Pneumothorax and malignant mesothelioma in patients over the age of 40

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Abstract

Five patients over the age of 40 with malignant mesothelioma of the pleura presented with a spontaneous pneumothorax in the course of five years. The diagnosis of malignant mesothelioma was not suspected at surgery but was made by histological examination of the pleurectomy specimens. During this time 91 pleurectomies for recurrent pneumothorax were performed, 45 in patients over the age of 40; malignant mesothelioma therefore accounted for 11% of spontaneous pneumothorax requiring pleurectomy in this age group. The association of spontaneous pneumothorax and malignant mesothelioma is not emphasised in current publications. These five cases highlight the need for all pleurectomy specimens in cases of spontaneous pneumothorax to be sent for histological examination and for a full occupational history to be taken, especially in older patients.

Two categories of spontaneous pneumothorax are described. Benign pneumothorax occurs chiefly in young men aged 20-40 years, and is often associated with a small apical bulla. In the other category the pneumothorax is due to pulmonary disease. Spontaneous pneumothorax occurs in association with pulmonary neoplasia. Of the 1143 patients presenting with spontaneous pneumothorax reported by Dines *et al.*¹ 10 had tumours, including meta-

static sarcoma, lymphosarcoma, and bronchogenic carcinoma.

The five cases reported here confirm the association of malignant mesothelioma and spontaneous pneumothorax in patients over the age of 40.

Methods

Ninety one specimens from pleurectomies carried out for recurrent or persistent spontaneous pneumothorax were received over five years. Forty five were from patients over the age of 40. Sections from all patients were stained by haematoxylin and eosin. The diagnosis of malignant mesothelioma was made from the morphological appearances, including invasion of adipose and connective tissue. Staining to confirm the absence of epithelial mucin and carcinoembryonic antigen² was performed in all cases. In four of the five cases the diagnosis was confirmed at postmortem examination; in the fifth patient (still alive) the clinical and radiological findings support the diagnosis of mesothelioma.

Patients and findings

Tables 1 and 2 summarise the relevant clinical and pathological findings in the five cases.

Case 3 was unusual in that the diagnosis of malignant mesothelioma was not made at the time of pleurectomy. At histological examination the pleurectomy specimen was reported as showing florid hyperplasia of mesothelial cells. Necropsy a year later, however, revealed

Table 1 Details of patients and pneumothoraces

Patient No	Sex	Age (y)	Pneumothoraces			Other treatment	Interval to death
			Site	Number	Months before pleurectomy		
1	M	87	Left	2	3	Chest drain, tetracycline pleurodesis	3 weeks
2	M	60	Left	1	1	Chest drain	2 years
3	M	63	Right	1	9	Chest drain	1 year
4	M	56	Right	3	6	Chest drain	1.5 years
5	M	43	Left	1	2	Chest drain	[Alive]

Table 2 Smoking, occupation, asbestos exposure and fibre count, and histological type of mesothelioma

Patient No	Smoking history	Occupation	Asbestos exposure	Asbestos fibre count (fibres/g dried lung)	Histological type
1	No	Lagger	Yes	1.24×10^5	Mixed
2	Yes	Docker	Yes	$2.4 \times 10^{6*}$	Mixed
				4×10^3	
3	Yes	Shipyard worker	Not known	3.7×10^4	Epithelial
4	Yes	Lagger	Yes	8.0×10^4	Mixed
5	Yes	Teacher	No	[Not done: patient alive]	Epithelial

*Electron microscope.

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Table 3 Details of previously described cases of pneumothorax and malignant mesothelioma

First author, reference	Sex	Age (y)	Histological type	Asbestos exposure	Interval to death
Ehrenhaft ⁴	F	25	Mixed	Not known	3 months
Ratzer ⁵	M	63	Epithelial	Not known	Not known
Ratzer ⁵	F	31	Sarcomatous	Not known	Not known
Handa ⁶	M	85	Undifferentiated	Not known	15 weeks
Ohkado ⁷	M	49	Not known	Not known	7 weeks
Mannes ⁸	M	60	Epithelial	Not known	Not known

an extensive right pleural malignant mesothelioma (epithelial type). When the histological appearance of the pleurectomy specimen was reviewed the extent of the mesothelial proliferation was thought to be consistent with malignant mesothelioma, despite the lack of invasion of fat.

Discussion

Spontaneous pneumothorax is a very rare presenting feature of malignant mesothelioma. Hillerdal³ in 1982 reviewed 4710 published cases of malignant mesothelioma and found only one case (from 1960) that presented with a pneumothorax.⁴ A search of published reports yielded five other cases, reported from 1967 to 1991⁵⁻⁸ (see table 3). The usual presenting feature of malignant mesothelioma in these reports is an insidious onset of chest pain or breathlessness.⁹⁻¹¹ A review of 327 cases of malignant mesothelioma did not mention previous treatment for recurrent pneumothorax¹² and several recent medical and pathological textbooks fail to mention an association.¹³⁻¹⁷

Our five cases presented at the same hospital in the course of five years, during which time 91 pleurectomies for pneumothorax were performed by one of two thoracic surgeons working in the hospital (it was not the practice of the other thoracic surgeon to send his pleurectomy specimens for histological examination at that time). Forty five of these 91 patients were over 40. Thus the five cases account for 11% of all pleurectomy specimens received from patients over 40 during this period. In all five cases the chest radiograph showed no preoperative abnormality other than the pneumothorax. In only one case (No 3) was malignancy suspected before operation, as the patient also had chest pain and weight loss. Mesothelioma was not suspected in any of the cases during thoracotomy. The treatment received by the five patients before surgery consisted of intercostal chest drains and, in one case, tetracycline instillation, none of which is likely to be relevant to the development of mesothelioma.¹⁸ All three main histological types of malignant mesothelioma—epithelial, sarcomatous and mixed—were seen in our five cases and the five already published.

Many surgeons discard pleurectomy specimens, but it is apparent from these cases that all pleurectomy specimens should be sent for histological examination, especially with patients over 40. It is also important to elicit a thorough occupational history from patients

with spontaneous pneumothorax. In three of the five cases there was a definite history of exposure to asbestos, though this was obtained retrospectively and was not communicated to the pathologist at the time of pleurectomy.

When faced with a differential diagnosis of florid mesothelial hyperplasia or early malignant mesothelioma, histopathologists may be reluctant to make a diagnosis of malignancy in a patient with a spontaneous pneumothorax but no clinical suspicion of neoplasia. Awareness that malignant mesothelioma may present with spontaneous pneumothorax and of the occupational history should prompt a detailed examination of the pleurectomy specimen.

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