

Association between Circulating Vitamin D, the Taq1 Vitamin D Receptor Gene Polymorphism and Colorectal Cancer Risk among Jordanians.

[Atoum MF](#)¹, [Tchoporyan MN](#).

[Author information](#)

Abstract

BACKGROUND:

The physiological role of vitamin D extends beyond bone health and calcium-phosphate homeostasis to effects on cancer risk, mainly for colorectal cancer. Vitamin D may have an anticancer effect in colorectal cancer mediated by binding of the active form 1,25(OH)₂D to the vitamin D receptor (VDR). The Taq1 VDR gene polymorphism, a C-to-T base substitution (rs731236) in exon 9 may influence its expression and function. The aim of this study was to determine the 25(OH)D vitamin D level and to investigate the association between circulating vitamin D level and Taq1VDR gene polymorphism among Jordanian colorectal cancer patients.

MATERIALS AND METHODS:

This case control study enrolled ninety-three patients and one hundred and two healthy Jordanian volunteers from AL-Basheer Hospital/Amman (2012-2013). Ethical approval and signed consent forms were obtained from all participants before sample collection. 25(OH)D levels were determined by competitive immunoassay Elecsys (Roche Diagnostic, France). DNA was extracted (Promega, USA) and amplified by PCR followed by VDR Taq1 restriction enzyme digestion. The genotype distribution was evaluated by paired t-test and chi-square. Comparison between vitamin D levels among CRC and control were assessed by odds ratio with 95% confidence interval.

RESULTS:

The vitamin D serum level was significantly lower among colorectal cancer patients (8.34 ng/ml) compared to the healthy control group (21.02ng/ml). Patients deficient in vitamin D (less than 10.0 ng/ml) had increased colorectal cancer risk 19.2 fold compared to control. Only 2.2% of CRC patients had optimal vitamin D compared to 23.5% among healthy control. TT, Tt and tt Taq1 genotype frequencies among CRC cases was 35.5%, 50.5% and 14% compared to

43.1%, 41.2% and 15.7% among healthy control; respectively. CRC patients had lower mean vitamin D level among TT (8.91 ± 4.31) and Tt (9.15 ± 5.25) genotypes compared to control (21.3 ± 8.31) and (19.3 ± 7.68); respectively.

CONCLUSIONS:

There is significant association between low 25(OH)D serum level and colorectal cancer risk. The VDR^{Taq1} polymorphism was associated with increased colorectal cancer risk among patient with VDR^{Taq1} TT and Tt genotypes. Understanding the functional mechanism of VDR^{Taq1} TT and Tt may provide a strategy for colorectal cancer prevention and treatment.