Second primary cancers following cancers of the kidney and prostate in New South Wales (Australia), 1972-91

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Data from the New South Wales (NSW) (Australia) Central Cancer Registry for the period 1972-91 were examined to determine the risk of second primary cancers following an initial invasive cancer of the renal parenchyma (ICD-9 code 189.0), renal pelvis (code 189.1), or prostate (code 185). Eligible cases were restricted to those who had survived for at least two months after diagnosis of the first primary cancer. Expected numbers of cancers were obtained by assuming that subjects experienced the same cancer incidence as prevailed in the corresponding general population and applying gender-, age-, and calendar-specific rates to the appropriate person-years at risk. The relative risk (RR) of a second primary cancer was taken to be the ratio of observed to expected numbers of second cancers. Following prostatic cancer, there was an overall deficit of cancers at all sites combined (RR = 0.79, 95 percent confidence interval [CI] = 0.75-0.84), and no site had a significantly raised RR. Taking this into consideration, there appeared to be a reciprocal relationship of increased risk of prostatic cancer (RR = 1.7, CI = 1.2-2.3) following an initial cancer of the renal parenchyma and of renal parenchymal cancer (RR = 1.2, CI = 0.8-1.7) after cancer of the prostate. An increased risk of bladder cancer occurred following renal parenchymal (RR = 3.4, CI = 1.1-8.0, for women only) as well as after renal pelvic cancer (men: RR = 8.7, CI = 5.4-13; women: RR = 39, CI = 26-56). A tobacco-related pattern of excess risk was seen after renal pelvic cancer but not after cancer of the renal parenchyma. These data illustrate that an excess of second primary cancers may reflect shared etiologic factors or increased medical surveillance. Cancer Causes and Control 1996, 7, 337-344

Key words: Australia, kidney cancer, prostate cancer, renal parenchyma, second primary cancer, renal pelvis.

Introduction

Cancers of the kidney and prostate have several characteristics in common. Internationally, there is a moderate correlation in their incidence, being higher in developed than in 'third world' countries1 and in almost all populations both cancers are increasing in incidence.2-4 Relatively little is known of the etiology of either. For cancer of the renal parenchyma (generally about 80 percent of renal cancers), the only confirmed risk factors are tobacco smoking and relative weight — but only the minority of cases can be attributed to these.4,5 Apart from a familial association, there is no unequivocally recognized risk factor for prostatic cancer.6,7

Study of the incidence of second primary cancers is valuable in that the resulting patterns can provide indications of shared etiologic factors between the initial and subsequent sites. Other factors which have to be taken into account are intensified medical surveillance resulting in earlier detection of second cancers, and the enhanced development of second tumors as a consequence of treatment of the initial cancer.
Analysis of data from cancer registries from Connecticut (United States) and Denmark has demonstrated an excess risk of second primary cancers of the bladder, kidney, and prostate following an initial kidney cancer, but a deficit of second primary cancers of most sites after an initial prostatic cancer. Separate estimates of risk for second primary cancers following cancers of the renal parenchyma, and of renal pelvis and ureter combined are available only from Connecticut.

Using data for 1972-91 from the New South Wales (NSW) (Australia) Central Cancer Registry, we have examined the incidence in NSW of second primary cancers following an initial diagnosis of cancer of the renal parenchyma, renal pelvis, or prostate.

Materials and methods

New South Wales, the most populous state of Australia, had a population in 1991 of 2.94 million males and 2.96 million females. The population-based NSW Central Cancer Registry has been the recipient of statutory notifications of invasive cancer since 1972; its operation has been described previously. With the ultimate aim of performing analyses of relative survival, the Registry has linked some cancer sites on its database with death certificates from the NSW Registrar of Births, Deaths, and Marriages via two automated matching programs (one written specifically for this purpose and Automatch) followed by manual checking of possible links. Persons not identified by this process as having died by 31 December 1991 are considered to be alive for the purpose of the current study (passive follow-up).

Eligible subjects for this study were NSW residents diagnosed with an invasive cancer of the renal parenchyma (ICD-9 code 189.0), renal pelvis (code 189.1), or prostate (code 185) in the period 1972-91, who had been notified to the NSW Central Cancer Registry and survived for at least two months after diagnosis of the first primary cancer. Person-years of risk were accumulated for each subject beginning two months after the initial diagnosis of cancer and ending with the date of death, date lost to follow-up (due to migration out of NSW), date of diagnosis of second primary cancer, or the end of the study period (12 December 1991), whichever came first. To allow a direct comparison with data from Connecticut and Denmark, persons who developed a second primary cancer within the first two months were considered to have two synchronous cancers and have been excluded from the main analysis.

Person-years at risk were classified by gender, five-year age group, five-year period (1972-76, 1977-81, 1982-86, 1987-91), and time since entry to the cohort (< 1, 1-4, 5-9, ≥ 10 years). The expected numbers of cancers were obtained by assuming that these persons experienced the same cancer incidence as prevailed in the corresponding general population and applying gender-, age-, and calendar-specific rates to the appropriate person-years at risk. The relative risk (RR) of a second primary cancer was taken to be the ratio of observed (Obs) to expected (Exp) numbers of second cancers. Tests of significance and 95 percent confidence intervals (CI) for the RR were calculated assuming that the cases followed a Poisson distribution.

In calculating the risk of a second primary cancer, we have excluded those cancers occurring at the same three-digit ICD-9 site as the initial tumor. This was necessary (i) partly due to coding rules laid according to the International Association of Cancer Registries which prohibit counting of a second cancer at the same three-digit ICD-9 site unless the histologic type is different, and (ii) partly because of inconsistency over time in coding practices at the NSW Central Cancer Registry with respect to multiple tumors at the same three-digit site.

Histologic verification was available for the majority of initial primary cancers of renal parenchyma (85 percent) and renal pelvis (94 percent). We cross-tabulated histologic type by subsite of the kidney and reviewed histopathologic reports for cases with apparently inconsistent codes.

Results

For persons diagnosed with cancer of the renal parenchyma, renal pelvis, or prostate, Table 1 gives the numbers and average age of those who developed a second primary cancer (after exclusion of those who survived less than two months after the diagnosis of the first primary cancer or who developed a simultaneous cancer during this period) and the duration of follow-up. Tables 2 through 5 provide the observed and expected numbers of subsequent tumors following cancers at each of these sites.

Renal parenchyma (ICD-9 code 189.0)

During the period 1972-91, 4,869 NSW residents (3,035 males; 1,834 females) had an initial diagnosis of cancer of the renal parenchyma (71 percent of ICD-9 code 189 in NSW; Table 1), the average age at diagnosis being 61 years. The average years of follow-up of 3.5 (males) and 3.7 (females) provided a total of 17,298 years of observation (Table 1). Excluding the kidney, ureter, or urethra (ICD-9 code 189) as a second site, 140 second primary cancers developed in men (RR = 1.0, CI = 0.9-1.2) and 57 in women (RR = 1.1, CI = 0.8-1.4) (Table 2). Significantly increased risks were found for prostatic cancer in men (RR = 1.7, CI = 1.2-2.3) and bladder cancer in women (RR = 3.4, CI = 1.1-8.0).