones are insulin antagonists. Both insulin and thyroid hormones are involved in cellular metabolism and excess or deficit of any one can result in functional derangement of the other [5, 6].

Aims and objectives

1. To assess the prevalence of thyroid dysfunction (subclinical hypothyroidism) in type 2 DM patients based on biochemical and clinical features.
2. To assess other biochemical risk factors i.e. Lipid parameters (total cholesterol, serum triglycerides, LDL, HDL, VLDL, urea, creatinine, CRP, uric acid, anti TPO antibody).

Materials and methods

This was an institution based study with cross sectional design. This study was conducted on patients (60 diabetic patients and 60 non diabetic) attending OPD in North Bengal Medical College (NBMCH), Darjeeling, a tertiary care hospital in Northern part of West Bengal, India during June 2017 to July 2018.

Venous blood glucose was measured and considered diagnostic for diabetes if fasting blood glucose level (FBG) is more than 126 mg/dl and HBA1C more than 6.5%.

Venous blood samples were also assessed for thyroid function test (FT4 & TSH) and other biochemical markers such as urea, creatinine, uric acids, C- reactive protein, anti TPO antibody and lipid parameters such as Sr. triglyceride, cholesterol, HDL, LDL and VLDL.

The following methods were used for biochemical assessment of different substances- GOD-POD method for FBG, immunoturbidimetry for HbA1c, enzyme linked immunosorbent assay (ELISA) for FT4 and TSH, ultraviolet kinetic method for blood urea, kinetic enzymatic method for Sr. creatinine, enzymatic colorimetry for Tg, homogenous enzymatic colorimetry for HDL, LDL & VLDL, kinetic method for Sr. uric acid, quantitative turbidimetry for CRP and anti TPO antibody.

Inclusion criteria for the cases

1. Age: Less than 40 years with Type 2 DM in accordance with the ADA criteria and evaluated with thyroid dysfunction test (FT4 and TSH) attending the OPD in NBMCH.
2. Gender: both males and females.
3. Cut-off values used in this study.

Exclusion criteria for the cases

1. Patients with type 1 diabetes.
2. Age greater than 40 yrs.

3. Iatrogenic diabetes.
4. Patients with conditions like DKA, chronic renal failure, and taking drugs like lithium and amiodarone etc. that affect thyroid functions.
5. Very sick or critically ill patients.
6. Undergone surgery of the thyroid gland.
7. Exposure of the thyroid gland to radiation.

Results

The results found in the study are represented in the form of following table –

Table 1: The results found in the study are represented in the form of following table

Serial no.	Investigations	T2DM (N=60) Mean± SD	Non diabetic (N=60) Mean± SD	P value
1	S. Cholesterol (mg/dl)	147±37.79	116.62±12.57	<0.001
2	S. Triglycerides (mg/dl)	119.55±43.13	86.18±16.78	<0.001
3	S.HDL (mg/dl)	36.66±6.74	36.26±2.66	>0.05
4	S.LDL(mg/dl)	87.06±31.53	74.50±13.85	<0.05
5	S.VLDL (mg/dl)	23.68±9.66	17.54±3.56	<0.001
6	S. Urea (mg/dl)	31.15±7.9	30.28±6.36	>0.05
7	S. Creatinine (mg/dl)	1.07±0.24	0.93±0.16	<0.001
8	S. uric acid (mg/dl)	6.90±1.46	4.56±0.64	<0.001
9	S.CRP (mg/l)	5.77±6.13	2.33±2.13	<0.001
10	FBG (mg/dl)	131.80±20.88	99.23±10.73	<0.001
11	HbA _{1c} (%)	7.5±0.70	5.04±0.57	<0.001
12	FT ₄ (ng/dl)	1.03±0.50	1.10±0.45	>0.05
13	TSH (μIU/ml)	6.23±3.49	5.02±1.16	<0.05

Discussion

It was reported that dyslipidemia is one of the complications of primary hypothyroidism in nondiabetic and diabetic subjects [7]. In our study, diabetic subjects with thyroid disorder showed significant higher serum levels of cholesterol, triglycerides, LDL, VLDL and lower level of HDL as compared to nondiabetic subjects. Sawant *et al.*, did the study among young adult population [8] and the results were similar to our studies. A study of Chubb *et al* [9] did not find any significant relationship between subclinical hypothyroidism and the presence of dyslipidemia.

Standard CRP (Creative protein) test is useful clinically to follow up patients with inflammatory diseases. In our study, CRP was increased in diabetic subjects with thyroid disorder and it has prognostic significance. Atherosclerosis has an inflammatory component. CRP binds selectively to LDL, activates complement resulting in plaque formation and causes endothelial dysfunction in long term if left untreated. In the present study, high prevalence of thyroid disorder was reported in type 2 DM patients compared to healthy controls (21 patients out of 60 diabetic cases). Our observations were consistent with previously similar studies performed by Gazalim *et al.* [10], Gurjeet Singh *et al.* [11], Radaidehar *et al.* [12], Laloodemitrost *et al.* [13], Diaz *et al.* [14], Perros *et al.* [15] and Athanasiapapazafibropoulou *et al.* [16] reported 29.7%, 30%, 12.5%, 31.2%, 32.4%, 13.4% and 12.3% respectively.

