Antitumor Activity of Common Antibiotics Against Non-Muscle Invasive Bladder Cancer

Antibiotics during BCG

2006: A randomized controlled clinical trial of 115 patients determined the impact of the antibiotic Ofloxacin on side effects of BCG therapy; the findings were interesting, showing 22% fewer ‘moderate’ side effects, a lessing of severe complications between instillations 1 and 9 (54% vs. 76% respectively), and a better adherence to therapy, with 81% of the antibiotic group completing the therapy vs. 66% of those who received placebos. Rischmann P, Colombel M, Chopin DK, et al. Prophylactic ofloxin to improve tolerance of BCG intravesical instillations: A randomized prospective, double blind, placebo-controlled, multicentre study in patients with mid to high risk superficial bladder tumors. Program and abstracts of the American Urological Association 2006 Annual Meeting; May 20-25, 2006; Atlanta, Georgia. Abstract 835.

More info on BCG and antibiotics on WebCafe here

A new study from experts A.Kamat and D. Lamm reports that urinary antibiotics commonly used to prevent infections after trans-urethral surgery also destroy bladder cancer cells.

The antibiotics ciprofloxacin, trimethoprim-sulfamethoxazole, cefazolin, and nitrofurantoin were studied at various concentrations and cytotoxicity was evaluated using the MTT colorimetric assay. The drugs were shown to reach high urinary concentrations when used orally or intravenously, with cell kill rates as great as 95.4% at the concentrations achieved in the urine of patients after oral administration. Between 30% and 45% of the dose was present in the urine up to 12 hours.

The effectiveness of the drugs appeared to be independent of the p53 status of the cell lines tested, an added benefit given that the p53 gene mutation has been associated with more aggressive, chemo-resistant disease.

Most importantly, the administration of antibiotics after transurethral resection of bladder tumors might prevent the possible seeding of cancer cells and thereby decrease the high recurrence rate.

Dr. Kamat states that antibiotics come close to being ideal chemotherapeutic agents in that they are administered orally, are concentrated in the urine, are readily available, and have a large population-based safety profile. Furthermore, if proven effective in clinical trials, this approach could conceivably replace the use of intravesical chemotherapeutic agents as a prophylactic treatment option, or at the very least help to increase the efficacy of these agents in preventing tumor recurrence.
These important, pre-clinical data should be incorporated in the design of clinical trials addressing recurrence after transurethral resection of bladder tumors [TURBT]; prospective randomized clinical trials are needed to test these hypotheses.

Dr. Kamat cautions against the indiscriminate use of antibiotics to prevent recurrence, however, because they are known to interact with BCG, an immunotherapy commonly used to treat superficial bladder cancer.

The study concludes:

Commonly used antibiotics exhibit significant dose-dependent cytotoxicity against transitional carcinoma cells at concentrations achievable in the urine of patients after oral administration. Antibiotics might prove beneficial in preventing seeding of exfoliated cancer cells after transurethral resection, thereby decreasing tumor recurrence rates.

Antitumor activity of common antibiotics against superficial bladder cancer. Kamat AM, Lamm DL. Department of Urology, University of Texas M. D. Anderson Cancer Center, Houston, Texas 77030, USA. Urology. 2004 Mar;63(3):457-60. PMID: 15028437-Medline abstract

From the Department of Urology, University of Texas M. D. Anderson Cancer Center, Houston, Texas; and Department of Urology, Mayo Clinic, Scottsdale, Arizona. Reprint requests: Ashish M. Kamat, M.D., Department of Urology, Unit 446, University of Texas M. D. Anderson Cancer Center, 1515 Holcombe Boulevard, Houston, TX 77030 UROLOGY 63: 457-&ndash;460, 2004. © 2004 Elsevier Inc.


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