Investigating the Relationship between 14 Antioxidants and PSA levels in Men

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Purpose: The prostate-specific antigen (PSA) test measures the blood concentration of PSA, a serine protease secreted by prostatic epithelial cells, and is used as an indicator of prostate health. Elevated levels of PSA are associated with various pathologies, including prostate cancer. Previous studies have suggested modifying dietary patterns and nutritional supplement intake to attenuate the development and progression of prostate cancer through its effect on PSA levels. This study aims to evaluate the association between 14 antioxidants, namely 4 endogenous antioxidants and 10 dietary antioxidants, and PSA levels.

Methods: This study utilized data from the 2001-2010 population-based National Health and Nutrition Examination Survey (NHANES) to assess the associations between the 14 antioxidants and PSA levels. A total of 7,397 men aged 40 years and above with PSA results were analyzed. PSA levels were categorized into 3 groups: normal, moderate, and high, corresponding to levels <4, 4-10, and >10 ng/ml, respectively. In addition, men were stratified into two age sub-groups, middle age (40-64.9) and older (≥65). The levels of antioxidants in the 3 PSA groups were measured and compared. All analyses were weighted to account for the multifaceted NHANES sampling design.

Results: In middle-aged men, albumin levels differed among the 3 PSA status groups, with mean levels of 43.3, 42.3, and 41.6 g/L for normal, moderate, and high PSA status, respectively (p<0.001). Similarly, Vitamin D levels differed significantly among the 3 PSA status groups, with mean levels of 5.5, 7.7, and 3.48 mcg for normal, moderate, and high PSA status, respectively (p<0.001). After adjusting for five potential confounding factors, the effects of albumin and vitamin D on PSA remain significant. Men with high albumin and high vitamin D tended to have a low risk of high PSA. In older men, albumin had a similar trend to that of the middle-aged men, with albumin levels being significantly lower in the high PSA status group (40.8 g/L) compared to the normal (42.0 g/L) and moderate (41.8 g/L) PSA groups (p<0.001). However, this association became insignificant after adjusting for other factors. None of other antioxidants were significantly associated with PSA for older men.

Conclusion: Higher levels of albumin and Vitamin D are associated with a decreased risk of high PSA levels in middle-aged men. However, no antioxidants were significantly associated with PSA in older men. Whether these associations reflect causal relations remains unclear. Our findings provide valuable insights into understanding antioxidants' impact on PSA, which may benefit prostate cancer prevention.