

Role of Vitamin D in Prostate Cancer in Developing Country

Sohil Takodara¹, Neha Sharma², Ashish Sharma³, Sabira Dabeer⁴, Ruchi Jindal⁵

How to cite this article:

Sohil Takodara, Neha Sharma, Ashish Sharma, *et al.* Role of Vitamin D in Prostate Cancer in Developing Country. Indian Journal of Medical & Health Sciences. 2019;6(2):69-71

Abstract

Introduction: Vitamin D₃ deficiency continues to be an unrecognized epidemic in many populations around the world. Vitamin D is important for the absorption of calcium, and bone formation and maintenance

Materials and Methods: 150 patients enrolled for the study along with control, serum analyzed by vitros - Eci- dry chemistry analyzer, (Johnson-Johnson). Study done in CRGH Hospital, in R.D. Gardi Medical College, Ujjain, Madhya Pradesh, during Dec. 2015-Sep. 2016. All data were analyzed by Graph pad. Prism 8.

Results: We have found decrease level of Vitamin D in patients with higher serum PSA level, *p* value < 0.0001.

Conclusion: Supplementation of Vitamin D is required for developing countries especially for older having higher risk of prostate carcinoma.

Keywords: Vitamin D; Prostate carcinoma; Calcium; Phosphorous.

Introduction

In Developing countries, prostate cancer is the most common malignant tumor in men and a major cause of cancer deaths.¹ Several epidemiological reports

showed that men with vitamin D deficiency had a higher risk of prostate cancer compared to men with vitamin D sufficiency.²⁻⁴ Vitamin D is a secosteroid hormone and well-known for its classical actions in the maintenance of calcium uptake and bone metabolism. Increasing evidence demonstrates that inflammation plays important roles in the pathogenesis of progression to castration-resistant prostate cancer.⁵ A double-blinded clinical study found that vitamin D supplementation reduced prostate specific antigen (PSA) level and enhanced survival rate in patients with prostate cancer.⁶ The present study aimed to investigate whether there was an association among prostate cancer, vitamin D status and inflammation in a hospital-based case-control study.⁷

Materials and Methods

A Hospital Based Study in CRGH Hospital, in R.D. Gardi Medical College, Ujjain, Madhya Pradesh, during Dec. 2015- Sep. 2016. We have enrolled 75 patients along with 75 healthy controls.

Inclusion criteria: Seventy-five patients with Complain of prostate cancer.

Exclusion criteria: Patients having any other clinical complain. 5 ml venous blood collected in plain vial by aseptic technique. Sample was processed by ECLIA methods.

Results

Biochemical characteristics were analyzed. As shown in Table 1, no significant difference in, ALT, Cr, UA, fasting blood glucose was observed

Author's Affiliation: ^{1,2}Associate Professor, ³Professor & Head, ⁴Assistant Professor, ⁵Demonstrator, Department Biochemistry, Geetanjali Medical College & Hospital, Udaipur, Rajasthan 313002, India.

Corresponding Author: Neha Sharma, Associate Professor, Department Biochemistry, Geetanjali Medical College & Hospital, Udaipur, Rajasthan 313002, India.

E-mail: neha16.sharma@gmail.com

Received on 23.07.2019 **Accepted on** 26.08.2019

Table 1: Biochemical characteristics

Parameters	Subject	Control	p value
Creatinine	0.85 ± .45	0.94 ± 0.35	0.84 Ns
Uric Acid	5.3 ± 3.4	5.8 ± 3.21	0.92Ns
Fasting Blood Glucose	74.32 ± 5.23	78 .13 ± 4.73	0.09 Ns
ALT	15.34 ± 2.3	16.32 ± 3.1	0.78 Ns

between cases and controls. As expected, serum T-PSA was significantly increased in patients with prostate cancer as compared with control subjects.

In addition, serum calcium level was lower in patients with prostate cancer than in control (Table 2 and 3).

Table 2: Biochemical characteristics

Parameters	Subject	Control	p value
Calcium	6.34 ± 2.3	9.87 ± 2.1	0.001 S
Phosphorus	2.2 ± 1.32	4.3 ± 1.2	0.001 S

Table 3: Biochemical characteristics

Parameters	Subject	Control	p value
PSA	25.67 ± 5.64	0.1 ± 1.1	0.0001S
Vitamin D	3.2 ± 1.21	12.23 ± 1.2	0.0001S

Discussion

The present study analyzed the association among prostate cancer, vitamin D status and inflammation. Our results showed that serum 25-(OH)D was reduced in patients with prostate cancer. Our results showed that serum 25-(OH)D level was lower in patients with severe prostate cancer than in patients with mild and moderate prostate cancer. The present study has several limitations. First, the present study did not observe whether vitamin D deficiency.

