

Dyslipidemia as an Early Harbinger of Erectile Dysfunction in Type 2 Diabetics

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ABSTRACT

Introduction: Sexual dysfunction is a common, underappreciated complication of diabetes. Men with diabetes tend to develop ED 10 to 15 years earlier than men without diabetes. As men with diabetes age, ED becomes even more common. Diabetes can damage the blood vessels and nerves that control erection. Hyperlipidemia may impair erectile function by affecting endothelial and smooth muscle cells of the penis. This study was undertaken to investigate the correlation between serum lipids and ED.

Material and method: 150 type 2 DM patients were enrolled for this retrospective done at S P Medical College Bikaner. ED was diagnosed by using international index of ED (IIEF-5).

Results: The mean duration of DM was 2.84+1.99 in patient without ED and 8.94+6.36 in patient with ED that was statistically significant ($p < 0.001$). FBS and HbA1c were other parameter that were correlated significantly. The mean lipid profile TC, LDL, TG, HDL were 158.36+15.38 and 186.26+38.88; 97.06+16.98 and 119.33+31.94; 116.33+37.30 and 94.09+14.48; 50.18+7.05 and 44.08+8.13 respectively in patient without ED and with ED that were statistically significant ($p < 0.001$). However mean VLDL was 21.60+4.16 and 23.00+7.17; in patient without ED and with ED that was statistically insignificant.

Conclusion: ED almost always has an organic or mixed etiology. This often results in diabetic men reporting more severe ED when they present for treatment of this condition. Because men with diabetes value their erectile function highly, it is important that health care provider must encourage them to maintain good glycemic, blood pressure, and lipid control to minimize their risk of developing this complication.

Keywords: Impotence; Diabetics; Dyslipidemia; Erectile dysfunction.

culty with erectile function. Male sexual dysfunction among diabetic patients can include disorders of libido, ejaculatory problems, and ED. All three forms of male dysfunction can cause significant bother for diabetic patients and can affect their quality of life. While all three forms of male sexual dysfunction can be found among diabetic men, our study will focus on the most common form, ED, as this being the most predominant comorbidity effecting quality of life in diabetic patient. ED is defined as the inability to achieve or maintain an erection sufficient for satisfactory sexual performance¹; ED is highly prevalent in diabetic men² and is almost always organic in its etiology. Despite this, health care providers often do not specifically ask their male diabetic patients about sexual function. This results in considerable under diagnosis because patients are often reluctant or embarrassed to initiate discussion of these issues themselves. The causes of ED in men with diabetes are complex and involve impairments in nerve, blood vessel, and muscle function. To get an erection, men need healthy blood vessels, nerves, male hormones, and a desire to be sexually stimulated. Diabetes can damage the blood vessels and nerves that control erection. Therefore, even if patient has normal amounts of male hormones and have the desire to have sex, he still may not be able to achieve a firm erection.

Although the etiology of ED in patients with diabetes is often complex and can be caused by several mechanism, organic vasculogenic factors appear to be most frequent cause of ED in men with diabetes³ with some studies citing an incidence of up to 87% and even 90%⁴ in one of studies. The pathogenesis of ED in diabetic patient may be linked to accelerated atherosclerosis.⁵ Hyperlipidemia may impair erectile function by affecting endothelial and smooth muscle cells of the penis. Among the metabolic abnormalities

INTRODUCTION

Sexual dysfunction is a common, underappreciated complication of diabetes. It is being estimated that about 35%-75% of men with diabetes will experience at least some degree of erectile dysfunction also called ED or impotence during their lifetime. Men with diabetes tend to develop ED 10 to 15 years earlier than men without diabetes. As men with diabetes age, ED becomes even more common. Above the age of 50, the likelihood of having difficulties with an erection occurs in approximately 50%-60% of men with diabetes. Above age 70, there is about a 95% likelihood of having some diffi-

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that commonly accompany diabetes are disturbances in the production and clearance of plasma lipoproteins. The lipid changes associated with diabetes mellitus are attributed to increased free fatty acid flux secondary to insulin resistance. In fact development of dyslipidemia may be a harbinger of future diabetes. A characteristic pattern, termed diabetic dyslipidemia, consists of low high density lipoprotein (HDL), increased triglycerides, and postprandial lipemia. This pattern is most frequently seen in type 2 diabetes and may be a treatable risk factor for subsequent cardiovascular disease and related comorbidities. It has been shown from numerous studies that dyslipidemia often is found in prediabetes, patients with insulin resistance but normal indexes of plasma glucose.⁶ Various trial of glucose reduction have confirmed that glucose control is the key to preventing microvascular diabetic complications. These trials have, however, failed to show a marked benefit of glucose control on macrovascular disease. Large vessel atherosclerosis is not a diabetes-specific disorder, yet it is worse in patients with diabetes; however, processes unrelated to diabetes must be the most important. For this reason it may not be surprising that treatment of these other processes, such as hypertension^{7,8} and hyperlipidemia⁹, appears to impact macrovascular disease more than does glucose control. This study was undertaken to investigate the correlation between serum lipids (cholesterol, LDL, HDL, triglyceride (TG) and erectile dysfunction (ED).

