

Occupational causes of Bladder Cancer



PREVENTION. CARE. RECOVERY.

Te Kaporeihana Āwhina Hunga Whara

»» *A distillation of best practice reflecting ACC's current position*

»» AUGUST 2007

- Tobacco smoking is the major cause of bladder cancer, but occupational exposures are recognised as the second most important risk factor.
- The age-standardised incidence in males is more than three times higher than that for females.
- A study of bladder cancer cases notified to the New Zealand Cancer Registry during 2001, found that 28% of males and 6% of females had a history of significant occupational exposure to “recognised” or “probable” bladder carcinogens.
- A significant proportion of presenting cases of bladder cancer, and an even higher proportion in male blue collar workers, or those from lower socio-economic backgrounds, may be attributable to occupation.
- Even when a bladder cancer patient has been a smoker, it is never valid to assume that smoking is the sole cause of the cancer.

Introduction

Tobacco smoking is the major cause of bladder cancer, due to the presence of various aromatic amines and polycyclic aromatic hydrocarbons (PAHs) in cigarette smoke. Occupational exposures are recognised as the second most important risk factor⁽¹⁾. Smoking is estimated to account for approximately 50% of all bladder cancers, and occupational exposures up to 20%.

Epidemiology

There are approximately 600 registrations of bladder cancer cases per annum. Of these, 75% are in males and 25% are in females. Annually, there are 170 deaths⁽²⁾ from bladder cancer. In spite of the strong association with smoking, there is no evidence of any decline in bladder cancer rates in recent years^(2, 3). This is despite reduction in smoking rates over the past 20 to 30 years⁽⁴⁾. Even where bladder cancer patients have been smokers, it is never valid to assume that their smoking is the sole cause of their cancers.

The age-standardised incidence of bladder cancer in males is more than three times higher than that for females. While this gender disparity may reflect higher historical smoking rates in males, the excess in males also suggests occupational causes. Historically, the most recognised occupational causes were exposures to the same aromatic amines as those contained in tobacco smoke. These were used as antioxidants in rubber manufacturing or as dyes for the textile and leather industries.

Studies in the mid 20th Century, observed up to a 200-fold excess bladder cancer risk in exposed rubber workers, and 92 of 331 workers exposed to benzidine in a German dye production facility eventually suffered bladder cancer⁽⁵⁾. It was estimated that up to 24% of cases in the general German population at this period were attributable to these exposures⁽⁶⁾. With improvements in working conditions, more recent estimates of the population attributable fraction are lower. One analysis of pooled data from 11 bladder cancer case-control studies, conducted in the period 1976-1996 in Western Europe, found that 7.4% of cases in males could be attributed to occupational exposure to known bladder carcinogens⁽¹⁾.

Current Occupational Exposures

Exposure to aromatic amines is now rare, but exposure to other recognised or suspected causes such as mineral oils, paints and organic solvents, textile and leather dusts, certain dyes, various chemical intermediates, and products of combustion of organic matter such as PAHs and diesel engine exhaust are still relatively widespread in New Zealand. These exposures occur in work in the plastic and rubber industry, petroleum refining, painting, hairdressing, boot and shoe manufacture and repair, textiles, foundries, road paving, machining and metal work, printing, fire fighting, vehicle maintenance and repair, and rail and heavy road transport⁽⁷⁾.

One New Zealand estimate of the proportion of deaths attributable to occupational exposures was 14% in males and 7% in females resulting in 20 deaths per annum⁽⁸⁾.

This estimate used relatively conservative assumptions about exposure only to well recognised bladder carcinogens. Higher estimates are obtained with less conservative assumptions. For instance, a study of cases notified to the New Zealand Cancer Registry during 2001, found that 45 males (28%) and 3 females (6%) had a history of significant occupational exposure to "recognised" or "probable" bladder carcinogens⁽⁹⁾. For males this included truck drivers (51%), engineering and metal workers (18%), crop farmers/orchardists (7%), textile and leather workers (7%), painters/furniture finishers (7%) and plastics manufacturing workers (4%). The three female cases included two textile workers and one telephonist.

Diagnosis, treatment and management

The classic presentation in bladder cancer is painless macroscopic haematuria, which occurs in 80-90% of patients. While there are many causes for macroscopic haematuria, bladder cancer should be presumed, until proved otherwise (especially in the elderly, high risk occupations and smokers), and patients should undergo urinary cytology, imaging of the urinary tract by computed tomography or intravenous pyelogram, and cystoscopy. A small proportion of cases present instead with irritative bladder symptoms such as dysuria, urgency or frequency of micturition without macroscopic haematuria. A patient from a high risk occupation (either current or past) presenting to a general practitioner with such symptoms and in whom other causes cannot be established, should have renal tract neoplasia excluded. Microscopic haematuria is not, in isolation, a reliable sign for diagnosis of renal tract cancer, and a finding of this must be considered in combination with a patient's other presenting symptoms. Routine screening for bladder cancer, by testing for microscopic haematuria, has a low sensitivity and specificity and is therefore not recommended.

As a significant proportion of presenting cases of bladder cancer may be attributable to occupation, the taking of an occupational history is valuable. If the work history indicates that there may be a link between the disease and employment, lodge a claim with ACC. The relevance of the exposure can then be determined, which may help with the patient's ongoing treatment and management.

References

1. Kogevinas M, 't Mannetje A, Cordier S, et al. Occupation and bladder cancer among men in Western Europe. *Cancer Causes and Control* 2003; 14: 907-914.
2. Ministry of Health. 2006. Cancer: New registrations and deaths 2002. New Zealand Health Information Service. Wellington: Ministry of Health.
3. Ministry of Health. 1995. Cancer: New registrations and deaths 1992. New Zealand Health Information Service. Wellington: Ministry of Health.
4. Ministry of Health. 2006. Tobacco Trends 2006: Monitoring tobacco use in New Zealand. Wellington: Ministry of Health.
5. Golka K, Wiese A, Assennato G, et al. Occupational exposure and urological cancer. *World J Urol* 2004; 21: 382-391.
6. Vineis P, Simonato L. Estimation of the proportion of bladder cancer attributable to occupation. *Scand J Work Environ Health* 1986; 12: 1472-1480.
7. Siemiatycki J, Richardson L, Straif K, et al. Listing Occupational Carcinogens. *Environ Health Perspect* 2004; 112: 1447-1459.
8. Driscoll T, 't Mannetje A, Dryson E, et al. 2004. The burden of occupational disease and injury in New Zealand: Technical Report. NOHSAC: Wellington.
9. Dryson E, Walls C, McLean D, et al. Occupational bladder cancer in New Zealand: a 1-year review of cases notified to the New Zealand Cancer Registry. *Internal Medicine Journal* 2005; 35: 343-347.