

# PLEURAL CALCIFICATION AND MESOTHELIOMA FOLLOWING EXPOSURE TO ASBESTOS

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IN 1960 Kiviluoto investigated 126 cases of pleural calcification in Northern Karelia, Finland, and found that the majority lived in the vicinity of two anthophyllite mines. He attributed the pleural calcification to non-occupational endemic anthophyllite asbestosis.

During the same year Wagner, Sleggs, and Marchand, in South Africa, described 33 cases of diffuse pleural mesothelioma, all but one of whom had probably been exposed to crocidolite asbestos in the North Western Cape Province.

This article describes a patient with pleural calcification followed by mesothelioma of the pleura. Ten years previously, after twenty years in charge of the stores of a firm engaged in distributing a variety of asbestos insulating materials for industry and the building trade, he was transferred to the office and had no further contact with asbestos.

## Case Report

A 63-year-old man with a history of intermittent winter bronchitis was admitted in March 1964 for investigation of six months' persistent cough and sputum, increasing dyspnoea on exertion, and loss of weight. He smoked 40 cigarettes a day. His father had died of bronchial carcinoma.

On examination he was thin. There were no enlarged glands or clubbing of the fingers. Movement, percussion note, and breath sounds were diminished on the left side of the chest. There were no abnormal physical signs in the abdomen or cardiovascular system; B.P. 140/90 mm. Previous chest X-rays in 1951, 1954, and 1959 had shown bilateral calcified pleural plaques (Fig. 1) and the present X-ray showed left-sided pleural thickening and effusion (Fig. 2).

Investigations showed the E.S.R. raised to 35 mm. (Westergren) and the Mantoux test 10 T.U. was strongly positive. The sputum was negative for neoplastic cells, tubercle bacilli, and asbestos bodies. Other investigations which were normal included full blood count, serum proteins, electrolytes, calcium and phosphorus, liver function tests, electrocardiograph, X-rays of the spine, and bronchoscopy. Respiratory function tests showed a one-second forced expiratory volume of 1220 c.c. and a forced vital capacity of 1300 c.c. Aspiration of the effusion produced straw-coloured fluid which was sterile on culture for organisms and tubercle bacilli.

In view of the strongly positive Mantoux test and raised erythrocyte sedimentation rate, it was concluded that the aetiology was probably tuberculous, and treatment was started with anti-tuberculous drugs. He was allowed to go home, but was re-admitted in June complaining of progressive dyspnoea and

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displacement of the mediastinum to the right. Barium swallow and showed some delay in oesophageal emptying, but no abnormality.

A percutaneous biopsy through the sixth left intercostal space in the axillary line, using a high-speed compressed-air drill, was performed by us (S.J.S.). The histology showed the appearances of mesothelioma of pleura (Fig. 3) with an asbestos body present in the adjacent lung (Fig. 4). Asbestos bodies were subsequently found in the sputum for the first time.

He was anxious to return home, where he died a month after the biopsy. Unfortunately no post-mortem examination was performed.

## Discussion

The association between asbestosis and bronchial carcinoma has been recognized for many years since the first case reported by Lynch and Smith (1919). More recently attention has been drawn to the development of other types of neoplasm in patients exposed to asbestos.

Keal (1960) described 19 men and 23 women with asbestosis, of whom 10 men and 9 women died of peritoneal or ovarian cancer and 10 men and 10 women died of lung cancer. Enticknap and Smither (1964) reported 11 cases of diffuse abdominal tumour in association with exposure to asbestos. Houril (1964) studied the pathology of 34 cases of primary mesothelioma of the pleura and peritoneum, of which 17 were pleural, and confirmed the association in both groups with asbestos bodies in the lungs. Owen (1964) studied 17 cases of diffuse mesothelioma in the Merseyside area, of which 16 were pleural, and found a history of exposure to asbestos in 14. In 7 out of 10 specimens of lung tissue examined asbestos bodies were seen. Fowler, Sloper, and Warner (1964) described 2 cases of mesothelioma of the pleura in whom the lungs contained asbestos bodies and there was an occupational history of exposure to asbestos. Selikoff, Churg, and Hammond (1965) found that of 307 deaths among asbestos-insulation workers in New York and New Jersey, U.S.A., 10 were due to mesothelioma, 4 of the pleura, and 6 of the peritoneum. Elmes, McCaughey, and Wade (1965) obtained a history of occupational exposure to asbestos in 10 out of 42 patients with mesothelioma of the pleura in Belfast. In 42 matched control patients of the same age and sex a history of exposure was obtained in only 9.

As originally observed by Wagner *et al.*, an interesting feature of many of the reported cases, in common with the patient described above, was that exposure to asbestos was slight in degree and remote in time.

Wagner *et al.* stated that in all the histological sections of pleura examined in cases of mesothelioma, no asbestos bodies or fibres were observed beyond the pleural elastic laminae. The section shown here (Fig. 4) demonstrates that asbestos bodies may be found in the adjacent lung.

Jacob and Bohlig (1955) first described calcified pleural plaques occurring in asbestos workers in 5 per cent. of 343 cases of asbestosis. Frost, Georg, and Flemming Moller (1956) examined 31 workers engaged for 20 years or more in different kinds of insulation work and found 9 with pulmonary asbestosis.

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thirteen cases of calcification of the pleura, with calcification in 11 cases, of which 8 were bilateral. Hurwitz (1961) described a characteristic pattern of sclerotic pleura presenting in the form of calcified pleural plaques among asbestos workers in South Africa. Lawson (1963) reviewed the previously reported radiological features of asbestosis and drew attention to the value of calcified pleural plaques as an additional sign of long-standing asbestosis. One of the 3 cases he described died of a peritoneal tumour, possibly a mesothelioma. Enticknap and Smither mentioned pleural calcification in 2 of their cases who developed diffuse abdominal tumours.

The question arises whether the development of pleural calcification in a subject exposed to asbestos is of any prognostic significance in anticipating the eventual development of pleural mesothelioma. The answer will probably have to wait until the long-term follow-up of a large series of patients with pleural calcification, such as Kiviluoto's, is published. However, the sequence of events in the case reported would indicate that it is advisable to enquire carefully into the history of exposure to asbestos in all patients with pleural calcification, and to keep them under observation.

### Summary

The case is described of a 63-year-old man with pleural calcification who developed mesothelioma of the pleura 10 years after exposure to asbestos as a store-keeper. The clinical and radiographic findings are reported and the chest X-rays and the histological appearance of a biopsy performed with a high-speed compressed-air drill are illustrated.

The literature relating to the association between exposure to asbestos and pleural calcification and mesothelioma is briefly reviewed and discussed. The question is raised whether pleural calcification has any prognostic significance in the development of mesothelioma. Comment is made on the slight degree and remoteness in time of the exposure to asbestos in the case reported, and on the finding of asbestos bodies in the biopsy specimen.

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FIG. 1.—Chest X-ray, 28.5.59, showing bilateral calcified pleural plaques.



FIG. 2.—Chest X-ray, 12.3.64, showing pleural thickening and effusion.



FIG. 3.—Air-drill biopsy showing the histology of mesothelioma of the pleura.



FIG. 4.—Air-drill biopsy showing an asbestos body in the lung adjacent to Figure 3.

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