



CORRELATION OF LEVEL OF VITAMIN D IN TUBERCULOSIS

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ABSTRACT **Background-** Tuberculosis remains a major public health problem globally. Deficiency of Vitamin D carries a high risk of tuberculosis infection and a worse disease progression.

Aims And Objectives- Aim of the study is to correlate the serum level of vitamin D with Tuberculosis & objective is to explore the association between low serum vitamin D and risk of active tuberculosis in humans.

Methodology- A prospective non interventional observational study where data from all the cases (>14years) of Tuberculosis and controls in whom tuberculosis was ruled out and healthy controls attending MGM hospital for treatment from December 2017 to October 2019. All cases & controls were subjected to routine blood investigations & serum Vitamin D levels. USG chest, HRCT chest and other special tests were carried out in particular cases if considered necessary.

Results- In our study majority of the patients in both the groups belonged to 31-50 years; 42% in cases and 46% in controls. Significant difference was seen in the mean levels of vitamin D between cases and controls.

Conclusion- Vitamin D deficiency was prevalent in the whole study population, a higher proportion of the patients suffering from TB were deficient indicating a significance in role of Vitamin D in immunomodulatory responses.

KEYWORDS : Tuberculosis, Vitamin D, Vitamin D deficiency.

INTRODUCTION

Deficiency of Vitamin D carries a high risk of tuberculosis (TB) infection [1,2]. Individuals with Vitamin D deficiency have a greater susceptibility to developing TB [3] and worse disease progression if infected with TB [4,5].

The likely mechanism by which vitamin D may prevent or limit Mycobacterium Tuberculosis (MTB) infection is through the binding of the bioactive form of vitamin D (1,25-dihydroxycholecalciferol) to the vitamin D receptor (VDR). VDR is a polymorphic nuclear receptor which regulates the expression of genes important for immune function and involved in cytokine production [6-8]. Immune cells [9,10] and bronchial and pulmonary epithelial cells contains VDR [11,12], and is up-regulated after the ligation of specific toll-like receptors (TLRs) during an antimicrobial response [13,14]. Because of this mechanism, several endogenous antimicrobial peptides are induced by Calcitriol [15,16], specifically cathelicidin LL-37 and b defensin [13,16], and suppresses matrix metalloproteinase enzymes that degrade the pulmonary extracellular matrix [17] & helps in killing of intracellular MTB.

Numerous studies have been conducted to study whether Vitamin D deficiency was associated with TB; however, they produced inconsistent and varying results. Thus, this study was conducted in order to assess the existence of Vitamin D deficiency in TB patients and aid in the strategies and development of newer improvised approaches in the treatment of TB.

MATERIALS AND METHODS

Study Design- Prospective observational study.

Study Population- Cases comprised of all patients (age >14years) of either sex detected having pulmonary or extrapulmonary tuberculosis or both and Controls comprised Healthy individuals and patients in whom tuberculosis has been ruled out.

Sample Size- 50 cases and 50 controls.

Tool- Detailed history was taken from cases and controls and meticulous examination was done. Additionally, Mantoux test was done in suspected TB patients and Serum Vitamin D level were obtained in all patients.

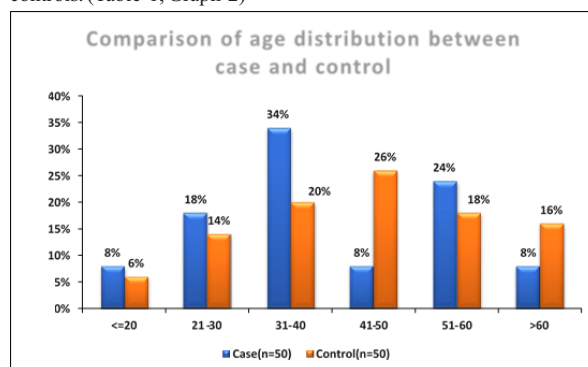
Ethical Review- The study protocol was approved by the ethics committees of MGM medical college.

