



ASSOCIATION OF VITAMIN D DEFICIENCY WITH ISCHEMIC CARDIOMYOPATHY

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ABSTRACT:

OBJECTIVE: To enhance further investigation in relation to vitamin D deficiency and its association with ischemic cardiomyopathy. From the past studies it is reported that vitamin D deficiency is coupled with variety of diseases, including ischemic heart diseases and other cardiovascular disorders.

MATERIAL & METHODS: In this case control study, 1135 ICMP patients and 1135 controls were admitted in Jinnah hospital Lahore from January to August, 2017. 25-Hydroxyvitamin D (25(OH)D) quantification of every patient serum was measured with diasorin radioimmunoassay method.

RESULTS: In this study, the mean age of patients in case group was 58.91 ± 7.36 years while mean age of control group was 59.67 ± 10.23 years. There were 517 males and 618 females in case group while there were 522 males and 613 females in control group. Among cases, vitamin D deficiency was observed in 79% patients while among controls, vitamin D deficiency was observed in 77.5% patients. There was although high risk of ICMP due to vitamin D deficiency i.e. OR= 1.092 (95% CI: 0.8945, 1.333), but it was statistically insignificant (p 0.38).

CONCLUSION: Vitamin D deficiency may increase the risk of ICMP by promoting ischemia and weakness of cardiac muscles. But further studies on larger scale are required to establish its causal relationship.

KEYWORDS: Vitamin D deficiency, Risk, Ischemic cardiomyopathy.

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INTRODUCTION:

Vitamin D apart from bones plays an important role in many organ functions including cardiovascular system and its deficiency is associated with coronary artery disease, myocardial infarction, heart failure, and stroke¹. In patients with deficient Vitamin D levels, its supplementation improves outcome².

Vitamin D deficiency is increased many folds in Pakistani population due to malnutrition. The most serious consequences of vitamin D deficiency is the development of structural growth deficiency and leading towards worsening of many fatal diseases in general population^{3,4}.

Suggested mechanisms with vitamin D deficiency are inflammation, disruption of rennin-angiotensin mechanism and change in lipid metabolism and

smooth muscle growth alteration that may lead to hypertension, diabetes and atherosclerosis⁵.

Incidence of vitamin D deficiency in ischemic cardiomyopathy is common in nowadays and its long-term reason is found to be delay in diagnosis of the disease. Definitely, vitamin D deficiency influence frequent adverse cardiovascular events and hence it leads to many ischemic, and cardiac remodeling changes in patients with cardiomyopathy^{6,7}.

In this study, we examined the relationship of vitamin D deficiency and Ischemic cardiomyopathy.

METHODOLOGY:

In this case control study, 1135 ICMP patients and 1135 patients without ICMP were admitted in Department of Cardiology, Jinnah Hospital, Lahore from January to August 2017. ICMP was diagnosed on the basis of signs include congestive heart failure, angina, edema, weight gain, fainting, shortness of breath, dizziness and palpitations, enlarged heart size on chest X-ray. Echocardiography was performed to confirm the ICMP. The following echocardiographic criteria of ICMP was determined: final diastolic size of LV >52mm, final diastolic volume of LV >133ml, index of LV myocardial mass >140g/m, EF <50%, fractional shortening <23%, index of local contractility >1.3. Controls were those who had previous history of

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myocardial infarction but did not develop ICMP. Vit. 25-Hydroxyvitamin D (25(OH)D) quantification of every patient serum was measured with diasorin radioimmunoassay method. Association of Vitamin D deficiency with ICMP was measured by calculating odds ratio with OR> 1 taken as significant risk of association. Vitamin D level below 75 nmol/l (30 ng/l) is regarded as vitamin D insufficiency, while a level below 50 nmol/l (20 ng/l) is considered deficiency.

