Original Article

Association of Vitamin D Deficiency with Ischemic Cardiomyopathy

Vitamin D Deficiency with Ischemic Cardiomyopathy

Imran Waheed[1], Zeeshan Hassan[1] and Aamir Siddique[2]

ABSTRACT

Objective: The basic aim of this study is to analyze the association of vitamin D deficiency with ischemic cardiomyopathy.

Study Design: Cross-Sectional study

Place and Duration of Study: This study was conducted at the Government Khawaja Muhammad Safdar Medical College Sialkot during June 2019 till December 2019.

Materials and Methods: All study participants underwent physical examinations, blood analysis, and echocardiographic evaluation. Venous blood samples were collected in the first part of the day after a short-term quick (10 to 12 hours). Afterwards, the serum was separated through centrifugation and immediately transported to the research facility for biochemical investigation.

Results: The data was collected from 50 patients. There were no differences in age, gender, body mass index, and sun exposure within the groups. Biochemical parameters were not significantly different in all study participants except that patients with ICMP had low calcium levels than the control group. The mean 25(OH) D3 levels were significantly lower and NT-proBNP levels were significantly greater in patients with ICMP than controls.

Conclusion: It is concluded that patients with ICMP had lower Vitamin D levels than controls, and Vitamin D deficiency had a significant relationship with cardiac function.

Key Words:

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INTRODUCTION

Vitamin D plays an important role in maintaining balanced serum calcium and phosphate levels for bone mineralization and skeletal health. Recent literature, in any case, has indicated a lot broader part of Vitamin D than just the guideline of calcium digestion as Vitamin D receptors (VDRs) are found in an assortment of cells and tissues[1]. These include harmful bosom, colon, and prostate cells and typical cells of the safe framework, kidney, heart, and vasculature[2]. Vitamin D probably gives physiologically pertinent pleiotropic capacities that include cardio protective and immunomodulatory impacts just as improves antimicrobial capacity and its deficiency could lead to increased danger of cardiovascular disease and malignancy[3].

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The instances of vitamin D inadequacy are regular both in the North American and in the European nations. Vitamin D, a steroid hormone, is additionally notable for its important function in calcium balance and musculoskeletal digestion[4]. Nonetheless, there is a developing body of evidence indicating that there might be a connection between vitamin D deficiency and cardiovascular diseases[5]. Vitamin D receptors present wide distribution all through the cardiovascular framework including vascular smooth muscle, endothelium, and cardiomyocytes[6].

Late studies reported that low vitamin D level is exceptionally regular in the patients with cardiovascular breakdown and it is linked with helpless guess among these patients. Chen and associates have likewise demonstrated that vitamin D-vitamin D receptor flagging framework has a direct antihypertrophic impact on cardio myocytes. Additionally, past studies indicate that there is a connection between vitamin D and left ventricular calculation[7].

Vitamin D deficiency is associated in different ways with the human body e.g DM, low HDL cholesterol, weight, older age and skin problems[8]. The heart is especially imperative in that plasma 25-hydroxyvitamin D3 [25(OH) D3] levels have been appeared to associate contrarily with the incidence of an assortment of cardiac disorders including ischemic coronary illness and cardiovascular breakdown[9]. Part of Vitamin D in myocardial contractility was demonstrated in a network study of 870 elderly patients without coronary illness during which higher circling Vitamin D levels were

found to connect with better left ventricular (LV) systolic capacity and littler LV end-systolic diameter [10]. The basic aim of this study is to analyze the association of vitamin D deficiency with ischemic cardiomyopathy.

MATERIALS AND METHODS

This cross sectional study was conducted in Government Khawaja Muhammad Safdar Medical College Sialkot during June 2019 till December 2019. This study was done with the permission of ethical committee of hospitals. All study participants underwent physical examinations, blood analysis, and echocardiographic evaluation. Venous blood samples were collected in the first part of the day after a short-term quick (10 to 12 hours). Afterwards, the serum was separated through centrifugation and immediately transported to the research facility for biochemical investigation. Serum complete cholesterol, hs-CRP, glucose, phosphorus, calcium and egg whites focuses were measured by standard research facility methods. The serum convergence of 25OHD3 was measured by radioimmunoassay. The serum PTH concentration was assessed by immunoassay method.

Statistical Analysis: All statistical were carried out with the Statistical Package for Social Science for Windows form 21.0 (SPSS Inc., Chicago, IL)

RESULTS

The data was collected from 50 patients. There were no differences in age, gender, body mass index, and sun exposure within the groups. Biochemical parameters were not significantly different in all study participants except that patients with ICMP had low calcium levels than the control group. The mean 25(OH) D3 levels were significantly lower (14.5 ± 7.4 ng/ml vs. 28.2 ± 12 ng/ml, $P = 0.001$), whereas PTH (90.5 ± 28.5 pg/ml vs. 57 ± 20.2 pg/ml, $P = 0.02$) and NT-proBNP levels were significantly greater in patients with ICMP than controls.

