

An Observational Study of Distribution of Symptoms in Patients of Diabetes Mellitus Type2 and Their Correlation with Low Serum Free Testosterone

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ABSTRACT

Background; The prevalence rate of symptomatic hypogonadism in men with type 2 DM is high and documented rates range from 20-64% with higher prevalence rates reported in the elderly.¹ Some of the clinical features of the testosterone deficiency syndrome (TDS) include diminished sexual function, changes in mood, decreased intellectual activity, fatigue, sleep disturbance, increased abdominal fat, decreased body hair and bone mineral density. The commonly documented feature of the TDS in men with DM is erectile dysfunction (ED); it is reported to be three times higher in men with DM than in those without DM.¹⁸

Methods and material;- In this observational (case control) study, 80 male patients with Type-2 diabetes mellitus, aged between 30-70 years seen in OPD and in medicine ward of Medical College Jhanshi, was taken as cases. And 40 Age & sex matched healthy controls were taken and an observational Study was done between March 2012 and February 2013 to evaluate the symptoms of diabetes mellitus, its risk factors and their correlation with low serum free testosterone level.

Results;- Symptoms of low serum testosterone were present in 51.25% of patients with type 2 diabetes mellitus. Decreased libido and decreased or absent morning tumescence were the symptoms most commonly present.

Keywords: Type-2 diabetes mellitus, low serum free testosterone level, hypogonadism, symptoms.

INTRODUCTION

The prevalence rate of symptomatic hypogonadism in men with type 2 DM is high and documented rates range from 20-64% with higher prevalence rates reported in the elderly.¹ Some of the clinical features of the testosterone deficiency syndrome (TDS) include diminished sexual function, changes in mood, decreased intellectual activity, fatigue, sleep disturbance, increased abdominal fat, decreased body hair and bone mineral density

Along with the conventional risk factors for diabetes mellitus type 2, a new trend of association of low testosterone level in the causality of diabetes has emerged in studies conducted worldwide. Epidemiological studies have reported that low testosterone levels are an independent risk factor for type-2 diabetes. Interestingly, concentrations of free and bioavailable testosterone even in the low-normal range are associated with diabetes, after adjusting for adiposity.

Reports abound in literature on the relationship between plasma testosterone and type 2 DM. Testosterone levels are not only lower in men with type 2 DM, but also that the risk of developing type 2 DM is increased in men with low testosterone levels.²⁻³

The prevalence of both hypogonadism and diabetes mellitus (DM) increase with age⁴⁻⁷, and the association between these conditions has recently received great attention⁸⁻¹⁰. The

Massachusetts Male Aging Study prospectively found that, for each decrease of 1 SD in free testosterone (FT), there was a 1.58-fold greater risk of developing DM after a median interval of 8.9 years¹¹

Aims And Objectives-

- 1.To study the distribution of symptoms and risk factors of diabetes
- 2.To study the relationship of serum testosterone level with conventional risk factors for diabetes mellitus.

METHODS AND MATERIAL

In this observational (case control) study, 80 male patients with Type-2 diabetes mellitus, aged between 30-70 years seen in OPD and in medicine ward of Medical College Jhanshi, was taken as cases. And 40 Age & sex matched healthy controls were taken and an observational Study was done between March 2012 and February 2013.and the relationship between common symptoms of diabetes mellitus type 2,risk factor and low serum free testosterone were studied.

Exclusion criteria

Patients taking drugs which are known to interfere with serum testosterone levels for example, glucocorticoids, hormone replacement therapy, ketoconazole, opioids, methadone, heroin and marijuana. Patients with features associated with congenital GnRH deficiency (midline facial defects, synkinesis or a family history of GnRH deficiency or anosmia). History of tumor, exposure to radiation, history of head trauma, spinal cord injuries, history of pelvic trauma and surgery. Any disease other than diabetes known to cause autonomic dysfunction. Any other chronic disease such as human immunodeficiency virus (HIV), end-stage renal disease, cirrhosis of liver and psychiatric disease.etc were excluded from the study

All 80 male patients with type 2 diabetes mellitus and 40 controls after informed consent, were studied based on the detailed history, anthropometric measurements, relevant blood investigations, changes and estimation of serum free testosterone

TT was measured by fully automated bi directionally interfaced chemiluminescent immunoassay (CLIA) And FT was measured by radio immune assay (RIA).

Normal levels of TT were taken as 300-1000ng/dl and normal levels of FT as 9-40pg/ml.

In all men LH/FSH were measured by chemiluminescent immunoassay (CLIA). For different qualitative parameters mean and standard deviation calculated.

To compare the means between two groups, student unpaired 't' test is used. Level of significance is taken as $p < 0.05$. Chi square test is used to find the association between two qualitative variables.

RESULTS

Table 1 Distribution of subjects according to age

Age	Cases		Controls	
	No.	%	No.	%
30-40	15	18.75	10	25
41-50	32	40	15	37.5
51-60	28	35	12	30
61-70	05	6.25	03	7.5
Total	80	100	40	100

(Chi-square value = 0.805, df = 3, p value = 0.848)

Majority of the cases belonged to age group between 41-50 yrs (n=32) i.e. 40% of the total cases. Mean age of the cases was 48.32 yrs.

In the case group, most common presenting symptom was decreased libido (n=41) in 51.25%, followed by decreased or absent morning tumescence, and easy fatigueability and weakness in 47.5% (n=38) of cases.

