

of the tumor, there is only one association with pleural association may be minimal. The presentations are invariably similar. The presentations include paraneoplastic.

usually one of rapid growth, the average survival time is approximately 13 to 15 months, and in one series after 3 years (187). In the course, the histologic classification of mesothelioma (205).

Diagnosis

Diagnosis is made only by a number of rather specific diagnostic tests, even when available. These include cell types within a sample of the mixed type, primary tumors elsewhere.

Diagnosis is made in most cases. In addition, there is a general agreement regarding histologic characteristics. The difficulty reflected by the number of cases, less than 100 (206), subsequently reviewed panels. This is a problem in clinical medicine. The distinction is between a malignant tumor, than in the effort to investigate the effects of asbestos exposure, diagnostic criteria in examination is all important.

Tumor and within-tumor development of the biopsy needle, other methods have been used to investigate. Thus, the presence of the pleural fluid in tumor tissue by (208) may be of some value between mesothelioma but is not the definition believed to be (207). In the fluids, by light

and electron microscopy, may offer useful contributory evidence. A series of papers under the general title "Assessment of Methods Used in the Studies of the Biological Effect of Asbestos to Pathology" (7, pp. 58-81) provides a most convenient and up-to-date summary of these methods, their precision, and general applicability.

The radiologic appearances vary according to the stage to which the disease has progressed. Common features are the presence of a pleural effusion, lobulated tumor masses that may be visible only after removal of the pleural fluid, chest wall masses, satellite lung lesions, and, occasionally, hydropneumothorax (209).

In a review of treatments (13, p. 277) Elmes pointed out that there is no effective curative treatment, although surgical excision, local and/or systemic cytotoxic therapy, and radiotherapy have all been tried. He also pointed out several features that suggest a considerable contribution of the body's defense mechanism, both in the formation of abnormal tissue and in the shaping of its clinical course. Relative to the first point is the apparently low dose of exposure capable of eliciting a response; relative to the second is the not infrequent occurrence of chest injuries and/or infections at the onset of the clinical course, and the sometimes rapid dissemination, apparently provoked by treatments, such as radiation or cytotoxic drugs. For these reasons, he believes that this tumor may eventually turn out to be controllable through improving body defenses. Thus, it is not surprising that the use of BCG vaccine in treatment is a matter of great current interest, with, as yet, no definitive evidence on which to base clinical action.

Meanwhile, therapy is symptomatic, and diagnostic measures should be kept to a minimum. Removal of fluid for diagnostic examination and to relieve breathlessness should be done as infrequently as possible. Indeed, as Elmes notes, the establishment of a precise diagnosis in life, given the absence of a potentially curative treatment, is an academic, rather than a clinically useful, exercise.

Carcinoma of the Lung Associated with Asbestos Exposure

An association between asbestosis and bronchial carcinoma, suspected in the 1930s on the basis of individual case reports (210), was subsequently confirmed in two British reports, one by the Chief Inspector of Factories, issued in 1947, and the second, an analysis of autopsy ma-

terial from more than 1,000 cases of pneumoconiosis published in 1951 (211). From these, it appeared that asbestosis was associated with a much higher lung cancer risk than other pneumoconiosis, with 15 to 20 per cent of men recorded as having asbestosis dying from this cause. This risk was reported to have further increased considerably in Britain by 1963 (10), and a similar increase in lung cancer risk during the same decades has been reported from Germany (Jacob, 5, p. 536). The emergence of lung cancer as an important threat to the health of asbestos workers is attributed to the improvement in dust conditions, with less mortality from asbestosis occurring after longer periods of exposure and, therefore, survival of workers through the long latent period of lung cancer (63).

Subsequent epidemiologic studies have amply confirmed the association between asbestos exposure and lung cancer, mortality experience being the chief method of study (63, 67, 82); however, table 7 indicates that despite the consistently increased relative risk in these reports, there are considerable between-study differences as to its degree. Some of these differences must certainly be ascribed to between-study differences in the methods used to calculate risk (217), particularly in such factors as composition of the risk group (in terms of age, years of exposure, and length of follow-up), and the nature of the control or reference group, which could be either a low-exposure group within the working population, or an appropriate reference population derived from national statistics. In addition, most studies deal with relatively small numbers of deaths (less than 100 in all but 2 of the studies), so that calculation would inevitably be influenced by the addition or loss of one case. Finally, differences in exposure dose and smoking habits are other relevant factors for which standardization is seldom possible. As Wagner and associates point out, however, "an additional lesson to be learnt from the apparent conflict of evidence is the need to pay more attention to the type of asbestos and to the physical state of the respirable fraction of the dust" (218), and the evidence that there are real differences in risk associated with the different fiber types, as well as the different types of exposure to the same fiber, is becoming more convincing. Such differences, however, have a greater significance in the field of environmental control and safety standards than in the practice of clinical medicine.

The interaction of cigarettes and asbestos exposure as risk factors, clarified to some extent by