Statistical Analysis- A p value of <0.05 was considered statistically significant. The analysis was done using 35 Statistical Package for Social Sciences (SPSS) version 21.0. with the help of a statistician.

RESULTS

Majority of the patients in both the groups belonged to 31-50 years; 42% in cases and 46% in controls. Mean value of age in cases was 40.6 ± 14.69 years and 44.58 ± 14.99 years in controls. No significant difference was seen in the mean levels of age between cases and control. So, it can be concluded that age was comparable between cases and control with no significant difference between them. (p value > 0.05) (Table 1)

Significant difference was seen in the mean levels of vitamin D between cases and controls. (p value = 0.001) Mean levels of vitamin D in cases was 17.27 ± 10.5 ng/ml which was significantly lower as compared to the mean level in controls (25.66 ± 14.46 ng/ml). Also 90% of the cases were vitamin D deficient as compared to only 62% of controls. So, it can be concluded that the proportion of patients with vitamin D deficiency were significantly higher in cases as compared to controls. (Table-1, Graph-2)

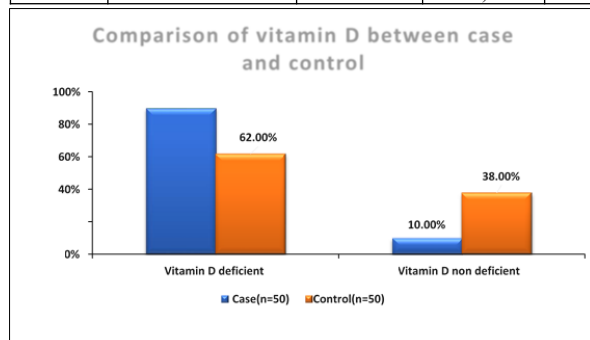


Graph 1: Comparison Of Age Distribution Between Group.

Table-1 Comparison Of Vitamin D Between Case And Control.

Vitamin D Group (ng/ml)	Case (n=50)	Control (n=50)	Total	P value
Vitamin D deficient	45 (90.00%)	31 (62.00%)	76 (76.00%)	0.001

Vitamin D non deficient	5 (10.00%)	19 (38.00%)	24 (24.00%)	
Mean \pm Stdev	17.27 \pm 10.5	25.66 \pm 14.46	21.47 \pm 13.26	0.001
Median (IQR)	15.38(8.850 - 25.100)	25.54 (14.300 - 38)	19.03 (11.195 - 29.785)	



Graph 2:- Comparison Of Vitamin D Between Case And Control.

DISCUSSION

Our study consisted of 50 cases of patients suffering from tuberculosis and 50 people who either were not suffering from TB or were healthy controls.

In this study high prevalence of Vitamin D deficiency (76%), was observed among the total study population. Significant difference was seen in the mean levels of vitamin D between cases and controls. (p value = 0.001) Mean levels of vitamin D in cases was 17.27 ± 10.5 ng/ml which was significantly lower as compared to the mean level in controls (25.66 ± 14.46 ng/ml). Also 90% of the cases were vitamin D deficient as compared to only 62% of controls. So it can be concluded that proportion of patients with vitamin D deficient were significantly higher in cases as compared to controls which is consistent with the results of the meta-analysis by Nnoaham et al [18]. Similar findings were seen in a small study by Sasidharan et al on patients with tuberculosis observed a statistically significant difference in mean vitamin D levels between controls and study subjects [76]. Majority of the patients were vitamin D deficient in all the types of TB irrespective of microbiological confirmation. Huang et al analysis revealed a significantly lower vitamin D level in TB subjects and that Vitamin D was associated with more risk of TB [19]. The probability of any Mtb infection was lower with higher serum vitamin D levels ($P < .001$) and lower probability of tuberculosis or past tuberculosis (compared with latent tuberculosis infection = .001) [20].

CONCLUSION

Our study concluded that Older age groups had more vitamin D deficiency especially in controls & Both genders had similar range of vitamin D levels. Vitamin D deficiency was prevalent in the whole study population, a higher proportion of the patients suffering from TB were deficient indicating a significance in role of Vitamin D in immunomodulatory responses.

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