Ethnic statement

A written informed consent was obtained from each subject included in the study. Ethical approval for the study was obtained from the Ethical committee S P Medical College, PBM and A.G of hospitals Bikaner, Rajasthan prior to the commencement of the study.

Material and methods

Present study was conducted among the patient admitted to

Medicine Department PBM and A.G of Hospital, a tertiary care center of North West rajasthan from June 2014 to June 2015. Patients of age group 35-65 years diagnosed according to ADA revised criteria 2013 were included in the study. Patients who were seriously ill, known cases of type 1 DM, history of pelvic trauma or pelvic surgery, history of psychiatric disease, men with debilitating disease or having an unfavorable penile anatomy for sexual act were excluded from the study. A thorough clinical examination was conducted and the findings along with other demographic data were recorded on predesigned and pretested performa. History regarding duration and treatment of diabetes was noted. Patient's Compliance with the medication was also noted. Patients were also evaluated for the presence of sexual dysfunction, peripheral vascular disease and other macro and micro vascular complications.

The diagnosis of sexual dysfunction was done with following criteria:

- A sexually competent male must have desire for his sexual partner (libido).
- Be able to divert blood from iliac artery in to corpora cavernosa to achieve penile tumescence and rigidity (erection).
- Discharge sperm and prostatic/seminal fluid through urethra (ejaculation).
- Finally experience a sense of pleasure (orgasm).

Hypoceptive sexual disease (HSD) (according to DSM IV) was defined as persistently and recurrently deficient sexual fantasy and desire for sexual activity leading to marked distress or interpersonal difficulty. In male diabetics predominant disorder is of erectile dysfunction but HSD is also seen however in female diabetic the predominant form of sexual dysfunction is HSD. Local examination of genitalia was also performed to rule out any congenital deformity. Testis was felt for size and consistency, sensation over penis and bulbo-

Characteristics	ED	Mean	SD	SE	t	P
Age	Present(n=117)	53.28	6.52	1.04	4.089	<0.001
	Absent(n=33)	44.09	6.83	2.06		
Duration	Present(n=117)	8.94	6.36	1.02	3.118	0.003
	Absent(n=33)	2.84	1.99	0.60		
BMI	Present(n=117)	26.12	4.86	0.78	0.807	0.423
	Absent(n=33)	24.87	2.87	0.87		
WHR	Present(n=117)	0.94	0.03	0.05	1.982	0.053
	Absent(n=33)	0.92	0.03	0.09		
Systolic BP	Present(n=117)	145.23	18.03	2.89	2.442	0.018
	Absent(n=33)	131.27	10.48	3.16		
Diastolic BP	Present(n=117)	86.00	9.83	1.57	-0.219	0.828
	Absent(n=33)	86.73	9.39	2.83		
S Creatinine	Present(n=117)	1.20	0.55	0.08	0.549	0.586
	Absent(n=33)	1.09	0.62	0.19		
Fasting BS	Present(n=117)	153.69	46.52	7.45	2.046	0.046
	Absent(n=33)	123.18	30.52	9.20		
HbA _{1c}	Present(n=117)	8.53	1.78	0.39	3.050	0.004
	Absent(n=33)	6.66	1.79	0.54		

Table-1: Anthropometric and biochemical parameters in study group with and without erectile dysfunction.

cavernous reflex. ED was diagnosed by using international index of ED (IIEF-5).¹⁰ Other relevant evaluations were performed regarding evaluation of peripheral vascular disease and other micro as well as macrovascular complications.

Fasting blood samples were drawn for investigations such as FBS and lipid profile (total cholesterol, triglycerides, HDL and LDL). The fasting blood glucose and lipid profile were measured using spectrophotometry technique. The data obtained was tabulated on Microsoft Excel spreadsheet. Categorical data was expressed as rates, ratios and percentages. Continuous data was expressed as mean \pm standard deviation (SD) Pearson's Correlation coefficient (*r*) was used to assess the correlation between serum lipids and ED.

RESULTS

This study was conducted among 150 type 2 DM patients attending either OPD, diabetic clinic or was admitted to medicine ward. The baseline anthropometric characteristics of patients included in the study are shown in table 1. The mean age was 44.09 \pm 6.83 in patient without ED and 53.28 \pm 6.52 in patient with ED that was statistically significant ($p < 0.001$). The mean duration of DM was 2.84 \pm 1.99 in patient without ED and 8.94 \pm 6.36 in patient with ED that was statistically significant ($p < 0.001$). The mean BMI was 24.87 \pm 2.87 and 26.12 \pm 4.86 without and with ED respectively that was statistically insignificant. The mean SBP was 131.27 \pm 10.48 and 145.23 \pm 18.03 without and with ED respectively that was statistically significant ($p < 0.001$). The mean DBP was 86.73 \pm 9.39 and 86.00 \pm 9.83 without and with ED respectively that was statistically insignificant. The FBS was 123.18 \pm 30.52 and 153.69 \pm 46.52 without and with ED respectively that was statistically significant ($p < 0.046$). The mean HbA1c was 6.66 \pm 1.78 and 8.53 \pm 1.79 without

