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Survival Analysis

Survival from cancers of the kidney and ureter in England and Wales up to 2001

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Malignant neoplasms of the kidney and ureter comprise around 2\% of adult cancers in England and Wales, some 5000 new cases a year. Cancers of the kidney account for some 90\% of upper urinary tract malignancies. They are analysed together here, and will often be referred to as kidney cancer for brevity. Incidence is two to three times higher in Europe and North America than in Africa, Asia or Latin America (Ferlay et al., 2004). Wilms’ tumour (nephroblastoma) is the most common renal tumour in children, but it is very rare in adults (less than 0.2 per million per year) (Mitry et al., 2006). Smoking is also a risk factor for urothelial carcinoma of the renal pelvis and ureter (McLaughlin et al., 1992), as is occupational exposure to petrochemicals.

The triad of flank pain, abdominal mass and haematuria has been the basis of clinical diagnosis, but incidental diagnosis during abdominal imaging has become more common, and it may underlie part of the increase in recorded incidence. Non-specific symptoms and the retroperitoneal location of the kidneys make early clinical diagnosis difficult. Less than half of patients have disease confined to the kidney at diagnosis, and a quarter present with metastatic disease, often in lung or bone. Nephrectomy is the main treatment for renal carcinoma, with interleukin-2 and interferon for advanced disease (Harris and Simons, 2004).

We analysed the survival of 49721 adults (63\% men) who were diagnosed with a first, primary, invasive neoplasm of the kidney or ureter in England and Wales during the 14-year period 1986–1999 and followed up to the end of 2001, about 81\% of the 61 189 patients eligible for analysis. Some 12\% of patients were excluded from analysis because their recorded survival was zero (date of diagnosis same as the date of death): most of these will have been registered from a death certificate only (DCO), but in these data, they could not be reliably distinguished from patients with true zero survival. Other patients were excluded because the kidney cancer was not their first primary cancer (4.6\%), or because their vital status was unknown on 5 November 2002, when the data were extracted for analysis (1.5\%).

Renal cell carcinoma accounted for about 87\% of kidney cancers analysed. Around 10\% were transitional cell carcinomas of the renal pelvis or ureter, and the remainder were coded to other or unspecified urinary organs (data not shown).

SURVIVAL TRENDS

Relative survival from kidney cancer at 1 year was 58\% for men and 54\% for women diagnosed during 1986–1990, rising steadily to 65 and 61\%, respectively, for those diagnosed during 1996–1999 (Table 1, Figure 1). For patients diagnosed during 1996–1999, 5-year survival had reached 46\% in men and women. These changes represent a statistically significant deprivation-adjusted rate of increase of about 3\% every 5 years for 1-year survival and 4–5\% for 5-year survival. Improvements were slightly more marked in longer-term survival.

Short-term survival predictions, based on hybrid analysis (Brenner and Rachet, 2004) of the conditional probabilities of survival actually observed among men alive at some point during 2000–2001, suggest that survival up to 10 years after diagnosis will continue to improve, but somewhat more slowly, reaching 62–65\% at 1 year, 46–47\% at 5 years and 39–42\% at 10 years, for patients diagnosed in 2000–2001 (Table 1, Figure 1).

DEPRIVATION

Among men, relative survival was systematically higher in more affluent groups, both at 1 year and at 5 years after diagnosis. The fitted difference in relative survival at 5 years...
between the most affluent and the most deprived groups (the deprivation gap) widened from −3% for those diagnosed in 1986–1990 to −6% for those diagnosed during 1996–1999, a statistically significant change of about −2% every 5 years (Table 2, Figure 2).

For women, in contrast, the deprivation gap in survival at both 1 and 5 years narrowed steadily during the 1990s, and was null or non-significant for those diagnosed during 1996–1999. Figure 2 shows the flattening of the gradient in 5-year survival.

Short-term predictions from hybrid analysis suggest that the deprivation gap in survival up to 5 years is not likely to increase further in the near future, and may fall slightly for men (Table 2).

