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Study Of Vitamin D In Patients With Coronary Artery Disease.

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ABSTRACT

Coronary artery disease (CAD) remains a leading cause of morbidity and mortality worldwide. Emerging evidence suggests that vitamin D deficiency may contribute to the pathogenesis and progression of CAD. This study aimed to evaluate serum vitamin D levels in patients with angiographically proven CAD and examine the correlation between vitamin D status and disease severity. A cross-sectional observational study was conducted over one year involving 40 patients with confirmed CAD. Patients underwent coronary angiography, and the extent of disease was classified as single, double, or triple vessel involvement. Serum 25-hydroxyvitamin D [25(OH)D] levels were measured using chemiluminescence immunoassay. Statistical analysis was performed to correlate vitamin D levels with CAD severity. The majority of patients were male (70%) and aged between 55–64 years. Vitamin D deficiency (<20 ng/mL) was observed in 70% of patients, while only 10% had sufficient levels (>30 ng/mL). A significant inverse relationship was found between vitamin D levels and CAD severity. Patients with triple vessel disease had the lowest mean vitamin D levels (12.6 ± 2.9 ng/mL), with p-value <0.01. Vitamin D deficiency is highly prevalent in CAD patients and is significantly associated with disease severity, highlighting its potential role as a modifiable risk factor.

Keywords: Vitamin D, Coronary Artery Disease, Atherosclerosis.

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INTRODUCTION

Coronary artery disease (CAD) is a leading global cause of morbidity and mortality, primarily resulting from atherosclerosis—a process marked by lipid plaque buildup in the coronary arteries. [1.2] While traditional risk factors such as hypertension, diabetes, smoking, and dyslipidemia are well known, recent studies have highlighted the potential role of non-traditional factors like vitamin D deficiency. [3] Vitamin D, synthesized through skin exposure to sunlight and available in limited dietary sources, has recognized roles beyond bone health. Its receptors are present in vascular and cardiac tissues, suggesting a regulatory role in cardiovascular health. [4.5.6] Studies indicate an inverse association between serum vitamin D levels and CAD severity, with deficiency linked to hypertension, inflammation, and endothelial dysfunction. In India, vitamin D deficiency is widespread despite ample sunlight. [7, 8] This study aims to assess serum vitamin D levels in patients with angiographically confirmed CAD and explore their correlation with disease severity, contributing to risk assessment and preventive strategies.

METHODOLOGY

This observational, cross-sectional study was conducted over a period of one year in the Department of Medicine at a tertiary care hospital. The study aimed to evaluate the serum vitamin D levels in patients diagnosed with coronary artery disease (CAD) and to assess the correlation between vitamin D status and the severity of the disease. Ethical clearance was obtained from the Institutional Ethics Committee prior to the commencement of the study. Written informed consent was obtained from all participants included in the study.

A total of 40 patients aged between 35 and 75 years with angiographically confirmed CAD were enrolled based on predefined inclusion and exclusion criteria. Patients with conditions known to affect vitamin D metabolism, such as chronic kidney disease, liver disease, parathyroid disorders, or those already on vitamin D supplementation, were excluded from the study. Demographic data, clinical history including risk factors like diabetes, hypertension, smoking, and family history of CAD, along with medication history, were recorded in a structured case record form.

All patients underwent coronary angiography as part of their diagnostic evaluation. The severity of coronary artery disease was classified based on the number of vessels involved (single, double, or triple vessel disease) and the degree of stenosis. Fasting blood samples were collected to analyze serum 25-hydroxyvitamin D [25(OH)D] levels using a chemiluminescence immunoassay method. Additional investigations included fasting blood sugar, lipid profile, renal function tests, and serum calcium levels to assess associated metabolic parameters.

Data were compiled and analyzed using SPSS software version 23. Descriptive statistics such as mean, standard deviation, and percentages were used to summarize the data. The association between vitamin D levels and severity of CAD was evaluated using chi-square test and Pearson correlation coefficient. A p-value of less than 0.05 was considered statistically significant. The results were interpreted in the context of current literature to assess the potential role of vitamin D in the pathogenesis and progression of coronary artery disease.

RESULTS

Table 1: Age and Gender Distribution of Patients (n = 40)

Age Group (Years)	Male (n=28)	Female (n=12)	Total (%)
35–44	4	2	6 (15%)
45–54	6	3	9 (22.5%)
55–64	10	4	14 (35%)
≥65	8	3	11 (27.5%)
Total	**28**	**12**	**40 (100%)**

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Table 2: Distribution of Patients by Severity of CAD

Severity of CAD	No. of Patients	Percentage (%)
Single Vessel Disease	12	30%
Double Vessel Disease	14	35%
Triple Vessel Disease	14	35%
Total	**40**	**100%**

Table 3: Serum Vitamin D Levels in CAD Patients

Vitamin D Level (ng/mL)	No. of Patients	Percentage (%)
<10 (Severe Deficiency)	10	25%
10–20 (Deficiency)	18	45%
21–30 (Insufficiency)	8	20%
>30 (Sufficient)	4	10%
Total	**40**	**100%**

Table 4: Correlation of Vitamin D Levels with Severity of CAD

CAD Severity	Mean Vitamin D (ng/mL)	p-value
Single Vessel Disease	24.8 ± 4.2	
Double Vessel Disease	17.3 ± 3.6	
Triple Vessel Disease	12.6 ± 2.9	**<0.01**

Statistically significant inverse correlation between Vitamin D level and CAD severity.

DISCUSSION

The present study aimed to evaluate serum vitamin D levels in patients diagnosed with coronary artery disease (CAD) and to assess the correlation between vitamin D status and the severity of the disease. The findings of our study highlight a high prevalence of vitamin D deficiency among CAD patients, supporting the hypothesis that hypovitaminosis D may be an important modifiable risk factor in the pathogenesis of coronary artery disease. [9,10,11]

In this study involving 40 patients with angiographically confirmed CAD, the majority of the participants were in the age group of 55–64 years (35%), followed by those above 65 years (27.5%). A male predominance was observed, with 70% of the study population being male. This gender distribution is consistent with previous literature that reports a higher incidence of CAD in males, potentially due to differences in hormonal protection, lifestyle, and risk factor exposure.

The angiographic profile of the patients revealed that 35% had double vessel disease (DVD), another 35% had triple vessel disease (TVD), and 30% had single vessel disease (SVD). The relatively high proportion of patients with multi-vessel involvement suggests an advanced stage of atherosclerotic burden in this cohort. [12]

The analysis of serum vitamin D levels revealed that only 10% of the patients had sufficient levels (>30 ng/mL), while the majority exhibited some form of deficiency—25% had severe deficiency (<10 ng/mL), 45% had moderate deficiency (10–20 ng/mL), and 20% had insufficiency (21–30 ng/mL). This indicates that 90% of the patients with CAD in our study were either deficient or insufficient in vitamin D, a finding that aligns with other Indian and global studies pointing toward a widespread prevalence of hypovitaminosis D in the general population and particularly among cardiovascular patients.

A key finding of our study was the inverse correlation between serum vitamin D levels and the severity of CAD. Patients with SVD had the highest mean vitamin D levels (24.8 ± 4.2 ng/mL), while those with DVD and TVD had progressively lower levels (17.3 ± 3.6 ng/mL and 12.6 ± 2.9 ng/mL, respectively). The p-value for this correlation was <0.01, indicating a statistically significant association. These findings suggest that lower vitamin D levels may be associated with more extensive coronary artery involvement.

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