Bladder cancer survival in NSW
Why do women have poorer survival than men?

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BACKGROUND

Unadjusted five-year relative survival from bladder cancer declined in NSW from 73.0% for patients diagnosed in 1980–1983 to 60.8% for the 1999–2003 period. There was also significantly lower survival in females compared to males.

NSW five-year survival was 21.2% lower than the corresponding survival for the United States for bladder cancer diagnosed between 1995 and 2001. However, differences in the coding of bladder cancers is likely to account for some of the higher survival in the US because the US survival figures for bladder cancer include in-situ cases of bladder cancer.

NSW survival rates were similar to the United Kingdom figure of 60% in persons diagnosed between 1996 and 1999.

The greatest risk factor for bladder cancer is smoking. Smokers are more than twice as likely to get bladder cancer as non-smokers. The risk is also increased in workers in the rubber, leather, textile, printing and paint industries, and in hairdressers, machinists and truck drivers, due to exposure to certain organic and industrial chemicals. Other risk factors include increasing age, male gender, chronic bladder inflammation, previous bladder cancer, treatment with cancer chemotherapeutic agents and arsenic in drinking water.

AIM

The purpose of the study was to use the data available with the Central Cancer Registry to investigate:

1. The factors that most influence survival from bladder cancer in NSW.
2. The impact of changes in coding practices on bladder cancer survival were also explored.

METHODS

All NSW cases of bladder cancer (17,923 cases) diagnosed between 1980 and 2003, and followed to the end of 2004, were included. Unadjusted relative survival was undertaken using the multiple cohort method developed by Brenner. ABS life tables were used to control for background mortality. Modelling was undertaken using cause specific Cox proportional hazards regression modelling. Censoring occurred of cases who died of other causes of death and who were alive at the end of 2004. All analyses were undertaken using SAS version 9.1.

RESULTS

The poorer survival noted in women (Figure 1) remained after adjusting for age, extent of disease, period of diagnosis and country of birth. The likelihood of death was 15% higher in females than in males with case fatality most influenced by age at diagnosis. When the analysis was repeated for cases with a method 6 coding (i.e., coding undertaken in the registry by medical coders after examination of the pathology report, which would enhance accuracy), the likelihood of dying in females was 16% higher (HR 1.16 95%CI 1.09% - 1.25%) than males while controlling for age, extent of cancer, period of diagnosis and country of birth (Table 1).

Figure 1 Five year relative survival from bladder cancer in NSW by sex 1999-2003

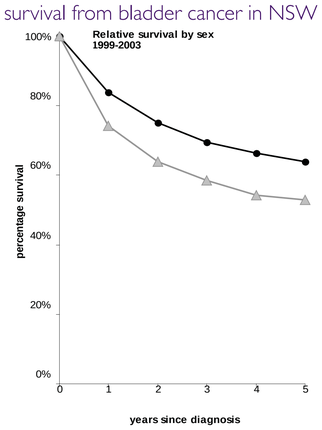

Table 1 Bladder Cancer in NSW 1980-2003 proportional hazards regression modelling method 6 only

Parameter	Hazard Ratio	95% LCI Hazard Ratio	95% UCI Hazard Ratio	p value
Male	1.00			
female	1.16	1.09	1.25	<.0001
15-39	1.00			
40-49	2.36	1.37	4.07	0.0021
50-59	2.66	1.59	4.47	0.0002
60-69	3.45	2.07	5.76	<.0001
70-79	4.89	2.94	8.14	<.0001
80+	7.72	4.63	12.87	<.0001
Australian born	1.00			
Eng speaking	1.02	0.93	1.12	0.6388
NESB	0.91	0.83	0.99	0.0332
1980-1983	1.00			
1984-1988	1.12	0.94	1.33	0.1963
1989-1993	1.14	0.96	1.35	0.147
1994-1998	1.05	0.88	1.24	0.6123
1999-2003	1.02	0.85	1.21	0.8473
localised	1.00			
regional	3.05	2.81	3.31	<.0001
distant	9.32	8.30	10.48	<.0001
unknown	1.16	1.06	1.26	0.0016

DISCUSSION

In a previous NSW report for the time period 1980 to 1996, survivals from bladder cancer did not vary by period of diagnosis after controlling for age, histology and degree of spread at diagnosis. Prior South Australian analyses also have shown no change in survival from bladder cancer after age adjustment, with case fatality being mostly influenced by age. SA women also experienced a higher case fatality than men from bladder cancer and there was no significant improvement in survival by diagnostic period. The likelihood of dying of bladder cancer increased with age at diagnosis and was higher for females compared to males (HR females 1.32 95%CI 1.18-1.48).

Our analysis is unique in that it controls for variability in coding and shows significantly lower survival from bladder cancer in NSW women compared to men, and no improvement in survival by period of diagnosis from 1980 to 2003. Bladder cancer is one of the few cancers in which men have a substantial survival advantage over women. In England and Wales, relative survival rates at five years were 64 and 56 per cent, respectively, for patients diagnosed in 1996–99. Survival for females in England and Wales was within 3 percentage points of the average, but in Scotland it was over 7 percentage points lower. More recently, Northern Ireland have also reported better survival in males compared to females. In the United States, the five-year relative survival rate of male patients with bladder cancer was calculated to be 79.5% (95% confidence interval 79.0% to 80.0%). Among women, the five-year relative survival rate was significantly worse: 73.1% (95% confidence interval 72.2% to 74.0%). A number of questions of interest are raised as a result of this findings these include: Why does age at diagnosis impact so much on survival from bladder cancer? What are the anatomical features that affect survival in females compared to males? Why has there been no improvement in survival by period of diagnosis. Further investigation of these issues is intended.

CONCLUSION

- Survival from bladder cancer was better in males than females even after adjusting for age, stage and period of diagnosis.
- Age and stage at diagnosis most influenced case fatality from bladder cancer.
- There was no significant difference in survival from bladder cancer by period of diagnosis after controlling for age, stage and sex.
- This survival difference between males and females, decreasing survival with age and stage is seen in other states and internationally.
- Coding changes have impacted on how bladder cancer is recorded over time, in other states and internationally, however, controlling for coding in NSW using method 6 (coded by a cancer registry coder) still shows that there are differences in survival in males and females while controlling for covariates.

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