RESULTS:

In this study, the mean age of patients in case group was 58.91±7.36years while mean age of control group was 59.67±10.23years. There were 517 males and 618 females in case group while there were 522 males and 613 females in control group. The mean BMI of cases was 26.52±10.02kg/m² while mean BMI of con-

to sunlight. Vitamin D deficiency leads to many secondary health related issues⁹. In patients with ischemic cardiomyopathy, it worsen the conditions and causes high mortality rate in hospital admitted patients⁹. Low serum 25-hydroxyvitamin D (25[OH]D) is associated with heart failure (HF) and its the association may be partly due to traditional cardiovascular risk factors and stronger among those who are genetically predisposed.¹⁰

Along with Vitamin D deficiency there are other confounders for ischemic heart failure like alcohol intake, increased BMI level, use of tabbaco, sex, ethnicity and high cholesterol diet¹¹. In our study more smokers were in ischemic cardiomyopathy group than in the control group. Patients who are regular smoker had definitely high risk of vitamin D deficiency; Kassi et al, also suggested that vitamin D deficiency in smokers is high as compare to non smoker population¹². Smoking is mainly linked with the vitamin D deficiency, it is hypothesize that it effects bone mineralization process; smoking is related to lower bone mineral density in patients¹³.

The patients who have high cardiovascular risk burden, because of their ill health may spend more time indoors and have less sun exposure, leading to vitamin D deficiency¹⁴. Vitamin D deficiency has been increasing in developed countries; it is an emerging risk factor for developing atherosclerosis and acute myocardial infarction. Exposure to sunlight is a cost-saving strategy for the management of vitamin D deficiency¹⁵.

It can be assumed that multiple predisposing factors including metabolic changes and life style effects at early period of the disease. Our study was in accordance with the past researches that concluded that the vitamin D deficiency is related to cardio-vascular diseases that might lead to cardiac failure¹⁶.

Vitamin D deficiency may be an important but neglected factor in the pathogenesis of cardiovascular disease. Vitamin D deficiency is related to a broad spectrum of cardiovascular disease and its risk factors. It is associated with increased morbidity and mortality. Vitamin D supplementation may play a role in decreasing morbidity and mortality of cardiovascular disease¹⁷.

CONCLUSION

Vitamin D deficiency may increases the risk of ICMP by promoting ischemia and weakness of cardiac muscles. But further studies on larger scale are required to establish its causal relationship.

Table 1: Demographic profile of patients

	Case	Control	p- value
N	1135	1135	
Age (years)	58.91±7.36	59.67±10.23	.042
Gender (m/f)	517 / 618	522 / 613	0.863
BMI (kg/m²)	26.52±10.02	30.22±14.13	0.001
Smoking	451 (39.7%)	369 (32.5%)	0.004
Pulmonary edema	1096 (96.6%)*	311 (27.4%)	0.001
Pulmonary infection	1074 (94.6%)*	284 (25.0%)	0.001
Peripheral edema	1026 (90.4%)*	37 (3.3%)	0.001

Table 2: Association of vitamin D deficiency with ICMP

Vitamin D deficiency	Case	Control	Total
Yes	897 (79.0%)	880 (77.5%)	1777 (78.3%)
No	238 (21.0%)	255 (22.5%)	493 (21.7%)
Total	1135 (100%)	1135 (100%)	2270 (100%)

controls was 30.22±14.13kg/m². There were 451 (39.7%) smokers in case group while 369 (32.5%) smokers in control group. Pulmonary edema was significantly high in cases (1096 (96.6%) vs. 311 (27.4%), respectively). Pulmonary infection was significantly high in cases (1074 (94.6%) vs. 284 (25.0%), respectively). Peripheral edema was significantly high in cases (1026 (90.4%) vs. 37 (3.3%), respectively). Table 1

Among cases, vitamin D deficiency was observed in 79% patients while among controls, vitamin D deficiency was observed in 77.5% patients. Although more patients of ICMP had vitamin D deficiency i.e. OR=1.092 (95% CI: 0.8945, 1.333), but the p-value was insignificant (0.386). Table 2

DISCUSSION:

Vitamin D deficiency is mainly due to less intake of vitamin by patients or due to less exposure



Author's Contribution

SS: Conducted the study and collected the data. AA: Helped in conducting the study. MJ: Analysis of data.

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