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A COMPARATIVE STUDY OF SERUM LIPID LEVEL IN PATIENTS OF BPH AND NORMAL CONTROL

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ABSTRACT

Objective: Benign prostatic hyperplasia (BPH) is a common melody of the aging men characterized by noncancerous enlargement of the prostate gland and possibility that abnormal lipids and lipoproteins might also be connected to the pathogenesis of BPH. This study is planned to assess the serum levels of Low density lipoprotein (LDL-C), High density lipoprotein (HDL-C), Triglycerides (TG), Total Cholesterol in patients of Benign Prostatic Hyperplasia (BPH) and to compare the above mentioned levels of lipids in Benign Prostatic Hyperplasia (BPH) patients with healthy control group. **Material and methods:** This was a Case-control analytic observational study conducted in Department of Biochemistry S.M.S. Medical College and Hospital, Jaipur between Oct.2011 to Sep.2012 which had 129 cases of BPH & 129 healthy controls and all participants were subjected to detailed clinical examination and investigations. **Results:** The maximum number of cases and controls (42.64% Vs 54.26%) were in age group of 60-69 years and Mean age for cases was 64.55 + 7.36 years while control group was 61.56+7.35 years. Results showed that hypertriglyceridemia hypercholesterolemia, high LDL value & low HDL value were present in all three grades but maximum in grade III. P-value in all three grades are <0.001, which are highly statistical significant. **Conclusion:** the correction of serum lipid profile concentration would have a beneficial effect on treatment, complication and progression of the diseases, so it would be recommendable to provide laboratory analysis of trace elements as a routine.

Key Words: Benign prostatic hyperplasia, LDL, HDL, Triglyceride, Cholesterol.

INTRODUCTION

Benign prostatic hyperplasia (BPH) is a common melody of the aging men characterized by noncancerous enlargement of the prostate gland.BPH has been variably defined as prostatic enlargement, histologic hyperplasia, lower urinary tract symptoms, diminished uro-flow or uro-dynamic obstruction. BPH decrease the quality of life as they have a negative impact on daily life and if left untreated, serious life threatening complications may arise. It is a chronic, progressive and highly prevalent disease, posing a socioeconomic burden to the patients.**(1,2)** Approximately, 60% of men aged over 50 years have histological evidence of BPH and, after the age of 70, the proportion increases to 80%.**(3)** Currently, BPH is the fourth most prevalent disease in men aged >50 years. However, current literature indicates that apart

from steroids, peptides & lipids are also playing a crucial role in the pathogenesis of BPH. **(4-11)** Even if the effects of peptides and lipids on the growth of the gland are milder as compared to that of steroids. Chronic change in their levels either due to dietary habit or genetic predispositions can significantly contribute to the initiation and/or progression of the disease over a period of time. Existing clinical/epidemiological and preclinical studies provide convincing evidence for the association between insulin resistance, metabolic disorder and type 2 diabetes with the BPH and also suggested that insulin-resistance associated secondary rise in the plasma insulin level plays a central role in the prostatic enlargement. Other peptides such as insulin like growth factor-I (IGF-I), IGF-I binding proteins (IGFBPs), growth hormone (GH), transforming growth factor (TGF) family proteins are reported to have important implications in the prostatic growth.**(5,9,10,12)** This observation raises the possibility that abnormal lipids and lipoproteins might also be connected to the pathogenesis of BPH. There are laboratory data to support the biological plausibility of this concept; in one study, rats fed cholesterol-rich diets had both altered blood lipid profiles and hyperplastic changes in the prostate.

Further study of lipids, lipoproteins and a diagnosis of BPH in community-dwelling men might elucidate the mechanisms of BPH pathogenesis, and suggest novel methods of prevention and treatment. Therefore, we examined the associations of serum lipid levels with the risk of clinical BPH in a cohort of community-dwelling men in our institution and compare it with normal control persons. The studies about the relationship between serum lipid levels of HDL-cholesterol, LDL-cholesterol, Total-cholesterol, Triglycerides and their association with risk of BPH are conflicting. Because BPH may lead to carcinoma prostate in long term which is a major form of cancer in old men and a major cause of mortality in old men, researches relating BPH association with serum lipids will be of great interest in future because by modifying lipid levels we can significantly reduce the mortality and morbidity. So the present study is designed to know that if there are any changes in serum lipid levels occurs in patients of BPH by comparing the levels of lipids in BPH with matched healthy control persons.

