Asbestos exposure: challenges for Australian clinicians

The unique properties of asbestos that still make it valuable for industry make it extremely hazardous to health

Due to the extensive past use of asbestos in Australia, known exposure is common and causes anxiety, especially because of the acknowledged increased risk of thoracic malignancies. With the increasing use of computed tomography for routine diagnostic purposes, more people are being identified with pleural plaques from minor asbestos exposure. This has led to increased concerns about the risks of more serious asbestos-related diseases (ARDs) developing, and has resulted in an increased number of diagnostic tests being performed, even though the presence of pleural plaques is not as such a risk factor for (pleural) malignant mesothelioma (MM) or bronchogenic cancer.[1] Nevertheless, anxiety[2] and the inability to reduce MM risk following exposure[3] or to halt progression of established asbestosis result in significant health care problems and expenditure.

Although overall rates of MM in Australia have levelled off at around 50 per million per annum in men and tenfold less in women,[4] the pattern of exposure of patients with MM is changing.[5] Three waves of disease have been described: disease resulting from exposure to asbestos in the mining and milling of ore and the manufacturing of asbestos products; disease among people who have used asbestos products; and disease among those engaged in the repair, renovation and demolition of buildings.[6] Landrigan also predicted disease resulting from serious environment exposure among residents, tenants and users of these buildings. These will continue to evolve. Since prohibition of the production and importation of asbestos in Australia in 2004, patterns of workforce and domestic exposure have further changed. Increasingly, claimants are presenting with MM arising solely from domestic exposure.[7]

Pleural plaques — the most common benign ARD — have minimal effect on lung function. However, plaques calcify with age and become more readily visible radiographically.

While there is no evidence that early diagnosis improves the survival of people with benign asbestos-related pleural diseases, asbestosis or MM, low-dose (albeit high-cost) computed tomography-based detection of early stage lung cancer in heavy smokers has been demonstrated to improve their survival, resulting in the establishment of screening programs.[8] The level of risk justifying participation in such programs is yet to be established.

Asbestosis also remains a problem because it cannot be distinguished on clinical or pathological grounds from diffuse interstitial pulmonary fibrosis of other or unknown cause, other than on the basis of evidence (historical, radiological or pathological) of asbestos exposure.[9-11] As exposure to asbestos in the community declines, it will be increasingly unlikely that clinicians will be mindful of the condition and diligent in taking an asbestos exposure history. There is still no treatment shown to be effective for asbestosis.

"Immunotherapies currently provide the most promise for new treatment advances"

Lung cancer and MM remain the outcomes of asbestos exposure which are most feared in the community. As there is no exposure threshold for either asbestos or smoking in causing lung cancer, and because smoking and asbestos interact in lung cancer causation, it is difficult to attribute disease solely to asbestos unless an exposed patient has never smoked. The principles of treatment and prognosis of asbestos-related lung cancer are identical to those of lung cancer in non-asbestos-exposed patients, with special consideration of lung function in the assessment of fitness for surgical resection.

Epidemiological observations have shown that the risk of MM is doubled in first-degree relatives of index cases,[12] leading to a need to understand the mechanism of such inheritance that could provide an understanding of the molecular changes in the process of carcinogenicity in general. MM has also become more readily and accurately diagnosed with cytology,[9] reducing the need for more invasive diagnostic procedures. MM remains universally fatal, with a median survival of 9–12 months, and epithelioid disease is the least rapidly progressive.[13] Most patients present with advanced disease, and

Arthur W (Bill) Musk
MD, FRACP, FAFOEM[1]

Nicholas H de Klerk
PhD[2]

Anna K Nowak
MB BS, FRACP, PhD[1]

1 Sir Charles Gairdner Hospital, Perth, WA.

2 Telethon Kids Institute, Perth, WA.

Bill.Musk@health.wa.gov.au

doi: 10.5694/mja15.01072

palliative cytotoxic chemotherapy has been the mainstay of treatment for the past 15 years, prolonging survival modestly in selected patients.[14] A recent randomised clinical trial reported a survival benefit from the addition of a monoclonal antibody targeting vascular endothelial growth factor,[15] and there are early reports of responses to immunotherapies targeting the checkpoint blockade molecules cytotoxic T lymphocyte antigen 4 and programmed death 1. Immunotherapies currently provide the most promise for new treatment advances.