and with ED respectively that was statistically significant ($p < 0.004$). Prevalence and severity of ED is shown in table 2. Detailed analysis of the above table revealed that although the prevalence of ED increasing with age however contrary to increasing prevalence, the variation in severity of ED doesn't increase proportionately and varied according to individual characteristics. Correlation between serum lipids and ED is shown in table 3. The mean lipid profile TC, LDL, TG, HDL were 158.36 \pm 15.38 and 186.26 \pm 38.88; 97.06 \pm 16.98 and 119.33 \pm 31.94; 116.33 \pm 37.30 and 94.09 \pm 14.48; 50.18 \pm 7.05 and 44.08 \pm 8.13 respectively in patient without ED and with ED that were statistically significant ($p < 0.001$). However mean VLDL was 21.60 \pm 4.16 and 23.00 \pm 7.17; in patient without ED and with ED that was statistically insignificant.

DISCUSSION

Erectile dysfunction is one of the most common complications of diabetes and also one of the most underdiagnosed. It's a common misbelief of diabetic patients that ED is "in their heads" and that "their Doctor will dismiss any sexual problems they might bring up,"¹¹ it may be a relief for patients to learn that their ED is physical, related to their diabetes, and treatable.

In our present study, ED was present in about 78% of patients out of which 6% had mild ED, whereas 36% each were having moderate and severe ED. Various studies done previously had enumerated the prevalence of ED in DM patient from as low as 15% to as high as 90%.¹² This difference may be due to effect of other factor like age, duration of illness and associated complication. However despite this limitation it can be stated that ED is a very common problem affected as many as 75% of diabetics in some stage of life. In our study it was observed that prevalence of ED increase with increasing age. Prevalence increased from 20% from age group of <40 years to 100% in age group of >60 years. Most of the earlier studies have also reported significant correlation between ED and age. The effect of age on prevalence and severity of disease might be due to age related changes occurring in body as well as various other complications that may coexist in DM patient. Ultimately, it is the accelerated atherosclerosis which is common denominator for increased

Severity of ED	Erectile dysfunction	
	No of Patients	%
Absent	33	22
Mild	9	6
Moderate	54	36
Severe	54	36
Total	150	100

Table-2: Prevalence and severity of ED

Lipid Profile	ED	Mean	SD	SE	t	P
TC	Present(n=117)	186.26	38.88	6.23	2.312	0.025
	Absent(n=33)	158.36	15.83	4.77		
LDL	Present(n=117)	119.33	31.94	5.12	2.214	0.032
	Absent(n=33)	97.06	16.98	5.12		
TG	Present(n=117)	116.33	37.30	5.97	2.014	0.022
	Absent(n=33)	94.09	14.48	4.59		
HDL	Present(n=117)	44.03	8.13	1.30	2.278	0.027
	Absent(n=33)	50.15	7.05	2.13		
VLDL	Present(n=117)	23.00	7.17	1.15	0.616	0.541
	Absent(n=33)	21.60	4.16	1.25		

Table-3: Correlation between serum lipids and ED

prevalence of ED in DM patients. A significant correlation was also noted between duration of diabetes and ED. It was seen that with duration of diabetes <5 years the prevalence of ED was 56%, 92% with duration of 6-10 years and 100% with duration of disease >10 years. Almost similar results were noted by Mota et al in 2003.¹³ Although no direct correlation was observed between severity of ED and FBS however it was observed that as FBS increased so was the prevalence of ED. Some studies having larger no subjects such as that done by Thomas et al¹⁴ have also demonstrated a significant correlation between FBS and ED. Most significant finding of our study was the alarming dyslipidemia especially hypercholesteremia and raised LDL level in majority of patients having moderate to severe dyslipidemia irrespective of their duration and glycemic status of the patients. It was also noted that low level of HDL predisposes the patient to development of ED. Almost similar results were noted by Roumequere T et al.¹⁵

Some limitation of the study should be kept in mind while interpreting the results. Most important being the sample size. The results would be better and generalized with larger population sample. Secondly most of patient selected were from government hospital that belong to low-middle socioeconomic group. Improper dietary habits as well increased incidences of STDs are quite common that increase incidences of ED. Thus better outcome can be drawn by including patients from other sections of the society.

CONCLUSION

ED almost always has an organic or mixed etiology in diabetic men. This often results in diabetic men reporting more severe ED when they present for treatment of this condition. ED is a common complication of diabetes that affects patients' quality of life. While the etiology of this complication may be multifactorial in nature, it is clear that it usually has a strong organic component. Because men with diabetes value their erectile function highly, it is important that health care provider must encourage them to maintain good glycemic, blood pressure, and lipid control to minimize their risk of developing this complication. Moreover patients with dyslipidemia particularly hypercholesteremia, triglyceridemia or having lower values of HDL can be warned about the possible adverse effect on their quality of life as well as impending ED and other adverse outcomes including stroke as well as CV risk. Early monitoring and correction of dyslipidemia will not only improve the quality of life of DM patients but will also enable them to live a longer healthier life.

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