USANA Technical Bulletin

Prostate

Description

- The prostate is a male gland that secretes a fluid that forms part of the seminal fluid.[1] Three typical problems associated with the prostate gland are benign prostatic hyperplasia (BPH), prostatitis, and prostate cancer.
- Enlargement of the prostate is common after middle age. Enlargement of the prostate results in obstruction of the urethra, which may impede urination, resulting in retention of urine. This can lead to complications including hematuria, cystits, infection of the kidney, infective nephritis and even kidney failure.[1] This enlargement is common to all three ailments.

Causes

- Benign prostatic hyperplasia may be linked with hormonal activity. In particular, the decrease in androgenic hormones that occurs with age may result in a hormonal imbalance that may be causative.[2]
- About 80% of bacterial prostatitis cases result from infection by *Escherichia coli*.[3]
- Prostate cancer has been associated with high intakes of saturated fats.[3]

Types

- The most common prostate problem is benign prostatic hyperplasia.
- Prostatitis is an inflammation of the prostate caused by infection.
- Prostate cancer is the most common type of cancer in men over the age of 50. It has an unpredictable course if left untreated. There is not a complete understanding of the diseases associated with the prostate gland, nor is there a good understanding of why some cancers grow and others do not.

At Risk

- Men middle aged and older.
- Black males (101 per 100,000) are more at risk than white males (70 per 100,000) for prostate cancer.[4]

Prevention and Management

- High fiber diets may help prevent prostate cancer.[5]
- Drinking plenty of water may help.

- There are many non-prescription alternatives for benign prostatic hyperplasia. Most of these products contain saw palmetto.

Sources of Additional Information

- http://www.ameripros.org/
- http://rattler.cameron.edu/ww/
- Prostate Health Council/The American Foundation for Urologic Disease, Inc./300 West Pratt Street/Suite 401/Baltamore, MD 21201.

Abstracts

Daviglus ML, Dyer AR, Persky V, Chavez N, Drum M, Goldberg J, Liu K, Morris DK, Shekelle RB, Stamler J. Dietary beta-carotene, vitamin C, and risk of prostate cancer: results from the Western Electric Study. Epidemiology 1996 Sep;7(5):472-7. Dietary factors are likely candidates for important determinants of prostatic cancer risk. Among the most investigated nutritional factors have been antioxidants. We evaluated dietary beta-carotene and vitamin C in relation to subsequent risk of prostate cancer in a prospective study of 1,899 middle-aged men. We combined prostate cancer cases diagnosed in the first 24 years of follow-up with incident cases identified from the Health Care Financing Administration hospitalization and outpatient files during an additional 6-year follow-up period. We obtained death certificates for all decedents. During the 30-year follow-up, prostate cancer developed in 132 men. There was no indication that consumption of beta-carotene or vitamin C was related to increased or decreased risk of prostate cancer. Relative risks for highest vs lowest quartiles of beta-carotene and vitamin C intake were 1.27 Í95% confidence interval (CI) = 0.75-2.14Í and 1.03 (95% CI = 0.59-1.60), respectively, after adjustment for age, number of cigarettes smoked per day, dietary cholesterol and saturated fat, alcohol consumption, total energy intake, and occupation. Associations between intake of these nutrients and risk of prostate cancer differed depending on whether the cancer was diagnosed during the first 19 years of follow-up or the next 11 years of follow-up. Overall survival over the 30 years of follow-up was positively associated with intake of beta-carotene and vitamin C.

Gilloteaux J, Jamison JM, Venugopal M, Giammar D, Summers JL. Scanning electron microscopy and transmission electron microscopy aspects of synergistic antitumor activity of vitamin C - vitamin K3 combinations against human prostatic carcinoma cells. Scanning Microsc 1995 Mar;9(1):159-73. A MTT/formazan assay was used to evaluate the antitumor activity of vitamin C (Vit C), vitamin K3 (Vit K3), or vitamin C:vitamin K3 combinations against a human prostatic carcinoma cell line (DU145). Both Vit C and Vit K3 alone exhibited antitumor activity, but only at elevated doses. When Vit C and Vit K3 were combined at a C:K3 ratio of 100:1 and administered to the carcinoma cells, the 50% cytotoxic concentrations (CD50) of the vitamins decreased 10- to 60-fold. Subsequently, the DU145 cells were examined with transmission and scanning electron microscopy (TEM and SEM) following a 1 hour treatment with Vit C, Vit K3, or Vit C/K3 combined at their 50% cytotoxic dose. Our morphological data suggest that vitamin treatment with individual vitamins affects the cytoskeleton, the mitochondria, and other membranous components of the cell. Treatment with the vitamin combination appears to potentiate the effects of the individual vitamin treatment. Specifically, there are abundant necrotic cells. The surviving cells display morphological defects characteristic of cell injury.

Peehl DM, Skowronski RJ, Leung GK, Wong ST, Stamey TA, Feldman D. Antiproliferative effects of 1,25-dihydroxyvitamin D3 on primary cultures of human prostatic cells. Cancer Res 1994 Feb 1;54(3):805-10. Cultures of adult human prostatic epithelial and fibroblastic cells were established from normal, benign hyperplastic, and malignant tissues.

Vitamin D receptors were detected by ligand binding of [3H]1,25-dihydroxyvitamin D3 [1,25(OH)2D3] in cytosolic extracts prepared from all types of cell cultures as well as from fresh prostatic tissues. Vitamin D receptor transcripts were demonstrated by Northern blot analysis. 1,25-(OH)2D3 inhibited the growth of epithelial cells with half-maximal inhibition at approximately 1 nM. The growth of fibroblasts was also inhibited by 1,25(OH)2D3 but to a lesser extent. This is consistent with the apparently lower level of vitamin D receptors in fibroblasts compared to epithelial cells determined by ligand binding and Northern analysis of RNA transcripts. The growth inhibition of epithelial cells by 1,25(OH)2D3 was irreversible even after a short 2-h exposure, but morphology and keratin expression were not appreciably altered by long-term exposure to the hormone. A physiological role for 1,25(OH)2D3 in the prostate is postulated, and the inhibitory effect of 1,25(OH)2D3 on cancer-derived prostate cells may provide a basis for new preventive or therapeutic strategies.

References

[1] Taber's Cyclopedic Medical Dictionary. 16th ed. Philadelphia:F.A. Davis Company; 1985. p 1496.
[2] Diseases. Springhouse (PA):Springhouse Publishing; 1993 p 849.
[3] Ziegler EE, Filer LJ. Present Knowledge in Nutrition. 7th ed. Washington (DC):ILSI Press; 1996. p 483.
[4] Ruddon R. Cancer Biology. New York:Oxford University Press; 1995. p 28.
[5] Kamen B. New Facts about Fiber. Novato (CA):Nutrition Encounter, Inc; 1991 p 80.