MATERIAL AND METHODS

This was a Case-control analytic observational study which was conducted in Department of Biochemistry S.M.S. Medical College and Hospital (Central Lab) Jaipur from the period of oct.2011 to sep.2012.The case data obtained from our study is to be compared with age and sex matched normal person without any other clinical problems. Cases taken from urology and surgery ward of S.M.S.Hospital Jaipur and control group taken from patient's attendants, staff, and also from private labs and general populations of Jaipur which conducted routine serum checkup of healthy persons. Case defined in present study a patientthose age more than 50 years and with known case of BPH diagnosed through ultra sound and digital rectal examination by urologist and grading according to IPSS. Patient were excluded from study those had malignancies, any other disease of prostate, any liver disorder or renal disorder or any chronic disease that may affect the progression of BPH and lipid level, any endocrine

disorders, diabetes, hypertension etc. that directly or indirectly affect serum lipid levels and on drugs affecting serum levels of lipid (Statins, cholesterol binding resins).

Sample size calculation:- Assuming difference of mean to be detected 32 gm and S.D. of residual for triglyceride as 91.3gm (as per seed article). Sample size is calculated keeping power of study 80% and α-level at 0.5% final sample size thus obtained 129 persons in each groups.

All the 258 participants were subjected to detailed clinical examination and investigations. Detailed history was recorded; detailed clinical examination and investigation was done in all the participants. General physical examination, BMI measurement, Ultra sound &digital rectal examination, Weight-Height Ratio measurement and Blood pressure Monitoring had been done to all participants. Following Investigation had been included in present study i.e. Serum LDL-cholesterol, Serum HDL-cholesterol, Serum Total Cholesterol, Serum Triglyceride, Renal function test (Serum Urea, Serum Creatinine) and Liver function test (Total Billirubin, SGOT,SGPT, Alkaline Phosphatase).The tests were done on fully automated chemistry analyzer OLYMPUS AU-400 in SMS Central Lab which was based on principle of colorimeter (photoelectric colorimeter).

Statistical Analysis:

Quantitative data will be expressed in the form of Mean±SD. Inference will be drawn with the use of appropriate test of significance. The level of significance was determined by employing Z-Test.

RESULTS:

In present study, the maximum number of cases (42.64%) were in age group of 60-69 years, followed by (29.46%) in 50-59 years age group were present and Mean age for cases was 64.55 ± 7.36 years while control group, more than half (54.26%) in 60-69 years age group followed by age group 50-59 years (23.25%) and mean age were 61.56+7.35 years. According to the religion, 89.15% cases and 93% control were Hindu while remaining were Muslim in present study.

Table No – 1: Demographic Characteristic Features of Case &Control groups

Characteristics	Case (N=129)	Control (N=129)
	No. (%)	No. (%)
Age group(in Yrs)		
50-59	38 (29.46)	**30 (23.25)**
60-69	55 (42.64)	**70 (54.26)**
70-79	36 (27.91)	**29 (22.48)**
Mean ± SD	**64.55 ± 7.36**	**61.56 ± 7.35**
Religions		
Hindu	115 (89.15)	**120 (93.02)**
Muslim	14(10.85)	**9 (6.98)**
Socioeconomic Status		
Lower	48 (37.21)	**53 (41.09)**
Middle	45 (34.88)	**40 (31.00)**
Upper	36 (27.91)	**36 (27.91)**
Residential Status		
Rural	31 (24.03)	**25 (19.38)**
Urban	98 (75.97)	**104 (80.62)**
Dietary Habit		
Veg	64 (49.61)	**72 (55.81)**
Non Veg	65 (50.39)	**57 (44.19)**
Life Style Status		
Moderate	78 (60.47)	**85 (65.89)**
Sedentary	**51 (39.53)**	**44 (34.11)**

Table 1 also revealed that maximum number of the cases and control were belonged to Low socioeconomic status and middle status.

However, current study revealed that maximum number of cases i.e. 98 (75.97%) included in the study were from Urban dwelling as compared to 31(24.03%) of cases from Rural background. In the control group 104 (80.62%) persons were taken from urban background and 25(19.38%) persons from rural background.

In our study number of cases according diet habit was approximately equal& controls was 55.81% Vegetarian& 44.19% Non-vegetarian while maximum number of cases 78 (60.47%) & controls 85(65.89) are belongs to moderate lifestyle.

Table 2 showed that the average value of triglycerides, Cholesterol, LDL & HDL in the case group and the control group which were highly statistically significant (P-value <0.001).

Table No-2: Mean ± SD of Triglyceride, Cholesterol, LDL % HDL levelof case & control group

Parameter (Mg/Dl)	Mean ± SD		P-value
	Case	Control	
Triglyceride	194.36 ± 12.59	72.87 ± 15.44	**<0 .001**
Cholesterol	231.30 ± 17.12	149.12 ± 31.96	**<0.001**
LDL	152.06 ± 11.10	89.25 ± 9.48	**<0 .001**
HDL	**36.44 ± 3.56**	**51.41 ± 4.06**	**<0 .001**

Table No-3: IPSS GRADING of Triglyceride, Cholesterol, LDL & HDL levelin case groups

