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Malignant mesothelioma in Hong Kong ☆

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Summary Malignant mesothelioma (mesothelioma) is rare. We conducted the first systematic study of the epidemiology of mesothelioma in Hong Kong from 1988 to May 2002 by reviewing medical records.

Mesothelioma patients were identified from the database of 12 out of 20 hospitals that would have admitted mesothelioma patients territory-wide. These 12 hospitals served 73% of the total hospital bed-years of the 20 hospitals.

We identified 67 mesothelioma patients. The estimated annual incidence was one per million, which was similar to the background incidence of one to two per million among Caucasians. Occupational history was available in 43 subjects. Three quarters of mesothelioma patients with available occupational history had occupational asbestos exposure.

Restricting analysis to 48 patients with accessible medical records and using 67 occupational asbestosis patients for comparison, the epidemiology of mesothelioma in Hong Kong shares similarities with the literature: mean age of 63 years upon diagnosis, mean latency of 46 years, median survival of 9.5 months, male predominance, selective presentation among women, high prevalence among workers in ships and dockyards, predominantly epithelioid type, lower prevalence of asbestos bodies, and negative association with pleural plaques.

Asbestos consumption in Hong Kong rose in the 1970s and peaked in early 1980s and late 1990s. Hong Kong may encounter an epidemic of mesothelioma in the 2010s if effective occupational asbestos control measures are not in place.

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Introduction

Malignant mesothelioma (mesothelioma) arises from mesothelial cells. The plasticity of mesothelial cells gives rise to three histological types: epithelioid, sarcomatoid and biphasic. The epithelioid type is the most common, with reported prevalence of 60–70% in most series.[1]

Approximately 80% of mesothelioma cases had past asbestos exposure.[2] Wagner presented the first piece of evidence implicating asbestos in the pathogenesis of mesothelioma in a study of South African miners in 1960.[3] Other implicated causes of mesothelioma include simian virus-40 (SV40),[4] radiotherapy or thorium dioxide use,[5,6] erionite fibres,[7] chronic pleural inflammation,[8] and chemical carcinogens.[9]

Asbestos refers to a group of mineral fibres that occur in two forms: serpentine and amphibole. Serpentine forms are curly and pliable while amphibole forms are short, straight and stiff. Chrysotile fibres are the only serpentine forms. The major amphiboles that have been used commercially are crocidolite and amosite. Amphiboles are more carcinogenic for mesothelioma than serpentines[10] probably by virtue of their greater biopersistence and higher iron content.[11] The latter can generate reactive oxygen species that cause mutagenic oxidative species.[12]

There are four main sources of asbestos exposure: primary occupations of asbestos mining and processing, secondary occupations that involve the industrial and commercial use of asbestos, paraoccupational exposure such as family members who have occupational exposure, and environmental exposure.

Mesothelioma is usually diagnosed in the fifth to seventh decades of life, with a mean age range of 60–65 years.[13,14] The tumour has a strong male predominance,[13] which can be explained by the male predominance of asbestos-exposed occupations.[15] Latency varies with different occupational groups.[16] It is typically over 20 years, usually 30–40 years,[17,18] and not infrequently 40 years or longer.[19,20] Prognosis is poor with a median survival range of 6–12 months reported in different series.[21–23] The epithelioid type has the best prognosis.[24]

The background incidence of mesothelioma, which was one to two per million per year,[10,25,26] has increased as a result of industrial and commercial use of asbestos. In industrialized countries with heavy asbestos usage from 1940s to 1970s, the annual incidence of mesothelioma in the 1990s was 2 per million in women and 10–30 per million in men in the 1980s.[27] In the 1990s, the average annual incidence was 22 per million in the UK,[28] and 9 per million in the USA,[29] with age-adjusted incidence rates in the USA around 4 per million for women and 20 per million for men.[30] The incidence in the USA is stable in younger persons but rising in men aged above 75 years.[31] In Europe the incidence of mesothelioma is also rising from 5000 dying in 1998 to a projected 9000 men dying by the year 2018, with the highest incidence in the cohort of men born from 1945 to 1950.[32] The incidence of mesothelioma was estimated to peak in the period between 2010 and 2020.[33]

Geographic variations in incidence are due to regional differences in industrial activity. A high incidence of mesothelioma (20–60 cases per million) has been reported in areas with heavy shipbuilding activity.[34,35] High odds ratios in the occurrence of mesothelioma were found in many European shipyard cities,[36] notably Walcheren (23.3), Wilhelmshaven (21.5), Plymouth (14.3), Dresden (16.8) and New Jersey (26.5). Construction and building maintenance are currently the most commonly related jobs in the western countries.[37]

Mesothelioma is rare in Hong Kong. This may be related to her industrial activity and the absence of asbestos mining and processing. The statutory Pneumoconiosis Medical Board that assesses pneumoconiosis compensation claims in Hong Kong has been the major source of local data on mesothelioma. The Board confirmed the diagnosis of only 22 cases of occupational mesothelioma from 1988 to mid-2002. Assuming an average population of 5 million in Hong Kong from 1988 to 2002, the overall annual incidence of mesothelioma was only 0.3 cases per million. Underestimation was likely in view of the rapid industrialization in Hong Kong before 1980s.

The epidemiology of mesothelioma in Hong Kong has not been studied systematically. In 2000, the Hong Kong Thoracic Society set up rare disease registries to collect information on various uncommon respiratory diseases. Its Working Group on Mesothelioma initiated this study to describe the epidemiology of mesothelioma in Hong Kong.

Methods

Mesothelioma patients were identified from the database of 12 out of 20 public hospitals that would have admitted mesothelioma patients territory-wide. These 12 hospitals accounted for approximately 73% of the total hospital bed-years of the 20 hospitals. Private hospitals that treated approximately 10% of all in-patients were excluded from this study.