Table No.1: Biochemical parameters of patients with ischemic cardiomyopathyand controls

Variables	Patients with ICMP	Controls	*P*
Fasting plasma glucose (mg/dl)	104±18.2	96±12.6	0.2
Total cholesterol (mg/dl)	186±25.6	178±22.6	0.56
LDL (mg/dl)	116±18	112±12	0.06
Hemoglobin (mg/dl)	9.2±1.8	11.2±2.2	0.03
Creatinine (mg/dl)	0.9±0.03	0.82±0.1	0.05
Albumin (mg/dl)	3.4±1.2	4.2±1.4	0.04
Calcium (mg/dl)	8.2±1.4	9.6±0.8	0.01
25(OH) D3 (ng/ml)	14.5±7.4	28.2±12	0.001
Parathyroid hormone (pg/ml)	90.5±28.5	57±20.2	0.02
NT-proBNP (pg/ml)	3482±1256	165±34	0.001

Taking everything into account, LV partial shortening (LVFS) and LVEF were essentially lower in patients with ICMP and LV end-diastolic and LVESDs were altogether higher in patients with ICMP compared to the controls. There was a huge negative connection between's 25(OH) D3 fixations and LV end-diastolic dimensions and LV end-systolic dimensions.

Table No.2: Correlations with Hypovitaminosis D

Parameter	Correlation coefficient	P
LVEF	0.36	0.01
LVFS	0.32	0.04
LVEDD	0.35	0.01
LVESD	0.38	0.01
NT-proBNP	0.36	0.02

DISCUSSION

Vitamin D decreases inflammation by means of a few pathways, for example, restraint of prostaglandin and cyclooxygenase pathways[11]. Vitamin D deficiency animates foundational and vascular irritation, empowering atherogenesis. Then again, as already mentioned, hypertension is likewise associated with absence of vitamin D, due to enactment of the RAA framework, empowering endothelial dysfunction, the initial phase in plaque development[12].

In the current study, it was observed that 25(OH) D3 levels were lower than typical in both the gatherings and altogether low in patients with DCMP than controls who were likewise the patients with other medical diseases[13]. There was a negative relationship between's 25(OH) D3 and LV dimensions in DCMP patients. This perception was in concordance with Ameri et al. who likewise reported that 25(OH) D3 level had reverse connection with LVESD and LV volume in patients with cardiovascular breakdown[14].

A few studies have demonstrated associations of low Vitamin D focuses with cardiovascular occasions including sudden cardiac death and mortality with cardiovascular breakdown patients. In a study drawn from the NHANES III database, Vitamin D inadequacy was associated with cardiovascular breakdown[15]. In another study of patients, Vitamin D levels were contrarily correlated with NT-proBNP, a marker of cardiac dysfunction and disappointment, and adversely correlated with NYHA. After rectification for cardiovascular danger factors, the hazard proportion for death due to cardiovascular breakdown was fundamentally higher when Vitamin D deficient patients. Strikingly, an ongoing report linked a useful polymorphism in the 1-(OH) ase quality, the rate-restricting advance in the combination of dynamic 1,25(OH) 2 with increased danger for cardiovascular breakdown[16].

ICMP is the third most basic reason for cardiovascular breakdown with a wide scope of etiologies, for

example, hereditary, irresistible, immune system, poisonous, metabolic, wholesome, endocrine, mitrochondrial. Notwithstanding, now and again the specific etiology stays hazy[17]. Hypocalcaemia is one of the inconsistent and reversible reasons for the DCMP. Some case reports indicated that the DCMP can be associated with hypocalcaemia and vitamin D deficiency in the pediatric populace. Generally, these cases were effectively treated with calcium and vitamin D substitution treatment, at that point cardiac dysfunction and dilatation totally resolve inside months[18].

CONCLUSION

It is concluded that patients with ICMP had lower Vitamin D levels than controls, and Vitamin D deficiency had a significant relationship with cardiac function. In this way, screening for Vitamin D deficiency alongside brief treatment is recommended in patients with ICM.

Author's Contribution:

Concept & Design of Study:	Imran Waheed
Drafting:	Zeeshan Hassan
Data Analysis:	Aamir Siddique
Revisiting Critically:	Imran Waheed, Zeeshan Hassan
Final Approval of version:	Imran Waheed

Conflict of Interest: The study has no conflict of interest to declare by any author.

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