	IPSS GRADING			
	I	**II**	**III**	**P-value**
Triglyceride	179.66 ± 5.37	194.06 ± 2.74	212.17 ± 7.89	**I v/s II = P < .001 I v/s III = P < .001 II v/s III = P < .001**
Cholesterol	210.63 ± 5.32	231.75 ± 7.39	254.47 ± 8.22	**I v/s II = P < .001 I v/s III = P < .001 II v/s III = P < .001**
LDL	135.97 ± 5.69	155.19 ± 2.82	164.17 ± 2.31	**I v/s II = P < .001 I v/s III = P < .001 II v/s III = P < .001**
HDL	**41.19 ± 1.37**	**36.81 ± 1.75**	**32.23 ± 0.92**	**I v/s II = P < .001 I v/s III = P < .001 II v/s III = P < .001**

Table no.3 showed that mean value of Triglyceride, Cholesterol, LDL & HDL in grade I , grade II and in grade III. These results showed that hypertriglyceridemia hypercholesterolemia, high LDL value & low HDL value were present in all three grades but maximum in grade III. P-value in all three grades are <0.001, which are highly statistical significant.

DISCUSSION

BPH is a highly prevalent condition of prostate in the aging men population. The worldwide increase in the prevalence of BPH has been thought to be associated with obesity and lifestyle changes such as excessive intake of fat-rich diet and physical inactivity. Considering the changing dietary habits and rising incidences of BPH, it becomes increasingly important to delineate the precise roles of lipids in the normal as well as pathological growth of the prostate. This present study, though probably first of its kind in Indian population, is an attempt forward in series of previous studies done internationally to study the serum levels of lipid in Benign Prostatic Hyperplasia. The data obtained from our study is to be compared with age matched control.

Our study showed that the more than fifty percent cases were in age group of 60-69 years was consistent with the average age of diagnosis of BPH and results were consistent with previous researches. In ageing males, a significant tissue-remodelling process takes place within the prostate, especially in the transition zone (TZ).Specifically, the most significant modifications take place in the basal cells, which change their intracellular metabolism and become enlarged and hypertrophic.

Approximately 90% of men will develop histologic evidence of benign prostatic hyperplasia (BPH) by 80 years of age, and a statistically significant correlation also exists between age and prostate volume. In fact, small BPH nodules develop from about age 30 onwards; however, it is not usual to develop symptoms due to enlargement of the prostate until men get into their late 40s or older.

Previous studies had demonstrated that abnormal lipid profile could lead to prostatism and hypothesized that dyslipidemia is a risk factor in the development of BPH and these results were consistent with our research.**(13, 15, 17)**.

We found that serum Triglyceride, total cholesterol, and LDL - cholesterol were significantly higher in BPH cases as compared to controls while serum HDL- cholesterol were significantly lower in BPH cases as compared to controls and these results were consistent with previous researches. Results of our study also showed that hypertriglyceridemia, hypercholesterolemia and high LDL-Cholesterolis present in all three grades but maximum in grade III BPH while HDL-Cholesterol values were significantly decreased in grade III BPH.

Nandeesha et al. in 2006 found that total cholesterol and LDL-cholesterol were significantly higher and HDL-cholesterol was significantly lower in BPH cases compared to controls. They reported that insulin had a significant regression with cholesterol, triglycerides, LDL cholesterol and VLDL cholesterol and insulin is claimed to be involved in pathogenesis of BPH through its action on sympathetic nerve activity, sex hormones and IGF (insulin-like growth factor) axis.**(14)** They suggested that dyslipidemia in BPH occurs due to insulin resistance and insulin plays role in promotion of prostate growth, as it has been established as growth promoting hormone. Increased serum insulin was shown to be associated with an increased annual growth of total and transitional zone volume of the prostate. **(15)**

The metabolic syndrome which is characterized by a defect in the insulin-mediated

glucose uptake is mainly localized to the muscle, adipose tissue and the liver of these patients, leading to an insulin resistance and a secondary hyperinsulinemia. Hence, the present study might indicate the possibility that BPH patients might have the same primary metabolic abnormality of a defective insulin-mediated glucose uptake and secondary hyperinsulinemia as patients with the metabolic syndrome. **(16-17)**

The studies about the relationship between serum lipid levels and BPH are conflicting. For that reason, researches relating BPH associated with serum lipids and hormones will be of great interest in future. In the present study, there was statistically significant relationship between serum total cholesterol, Triglyceride, LDL -cholesterol levels and HDL-cholesterol and BPH.

CONCLUSION

As a conclusion, in this case control study we found that serum concentration of Triglyceride, total cholesterol, and LDL - cholesterol were significantly higher in BPH cases compared to controls while serum HDL- cholesterol were significantly lower in BPH cases as compared to controls. While there are possible pathophysiological explanations, the underlying mechanisms have yet to be identified with further experimental and epidemiological researches to confirm our results. Considering all that, the correction of serum lipid profile concentration would have a beneficial effect on treatment, complication and progression of the diseases, so it would be recommendable to provide laboratory analysis of trace elements as a routine.

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