CHAPTER 9

CANCER CHEMOPREVENTION BY CYCLOOXYGENASE 2 (COX-2) BLOCKADE

Results of case control studies

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1. Introduction............................................................................................................. 194
   1.1. Burden of Cancer ......................................................................................... 194
   1.2. Nonsteroidal Anti-inflammatory Drugs (NSAIDs) and Cancer .................. 195
   1.3. Antineoplastic Effects of NSAIDs............................................................... 195
   1.4. Breast Cancer and NSAIDs ......................................................................... 197
   1.5. Prostate Cancer and NSAIDs ....................................................................... 198
   1.6. Colon Cancer, Colon Polyps and NSAIDs.................................................. 198
   1.7. Lung Cancer and NSAIDs ........................................................................... 199
   1.8. Rationale for Epidemiologic Investigation of Selective COX-2 Inhibitors 199
2. Research Design and Methods............................................................................... 200
   2.1. Experimental Design and Population Studied ............................................. 200
   2.2. Data Collection............................................................................................. 200
   2.3. Biostatistical Analysis .................................................................................. 201
3. Results..................................................................................................................... 201
   3.1. Breast Cancer Results .................................................................................. 201
   3.2. Prostate Cancer Results................................................................................ 201
   3.3. Colon Cancer Results................................................................................... 203
   3.4. Lung Cancer Results .................................................................................... 203
4. Discussion............................................................................................................... 204
5. Conclusions............................................................................................................. 206
References..................................................................................................................... 207

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Abstract: Significant use of selective cyclooxygenase-2 (COX-2) blocking agents prescribed for the treatment of arthritis during 1999 to 2005 facilitates epidemiologic investigations to illuminate their chemopreventive effects against human cancer. We therefore conducted a set of case control studies of selective COX-2 blocking agents to determine their chemopreventive potential for the four major cancers: breast, prostate, colon, and lung. Newly diagnosed cases (323 breast cancer patients, 229 prostate cancer patients, 326 colon cancer patients, and 486 lung cancer patients) were ascertained during 2002 to September 30, 2004, at The James Cancer Hospital and Solove Research Institute, The Ohio State University Medical Center, Columbus, Ohio. All cases of invasive cancer were confirmed by examination of the pathology report. Healthy controls without cancer were ascertained from hospital screening clinics during the same time period. Controls were frequency matched at a rate of 2:1 to the cases by age, gender, and county of residence. We collected information on type, frequency, and duration of use of selective COX-2 inhibitors and nonselective nonsteroidal anti-inflammatory drugs (NSAIDs). Other potentially important risk factors (smoking, drinking, body mass, medical history, blood pressure and cholesterol medications, family history of cancer, occupational history, and reproductive history for women) were also recorded for each subject. Estimates of odds ratios were obtained with adjustment for age and other potential confounders using logistic regression analysis. Use of selective COX-2 inhibitors resulted in a significant risk reduction for each type of cancer (71% for breast cancer, 55% for prostate cancer, 70% for colon cancer, and 79% for lung cancer) and an overall 68% risk reduction for all four cancers. This investigation demonstrates that COX-2 blocking agents have strong potential for the chemoprevention of cancers of the breast, prostate, colon and lung.

1. INTRODUCTION

1.1. Burden of Cancer

The American Cancer Society estimates that more than 1.4 million new cases of invasive cancer will be diagnosed during 2006 in the United States, and more than 564,000 Americans will die from cancer [1]. When age-adjusted death rates are considered, cancer has surpassed heart disease and is now the leading cause of death among American women and men under age 85. The majority (about 60%) of cancer deaths are attributable to four major cancer types: lung, breast, prostate, and colon. Among women, cancers of the lung and bronchus, breast, and colon account for more than half of the deaths. Among men, the majority of deaths are due to cancers of the lung and bronchus, prostate, and colon. Lung cancer is the leading cause of cancer death in both men and women, causing nearly 93,000 deaths in men and 82,000 deaths in women every year. Breast cancer is the most common malignancy among American women and the second leading cause of cancer death. In 2006, 213,000 women are expected to develop invasive breast cancer and nearly 41,000 will die from the disease. Prostate cancer is the most common malignancy among American men and the second leading cause of death. In 2006, 234,000 men are expected to develop invasive prostate cancer and 27,000 will die from the disease. Colon cancer is the third leading cause of death in both men and women and will cause nearly 55,000 deaths in 2006. Despite intensive efforts aimed primarily at early detection and therapy, the high mortality