One meta-analysis showed positive association between high level of vitamin D and increased incidence of prostate cancer.⁸ Some studies also suggested that high incidence of aggressive prostate cancer in African Americans might be partly due to deficient concentrations of serum vitamin D.^{9,10} In the contrast, one Mendelian randomization study showed null relationship between vitamin D and risk of prostate cancer.¹¹ Other studies also failed to find a positive relationship between vitamin D and prostate cancer risk.^{12,13} The conflicting findings in the relationship between vitamin D and prostate cancer risk may result from the some factors, such as different populations, various study design and different confounding factors.¹⁴ The findings in our study suggest that vitamin D is more likely to be a suppressive and protective factor during the development of prostate cancer. Therefore, there is still controversy on the role of vitamin D

in prostate cancer, which need to be elucidated in future researches.

References

1. Attard G, Parker C, Eeles RA, *et al.* Prostate cancer. *Lancet.* 2016;387:70–82. doi: 10.1016/S0140-6736(14)61947-4. [PubMed] [CrossRef] [Google Scholar]
2. Gueron G, De Siervi A, Vazquez E. Advanced prostate cancer: reinforcing the strings between inflammation and the metastatic behavior. *Prostate Cancer Prostatic Dis.* 2012;15:213–21. doi: 10.1038/pcan.2011.64. [PubMed] [CrossRef] [Google Scholar]
3. Beer TM, Ryan CW, Venner PM, *et al.* Double-blinded randomized study of high-dose calcitriol plus docetaxel compared with placebo plus docetaxel in androgen-independent prostate cancer: a report from the ASCENT Investigators. *J Clin Oncol.* 2007;25:669–74. doi: 10.1200/JCO.2006.06.8197. [PubMed] [CrossRef] [Google Scholar]
4. Tuohimaa P, Tenkanen L, Ahonen M, *et al.* Both high and low levels of blood vitamin D are associated with a higher prostate cancer risk: a longitudinal, nested case-control study in the Nordic countries. *Int J Cancer.* 2004(108):104–8. doi: 10.1002/ijc.11375. [PubMed] [CrossRef] [Google Scholar]
5. Ahonen MH, Tenkanen L, Teppo L, *et al.* Prostate cancer risk and prediagnostic serum 25-hydroxyvitamin D levels (Finland) *Cancer Causes Control.* 2000(11):847–52. [PubMed] [Google Scholar]

6. Nelson SM, Batai K, Ahaghotu C, *et al.* Association between Serum 25-Hydroxy-Vitamin D and Aggressive Prostate Cancer in African American Men. *Nutrients*. 2016;9:12. doi: 10.3390/nu9010012. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
 7. Gilbert R, Metcalfe C, Fraser WD, *et al.* Associations of circulating 25-hydroxyvitamin D with prostate cancer diagnosis, stage and grade. *International Journal of Cancer*. 2012;13(1):1187-96. (<https://doi.org/10.1002/ijc.27327>)
 8. Nyame YA, Murphy AB, Bowen DK, *et al.* Associations between serum vitamin D and adverse pathology in men undergoing radical prostatectomy. *Journal of Clinical Oncology*. 2016;34:1345-49. (<https://doi.org/10.1200/JCO.2015.65.1463>)
 9. Xu Y, Shao X, Yao Y, *et al.* Positive association between circulating 25-hydroxyvitamin D levels and prostate cancer risk: new findings from an updated meta-analysis. *Journal of Cancer Research and Clinical Oncology*. 2014;140:1465-77. (<https://doi.org/10.1007/s00432-014-1706-3>)
 10. Nelson SM, Batai K, Ahaghotu C, *et al.* Association between serum 25-hydroxy-vitamin D and aggressive prostate cancer in African American men. *Nutrients*. 2016;9:12. (<https://doi.org/10.3390/nu9010012>)
 11. Jackson MD, Tulloch-Reid MK, Lindsay CM, *et al.* Both serum 25-hydroxyvitamin D and calcium levels may increase the risk of incident prostate cancer in Caribbean men of African ancestry. *Cancer Medicine*. 2015;4:925-35. (<https://doi.org/10.1002/cam4.457>)
 12. Dimitrakopoulou VI, Tsilidis KK, Haycock PC, *et al.* Circulating vitamin D concentration and risk of seven cancers: mendelian randomisation study. *BMJ*. 2017 Oct 31;359:j4761. (<https://doi.org/10.1136/bmj.j4761>)
 13. Ordóñez-Mena JM, Schöttker B, Fedirko V, *et al.* Pre-diagnostic vitamin D concentrations and cancer risks in older individuals: an analysis of cohorts participating in the CHANCES consortium. *European Journal of Epidemiology*. 2016;31:311-23. (<https://doi.org/10.1007/s10654-015-0040-7>)
 14. Sharma N, Mangukiya K, Mali KL, *et al.* Comparative Study of the Status of Vitamin D₃ in Young Office Working Women and Housewives in Udaipur, Rajasthan. *Int J Pharm Sci Res*. 2015;6(5):2197-200. doi: 10.13040/IJPSR.0975-8232.6(5).2197-00.
-