Table 2 Incidence of Different symptoms in DM2 (n=80)

Symptoms	No. of cases	Percentage
Increased urinary frequency	05	6.25
Polydipsia	11	13.75
Polyphagia	08	10
Weight gain	11	13.75
Difficulty in vision	04	5
Decreased muscle mass and strength	12	15
Easy fatigueability, weakness	38	47.5
Decreased sexual hair	14	17.4
Decreased libido	41	51.25
Change in mood and energy	09	11.25
Decreased or absent morning tumescence	38	47.5

Table 3 Distribution of symptoms of testosterone deficiency in patients of Diabetes Mellitus type2 with low serum testosterone.

S.No	Symptoms	Free Testosterone		Total Testosterone	
		No.	%	No.	%
1.	Decrease libido	30	65.2	14	60.8
2.	Decreased muscle mass and strength	09	19.5	5	21.7
3.	Decreased sexual hair	10	21.7	4	17.39
4.	Decrease/ Absent Morning tumescence	26	56.52	12	52.17

Most of the patients of DM2 with low serum testosterone presented with decreased libido (65.2%) followed by decreased or absent morning tumescence in (56.52%).

Table 4 Distribution of risk factor for DM2 in cases &controls

Risk factor	Cases (n=80)		Controls (n=40)		P value
	No.	%	No.	%	
Family history of diabetes	15	18.75	06	15	0.610
Obesity (BMI >25 kg/m ²)	26	32.5	10	25	0.398
Physical inactivity	38	47.5	12	30	0.067
Previously identified with IFG, IGT, or an A1C of 5.7–6.4%	06	7.5	0	0	0.076
Hypertension (blood pressure >140/90 mmHg)	13	16.25	01	2.5	0.027
HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)	22	27.5	02	5	0.004
History of cardiovascular disease	20	25	0	0	0.001

Most common risk factor for DM 2 present in cases (n=38) and controls (n=12) was physical inactivity in 47.5% and 30% respectively.

Family history of DM 2 (n=15) and cardiovascular disease (n=20) was found in 18.75% and 25% of cases respectively.

Table 5 Incidence of Different symptoms in DM2 with CAD (n=20)

Symptoms	No. of cases	Percentage
Chest Pain	15	75
Breathlessness	06	30
Palpitation	03	15
Syncope	03	15

In the cases of DM 2 with CAD, most common presenting symptom was chest pain (n=15) in 75%, followed by breathlessness (n=06) in 30%. Palpitation and syncope was found in 15% of cases.

Table 6 Distribution of cardiovascular risk factors in cases with low levels of serum testosterone, LH and FSH

	Cases with 0-2 risk factors (n=38)		Cases with ≥ 3 risk factors (n=42)	
	No.	%	No.	%
Serum total testosterone	02	5.26	21	50
serum free testosterone	16	42.1	30	71.42

In cases with 2 or lesser risk factors for CAD, 2(5.26%) and 16 (42.16%) patients had low level of serum total and free testosterone respectively,

In cases with 3 or more risk factors for CAD, 21(50%) and 30(71.42%) patients had low level of serum total and free testosterone respectively.

DISCUSSION

In the present study total 80 patients of diabetes mellitus and 40 healthy controls of age between 30-70 years attending the medicine outpatients department of M.L.B. Medical College Jhansi (UP) from March 2012 to February 2013 were taken for evaluation. They were evaluated for various complains regarding diabetes mellitus and sexual dysfunction. Hormonal assay of serum free testosterone, routine investigation ECG, HbA1c and lipid profile were carried out in all subjects.

The present study was undertaken in order to study the Distribution of symptoms in patients of Diabetes Mellitus type2 and their correlation with low serum free testosterone.

It has been documented in the literature that serum testosterone levels decreased with age. After age of 30 yrs 1-2% of serum testosterone levels decrease with every year as a part of normal aging process. But few recent studies have shown that decrease in serum testosterone level with age is not normal (Guay et al¹², 2003)

The mean age in the present study was 48.32±8.20 in case group and 47.02±9.42 in control group. Majority of the cases (40.1%) and controls (37.5%) were in age groups of 41-50 yrs.

The mean age in the study by Koopman et al¹³ 2005 was 46.01±1.27yrs.

According to Gale et al¹⁴ 2010, the average age of onset of diabetes mellitus type 2 in Indian population is 42.5yrs.

In the present study, most common presenting symptoms were decreased libido (51.25%) followed by easy fatigability and weakness (47.5%) and decreased or absent morning tumescence (47.5%)

Most common presenting symptom in the cases of diabetes mellitus with coronary artery disease was chest pain (75%) followed by breathlessness (30%). Correlation of symptoms to serum free testosterone level-

In present study out of 80 patients, 41 (51.25%) had decreased sexual desire

and 38(47.5%) had decreased or absent morning tumescence. Out of this 14 patients with decreased sexual desire 14(34.1%) and 30(43.17%) had low levels of serum total and free testosterone respectively. Out of 38 patients with decreased or absent morning tumescence, 14(36.8%) and 21(55.2%) had decreased serum total and free testosterone respectively.

Similar observations have been reported by Fedele et al¹⁵ (2000) who observed erectile dysfunction, decreased or absent morning tumescence in type 2 diabetics to be 37%.

Normal sexual desire was observed in 39(48.75%) patients and all of these patients had normal serum free testosterone.

CONCLUSIONS

1. Symptoms of low serum testosterone were present in 51.25% of patients with type 2 diabetes mellitus. Decreased libido and decreased or absent morning tumescence were the symptoms most commonly present.
2. Among 42 patients of DM2 with 3 or more conventional risk factors for atherosclerosis >71.4% had low free testosterone and 50% had low total testosterone

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How to cite this article: Jat RK, Panwar AK, Agarwal P et.al. An observational study of distribution of symptoms in patients of diabetes mellitus type2 and their correlation with low serum free testosterone. *International Journal of Science & Healthcare Research*. 2020; 5(1): 101-105.