Fortunately, in the face of an ongoing ARD burden, liability issues in common law damages claims have largely been resolved across Australia, and most people with disabling ARD are compensated. However, workers' compensation schemes for ARD vary among the states — there is still a disparity in the awards of general damages (for pain and suffering) in the various jurisdictions such that there is a strong case to harmonise the approach nationally.

Competing interests: No relevant disclosures.

Provenance: Commissioned; externally peer reviewed. ■

References are available online at www.mja.com.au.

1 Brims F, Musk B, Reid A et al. Presence of pleural plaques and/or asbestosis and the risk of lung cancer in a crocidolite exposed population from Western Australia. *J Thorac Oncol* 2015; 10 (Suppl 1): 2011.

2 Reid A, Alfonso H, Ti JS, et al. Sense of control and wellbeing decades after exposure to blue asbestos at Wittenoom, Western Australia. *Int J Occup Environ Health* 2012; 18: 116-123.

3 Musk AW, de Klerk NH, Ambrosini GL, et al. Vitamin A and cancer prevention I: observations in workers previously exposed to asbestos at Wittenoom, Western Australia. *Int J Cancer* 1998; 75: 355-361.

4 Australian Mesothelioma Registry. Mesothelioma in Australia 2014: 4th annual report. Sydney: AMR, 2015. https://www.mesothelioma-australia.com/media/12174/amr_4thannualdatareport_final.pdf (accessed Dec 2015).

5 Musk AW, Olsen N, Alfonso H, et al. Pattern of malignant mesothelioma incidence and occupational exposure to asbestos in Western Australia. *Med J Aust* 2015; 203: 251-252 https://www.mja.com.au/journal/2015/203/6/pattern-malignant-mesothelioma-incidence-and-occupational-exposure-asbestos

6 Landrigan PJ. The third wave of asbestos disease: exposure to asbestos in place. Public health control. Introduction. *Ann N Y Acad Sci* 1991; 643: xv-xvi.

7 Olsen NJ, Franklin PJ, Reid A ,et al. Increasing incidence of malignant mesothelioma after exposure to asbestos during home maintenance and renovation. *Med J Aust* 2011; 195: 271-274. https://www.mja.com.au/journal/2011/195/5/increasing-incidence-malignant-mesothelioma-after-exposure-asbestos-during-home

8 Tammemagi MC, Lam S. Screening for lung cancer using low dose computed tomography. *BMJ* 2014; 348: g2253.

9 Wolff H, Vehmas T, Oksa P, et al. Asbestos, asbestosis, and cancer, the Helsinki criteria for diagnosis and attribution 2014: recommendations. *Scand J Work Environ Health* 2015; 41: 5-15.

10 Segal A, Sterrett GF, Frost FA, et al. A diagnosis of malignant pleural mesothelioma can be made by effusion cytology: results of a 20 year audit. *Pathology* 2013: 45; 44-48.

11 Henderson DW, Jones ML, de Klerk N, et al. The diagnosis and attribution of asbestos-related diseases in an Australian context: report of the Adelaide Workshop on Asbestos-Related diseases. October 6-7, 2000. *Int J Occup Environ Health* 2004; 10: 40-46.

12 de Klerk N, Alfonso H, Olsen N, et al. Familial aggregation of malignant mesothelioma in former workers and residents of Wittenoom, Western Australia. *Int J Cancer* 2013; 132: 1423-1428.

13 Musk AW, Olsen N, Alfonso H, et al. Predicting survival in malignant mesothelioma. *Eur Respir J* 2011; 38: 1420-1424.

14 Vogelzang NJ, Rusthoven JJ, Symanowski J, et al. Phase III study of pemetrexed in combination with cisplatin versus cisplatin alone in patients with malignant pleural mesothelioma. *J Clin Oncol* 2003: 21; 2636-2644.

15 Zalcman G, Mazieres J, Margery J, et al. Bevacizumab 15mg/kg plus cisplatin-pemetrexed (CP) triplet versus CP doublet in Malignant Pleural Mesothelioma (MPM): Results of the IFCT-GFPC-0701 MAPS randomized phase 3 trial. *J Clin Oncol* 2015; 33 (Suppl): Abstract 7500.