There was significant increase in serum uric acid level in diabetic subjects with thyroid disorder compared to control subjects. Severe diabetic arthropathy can be mistaken for hypothyroidism because patients with similar conditions may have swelling on feet, lack of energy, pallor, weight gain and pain in several small and large joints.

Due to high blood glucose level, there is formation of advanced glycated products, long been known to cause cellular injury. A decrease in renal function increases circulating advanced glycated product concentrations by reduced clearance as well as increased formation. As a result,

kidneys are unable to maintain the fluid and electrolytes homeostasis. There is a chance of progressive rise in plasma concentration of serum creatinine and urea if left untreated. Similar studies were observed in diabetic Nepalese [17].

Autoimmunity is common in type 1 DM. But several studies have demonstrated a higher prevalence of thyroid auto antibodies such as anti TPO antibody. Our study showed presence of significantly higher positive antibodies in type 2DM patients with subclinical hypothyroidism indicating the important role of autoimmunity and they have greater chance of suffering from overt hypothyroidism in near future. Similar findings are shown in Almaskari MA and Bassyouni A *et al.* studies [18, 19].

So it is important to evaluate diabetic population for clinical or and subclinical hypothyroidism.

References

1. International Diabetes Federation. Diabetes Atlas, 6th edn, 2013.
2. API Textbook of Medicine, 9th edition, 2012; 2:2048-2052.
3. Udiong CEJ, Udoh AE, Etukudoh ME. Evaluation of thyroid function in diabetes mellitus in calabar, Nigeria. India J ClinBiochem 2007; 22(2):74-8.
4. Wu P. Thyroid disease and diabetes. Clinical Diab 2000; 18(1):1-10.
5. 25. Puri D. Integration of metabolism. In: Textbook of Medical Biochemistry, 3rd ed., Puri D (ed.) New Delhi: Elsevier, 2011, 316-33.
6. Shaikh AW, Memon AS, Sirichand. Frequency of hypothyroidism in type 2 diabetic patients. Pakistan J Med Health Sci, 2009, 2(4).
7. Sawant AM, Shetty D, Mankeshwar R, Ashavaid TF. Prevalence of Dyslipidemia in young adult Indian population. JAPI. 2008; 56:99-102.
8. Sathish R Mohan V. Diabetes and Thyroid disease. Int J

- Diab. Dev Countries. 2003; 23:120-3.
9. Chubb SA, Davis WA, Inman Z, Davis TM. Prevalence and progression of subclinical hypothyroidism in women with type2 diabetes: the Fremantle Diabetes study. *ClinEndocrinol (oxf)* 2005; 62(4):480-486.
 10. Gazali SM Abbiyesuku FM. Thyroid Dysfunction in type2 diabetes seen at the university college hospital, Ibadan,Nigeria. *Nig. J Physiol. Sci.* 25, (december2010) 173-179.
 11. Gurjeet Sing, Vikas Gupta, Anu Kumar Sharma, Neeraj Gupta. Evaluation of Thyroid Dysfunction Among type 2 diabetic Punjabi population.
 12. Radaideh ARM, Nusier MK, Amari FL *et al.*, Thyroid Dysfunction in patients with type2 diabetes mellitus in Jordan.*Soudi Medical Journal.* 2004; 25(8):1046-1050.
 13. Lalloo Demitrost Salam Ranabir. Thyroid dysfunction in type 2 diabetes mellitus: A retrospective study. *Indian J Endocrinol Metab.* December; 16 (supply2), 2012, S334-S335.
 14. Diez JJ, Sanchez P, Iglesias P. Prevalence of thyroid dysfunction in patients with type 2 diabetes. *exp clinendocrinol diabetes.* 2011; 119:201-7.
 15. Perros P, Mc Crimmon RJ, Shaw G, Frier BM. Frequency of thyroid dysfunction in diabetic patients: value of annual screening. *Diabetic Medicine* 1995; 12(7):622-627.
 16. Athanasia Papazafiropoulou, Alexios Sotiropoulos. Prevalence of Thyroid Dysfunction among Greek Type 2 Diabetic patients attending an Outpatient Clinic. *J Clin Med Res.* 2010;2(2):75-78.
 17. Mittal A, Sathian B, Kumar A. Diabetes Mellitus as a potential Risk Factor Disease among Nepalese. *Nepal Journal of Epidemiology* 2010; 1(1):22-25.
 18. Al-Maskari MA, ALNAQDY a. Glutamic acid decarboxylase and throid antibodies in Omani patients with type2 diabetes .*Kuwait Med J* 2005; 37(3):165-8.
 19. Bassyouni A, Ebrashy IE, Ismiel A, Amara I, Mahfouz M, Halmy N. Profile of thyroid function and ultrasound among patients with type 2 diabetes mellitus. *Sci Med J* 2010; 22(2):15-28.