The Australian mesothelioma programme and register

James Leigh
Head of the Epidemiology and Surveillance Unit of the National Institute of Occupational Health and Safety and Senior Lecturer of the University of Sydney, Australia

Background
Malignant mesothelioma is increasing in incidence throughout the industrial world and is very frequently associated with past exposure to asbestos. It is usually fatal and has no direct relation to smoking. Australia has a very high and increasing incidence rate.

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The Australian Mesothelioma Surveillance Programme (Ferguson et al., 1987) began on 1 January 1980. Formal voluntary notification of cases was actively sought from a network of respiratory physicians, pathologists, general and thoracic surgeons, medical superintendents, medical records administrators, state and territory departments of occupational health, cancer registries, compensation authorities or any other source. A full occupational and environmental history was obtained for each case, either from the patient or next-of-kin. The history taking was non-directive but included specific questions on asbestos exposure at the end. Occupational and environmental exposure was based on the opinions of two experienced hygienists, who are, however, not independent nor blinded as to disease status. The diagnosing pathologist was requested to provide slides and/or tissue specimens. These were circulated among a pathology expert panel for confirmation of diagnosis. Post-mortem examination was actively sought for in every case in order to confirm diagnosis and to obtain lung tissue free of tumour for lung fibre content analysis.

From 1 January 1986, a less detailed notification system has operated, with a short questionnaire history, which is followed up by mail. Only histologically confirmed cases are accepted but there is no pathology panel to confirm the diagnosis. The notification system is now known as the Australian Mesothelioma Register but is merely a continuation of the programme. Cross-checks with state cancer registries are regularly carried out. Annual reports are published and a comprehensive review is available (Leigh, 1994).

Mesothelioma incidence in Australia and future estimates
Up to the end of 1995, a total of 4,129 notifications had been received. Notifications show a continuing upward trend. Analysis is not complete for 1996 but the number of notifications to the end of 1996 was 461, a large increase over 1995 (358). Both male and female rates have increased but the male rate is over seven times the female rate. In 1995, the male crude rate was 6.7 per 100,000 per year and the female crude rate 1.1 per 100,000 per year. These are the highest reported rates in the world. The incidence is now similar to Hodgkin’s lymphoma or liver cancer and the mortality greater than that of cervical cancer. Western Australia has the highest incidence but contributes only 15 per cent of the total cases. Wittenoom contributes about 5 per cent of the Australian cases. Most of the cases come from the two most populous and industrialized states, New South Wales and Victoria (Leigh et al., 1991).

In 93.2 per cent of all cases, the mesothelioma was pleural in site, 6.5 per cent peritoneal and only four cases were in other sites. Of the cases that underwent pathology panel review 96 per cent were confirmed as mesothelioma. In the cases reported with detailed histories (up to the end of 1985), the most common occupational exposures were repair and maintenance of asbestos materials (18 per cent), shipbuilding (11 per cent), asbestos cement production (7 per cent), asbestos cement use (7 per cent), railways (6 per cent), Wittenoom crocidolite mining/mining (6 per cent), insulation manufacture/installation (4 per cent), wharf labouring (3 per cent), power stations (3 per cent), boiler making (2 per cent) para occupational, hobby, environmental (15 per cent). The definition of exposure was extended to slight exposures such as working with asbestos cement in home construction and maintenance, visiting Wittenoom, or living close to an asbestos factory or mine. (These categories had been categorized as “no
known history” in some earlier reports.) Only 18 per cent had no known history of exposure according to the extended definition. Of this “no known history” group, 81 per cent had fibre counts detected in the lungs, 30 per cent with more than \(10^6\) fibres/g > 2\(\mu\) including “long” (> 10\(\mu\)) fibres suggesting that nearly all these cases had been exposed to some level of asbestos. Indeed absence of fibres in the lungs does not negate exposure as fibres may have initiated mesothelioma and then been cleared before death. Mean latency from first exposure to presumptive diagnosis was 37.4 years (range 4-75 years) (Ferguson et al., 1987).

In the cases reported since 1 January 1986, when less detail of history of exposure was sought, 86 per cent of males responding to the questionnaire and 46 per cent of females gave a history of asbestos exposure (overall 83 per cent) (non-response 11 per cent).

Some common exposure histories were: repair and maintenance of asbestos materials (13 per cent), shipbuilding (3 per cent), asbestos cement production (4 per cent), railways (3 per cent), power stations (3 per cent), boiler making (3 per cent), Wittenoom (5 per cent), wharf labour (2 per cent), para occupational, hobby, environmental (4 per cent), carpenter (4 per cent), builder (6 per cent), navy (3 per cent), plumber (2 per cent), brake linings (2 per cent), multiple (12 per cent).

The pattern of exposure is shifting away from the older traditional industries towards product, domestic and environmental exposure. The incidence is still increasing and, assuming peak amphibole exposure occurred about 1965 and peak chrysotile about 1975, peak incidence is not expected until about 2010. The expected total number of cases from 1945 to 2020 is estimated to be about 18,000, based on models by Berry (1991) and de Klerk et al. (1989) for Wittenoom, extrapolated for Australia as whole (assuming Wittenoom contributes 5 per cent of cases), and direct extrapolation from the best fit to the empirical incidence curve, constrained to have a maximum value at 2010, following a 40-year latency from the time of maximum exposure (1970). Given that there are at least two partially asbestos-related bronchial carcinoma cases for each mesothelioma case (Barroetavena et al., 1996), the total burden of asbestos-related cancer in Australia is likely to be in excess of 50,000 cases.

Comment

Other countries, especially developing ones, could do well to take heed of the dreadful Australian experience in malignant mesothelioma. Once workers have been exposed to asbestos (especially crocidolite and amosite), there is nothing effective in medical science today to prevent the development of that cancer in at least some individuals, although the latency period is notoriously long. Undoubtedly, the protection of workers against undue exposure is the only effective measure at the present time.

References