**COMMENT**

Survival from kidney cancer in England and Wales has increased steadily for both sexes during the last three decades. Relative
survival at 5 years for patients diagnosed in 1971–1975 was only
30–31%, compared with around 46% for those diagnosed in the late
1990s. The pace of increase in survival has also improved,
From around 3% every 5 years during the 1970s and 1980s
(Coleman et al, 1999) to around 5% every 5 years in the
1990s, as seen in the data reported here.

Cancer of the kidney is unusual in that it is one of the few
cancers for which there may have tended to have a small survival
advantage over women. Socioeconomic inequalities in survival are
notably more marked among men, however, and they
increased during the 1990s, whereas those for women have
virtually disappeared. The explanation for these patterns is unclear.

Table 2  Trends in the deprivation gap in relative survival (%) by sex, time since diagnosis and calendar period of diagnosis: England and Wales, adults (15–99 years) diagnosed during 1986–1999 and followed up to 2001.

| Time since diagnosis | Deprivation gap (%) 1986–1990 | Deprivation gap (%) 1991–1995 | Deprivation gap (%) 1996–1999 | Average change (%) every 5 yearsb | Predictionc for patients diagnosed during 2000–2001 |
|----------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|---------------------------------|
|                      | 95% CI                          | 95% CI                          | 95% CI                          |                                | 95% CI                          | 95% CI                          |
| 1 year               | −5.4**                          | −7.9**                          | −4.1**                          | 0.7                             | −2.7                            | −6.7, 1.3                        |
|                      | (−8.5, −2.4)                    | (−10.5, −5.2)                   | (−6.9, −1.3)                    | (−1.5, 2.9)                     | (−6.7, 1.3)                     |
|                      | 95% CI                          | 95% CI                          | 95% CI                          |                                | 95% CI                          | 95% CI                          |
| 5 years              | −4.0                            | −0.6                            | −1.4                            | 1.3                             | −1.9                            | −7.0, 3.3                        |
|                      | (−7.9, 0.0)                     | (−4.2, 2.9)                     | (−5.0, 2.3)                     | (−5.0, 2.3)                     | (−5.0, 2.3)                     |
|                      | 95% CI                          | 95% CI                          | 95% CI                          |                                | 95% CI                          | 95% CI                          |
| 10 years             | −2.7                            | −6.0**                          | −5.8**                          | −1.7                            | −2.7                            | −7.3, 1.8                        |
|                      | (−6.1, 0.6)                     | (−9.0, −3.1)                    | (−9.5, −2.0)                    | (−4.3, 0.9)                     | (−4.3, 0.9)                     |
|                      | 95% CI                          | 95% CI                          | 95% CI                          |                                | 95% CI                          | 95% CI                          |
|                      | −3.0                            | −1.4                            | 0.0                             | 1.6                             | 2.4                             | −3.3, 8.1                        |
|                      | (−7.1, 1.2)                     | (−5.2, 2.3)                     | (−4.6, 4.6)                     | (−1.6, 4.8)                     | (−1.6, 4.8)                     |
|                      | 95% CI                          | 95% CI                          | 95% CI                          |                                | 95% CI                          | 95% CI                          |
|                      | −1.0                            | −3.4                            | −2.4                            | −2.4                            | −1.6                            | −6.7, 3.5                        |
|                      | (−4.5, 2.6)                     | (−7.2, 0.4)                     | (−7.6, 2.8)                     | (−7.6, 2.8)                     | (−7.6, 2.8)                     |
|                      | 95% CI                          | 95% CI                          | 95% CI                          |                                | 95% CI                          | 95% CI                          |
|                      | −1.3                            | −2.7                            | −1.4                            | −1.4                            | 0.5                             | (−5.8, 6.8)                      |
|                      | (−5.6, 3.0)                     | (−7.1, 1.7)                     | (−7.5, 4.7)                     | (−7.5, 4.7)                     | (−5.8, 6.8)                     |

CI = confidence interval.  Survival estimated with cohort or complete approach (see Rachet et al, 2008).  Mean absolute change (%) in the deprivation gap in survival every 5 years, adjusted for the underlying trend in survival (see Rachet et al, 2008).  Survival estimated with hybrid approach (see Rachet et al, 2008).  **P<0.01.

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