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COMPARATIVE STUDY OF SERUM VITAMIN D LEVELS AND OTHER BIOMARKERS IN PATIENTS ATTENDING TERTIARY CARDIAC CARE CENTER

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Abstract: To study serum vitamin D levels in patients with proven coronary artery disease (CAD) attending cardiology clinic of Sri Aurobindo Medical College and PG Institute, Indore and to compare it with control subjects.
Material and Method: Total 50 patients with cardiovascular disorder diagnosed by ECG, ECHO or troponin I test were recruited for the study. Total 50 age sex matched healthy controls were also recruited for the study. Serum 25(OH) vitamin D and lipid profile estimation was done on automatic analyzer. A p value <0.05 was considered significant.
Result: Serum 25(OH) vitamin D was found significantly lower in cases as compared to controls. We also observed the significant difference in mean of total cholesterol, HDL cholesterol and LDL Cholesterol in between cases and controls
Conclusion: serum Vitamin D estimation may be considered as an important surrogate marker for screening and prevention of CAD to improve the outcome which needs further exploration.

Key Words: 25(OH) Vitamin D, coronary arterydisease, Lipid Profile

INTRODUCTION

Cardiovascular disease (CVD) is consists of variety of heart disease, illnesses and events that impact the heart & circulatory system, including high blood pressure & coronary artery disease (CAD). According to the World Health Organization (WHO), almost 23.6 million deaths will be attributed to cardiovascular diseases (CVD), mainly stroke and heart diseases by the year 2030[1].

Vitamin D has long been known to be an essential part of bone metabolism, although recent evidence suggests that vitamin D plays a key role in the pathophysiology of other diseases, including CVD. Some observational studies indicate an association of vitamin D deficiency with lower high density lipoprotein cholesterol (HDLc) and higher triglycerides (TG), as well as higher apolipoprotein E levels.[2,3] Blood lipids showed a significant association of lower vitamin D levels with hypercholesterolemia.[4] The elevated levels of serum total cholesterol(TC), triglyceride and LDLc and low levels of HDLc is called dyslipidaemia, which is a major risk factor for CVD. All the components are associated with increased incidence of CAD[5]. Therefore this study was undertaken to evaluate the cardiac patient for vitamin D Status and its association with CAD and comparative study of other biomarkers.

MATERIAL AND METHOD

This present case control study was conducted in Department of Biochemistry, of a tertiary care center of SAIMS hospital during period April 2013 to October 2014. The study was approved by institutional ethics committee for research work. The study population consists of total 100 patients, out of which 50 patients were case (CAD patients) and 50 patients were control (normal, healthy subjects). All subject of study population, selected for present study had attended clinic and admitted to SAIMS Hospital &Research Center. Study group inclusion consists of subjects having age more than 20 years. The diagnosis of CAD patients was done by Cardiology Department based on serum TROP I level, ECG, ECHO and CAG findings.

After taking written consent from the patients, venous blood was collected in vacutainer allowed to clot and then immediately sent to the biochemistry laboratory, where the samples were centrifuged at 4000 rpm for 10 minutes, then serum was separated and analyzed for the serum lipid profile, serum vitamin D and troponin I.

Statistical analysis:

Student t test was performed to see the difference on mean of quantitative data between cases and controls. Multivariate logistic regression analysis was performed using backward elimination model to see the independent risk factor.

RESULT

The mean age of cases and controls were 52.24±8.24 and 47.88±5.63 years respectively. As per inclusion criterion for selecting age sex matched controls, there was no significant difference in age and sex of cases and controls (Table 1). Serum 25(OH) vitamin D levels were found significantly lower in cases as compared to controls. The total cholesterol, HDL

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cholesterol and LDL cholesterol was also found significantly higher in cases than controls.

Table 1: Demographic and biochemical profile of cases and controls

Parameter	Case	Control	P value
Age(years)	52.54±8.24	47.88±15.6	0.062
Sex(Male)	33(60%)	25(50%)	0.105
Serum 25(OH) Vitamin D(ng/ml)	20.31±12.29	36.90±18.3	<0.0001
Total cholesterol(mg/dl)	202.66±38.73	177.94±28.79	<0.0001
Triglyceride(mg/dl)	174.90±36.94	161.12±36.75	0.065
HDL Cholesterol(mg/dl)	30.46±7.42	35.48±6.97	<0.0001
VLDL Cholesterol(mg/dl)	34.56±7.68	31.84±7.3	0.074
LDL Cholesterol(mg/dl)	136.40±35.8	108.62±30.06	<0.0001

Karl Pearson correlation test was applied to see any correlation of vitamin D with lipid profile and no statistically significant correlation was observed between serum vitamin D levels and any of the cholesterol and triglyceride (Table 2).

Table 2: Correlation of serum lipid profile with 25(OH) Vitamin D

Lipid Parameter	r value (p value)
Total cholesterol	0.107 (0.458)
Triglycerides	-0.087 (0.549)
HDL Cholesterol	0.004 (0.977)
VLDL Cholesterol	0.125 (0.386)
LDL Cholesterol	-0.099 (0.495)

Multinomial logistic correlation test was applied to see weather vitamin D levels were act as independent risk factor for the CVD and we observed that serum vitamin D as an independent risk factor for the CVD (table 3).

Table 3: Independent risk factor for CVD

Parameter	Exp (B)	P value	95%CI
Age	1.055	0.039	1.003-1.110
Total Cholesterol	1.025	0.009	1.006-1.044
HDL Cholesterol	0.857	<0.0001	0.785-0.934
25(OH)Vitamin D	0.875	<0.0001	0.815-0.939

DISCUSSION

Hypovitaminosis D has emerged as a key biologic predictor of increased rates of CVD risk factors (hypertension, obesity, diabetes mellitus and the metabolic syndrome) and progression factors (e.g., inflammation and fibrosis)[5-10]. Data from prospective observational studies suggest that low vitamin D levels are a risk factor for the occurrence of strokes [11-13]. Chowdhury *et al.,* showed in a meta-analysis of seven studies, including 47,809 individuals and 926 cerebrovascular events that, under consideration of established cardiovascular risk factors, the risk for cerebrovascular disease was significantly lower in subjects with high 25(OH)D levels compared to those with insufficient vitamin D status [12]. Another meta-analysis reported on similar results when compared low versus high vitamin D levels, with an RR for strokes of 1.52 (95% CI 1.20–1.85) in the lowest versus the highest 25 (OH) D group[11]. In a prospective nested case-controlled study of 18,225 men in the Health Professionals Follow-Up Study, there was 2.4 fold adjusted increased risk for myocardial infarction for men with 25D levels <15 ng/mL[14]. Similar to these studies we observed a positive association of serum 25(OH) Vitamin D with CVD.

Skaaby *et al.,* [4] investigated the association between serum 25(OH)D levels at baseline and incident dyslipidemia over five years in a prospective study with 4330 participants and concluded that higher serum 25(OH) vitamin D levels may favorably change lipid profiles and therefore positively influence cardiovascular health. Karhapää *et al.,* [15] found a significant inverse association between serum 25(OH) vitamin D levels and TC, LDL-C and TG level. However, they found no association between serum 25(OH) vitamin D and HDL-C levels, which does not support an association between lower serum 25(OH) vitamin D levels and a more favorable lipid profile. In contrast in present study we did not observe a correlation of serum 25(OH) vitamin D levels with lipid profile. In conclusion our study add inputs to previous existing studies suggesting that low serum 25(OH) vitamin D levels may be an independent, potentially modifiable cardiovascular risk factor which need further evaluation.

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