

Clinical Diagnosis of Asbestos-Related Diseases

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Which diseases are related to exposure to asbestos?

The main findings and diseases are in the thorax: the lung itself or the pleura. There are benign and malignant diseases in both sites. The benign pleural diseases are plaques, asbestos pleurisy, and diffuse pleural fibrosis; in the lung, asbestosis. The malignant ones are bronchial carcinoma in the lung and malignant mesothelioma in the pleura.

PLEURAL LESIONS

Pleural plaques

Pleural plaques, when seen at surgery or at the operating table, are discrete, elevated, opaque, shiny, rounded lesions. They characteristically occur on the parietal pleura, i.e. the inside of the chest wall and do NOT affect the lung. As a result, they do not cause any symptoms, and can only be diagnosed by chest X-ray or CT scan. The diagnosis can be difficult with small plaques and over-diagnosis as well as under-diagnosis is very common.

Any symptoms (dyspnoea, pain etc) should not be attributed to the plaques but investigations for other causes should be performed. The plaques are rarely seen until 30 years or more have passed after exposure.

Benign asbestos pleurisy

Pleural effusion may be caused by inhalation of asbestos; this is an early manifestation of asbestos exposure and practically the only one which can occur less than 10 years after first exposure. It is usually an exudate. On rare occasions it may persist for months or years. It may recur on the same or the opposite side. It can occur suddenly in asbestos-exposed persons and can be of any magnitude, but rarely amounts to up to a litre or more. Despite this, the patients are often free of symptoms, and the condition can be a surprise finding at X-ray.

The exudate is often haemorrhagic, but can also be serous or fibrinous, and can contain eosinophils. Lymphocytes are the most common cells. Residually, a diffuse thickening of the pleura or a rounded sinus may be observed but often the exudate disappears without trace.

To make the diagnosis of Benign Asbestos Pleural Effusion, three criteria should be fulfilled:

1. Exposure to asbestos.
2. Exclusion of other causes, especially malignant disease.
3. Observation for at least two years to exclude a mesothelioma.

Diffuse pleural thickening

This is a fibrotic disease of the pleura which involves both the parietal (i.e. outer or “rib layer”) and the visceral (i.e. the inner layer) of the pleura. A more or less diffuse thickening of the pleura occurs and will restrict the movements of the chest and of the lung, which cannot properly expand. There are all degrees of this thickening, which can sometimes be less diffuse, usually involves the lower lobes the most, but occasionally mainly the upper lobes.

The main radiological difference from plaques is that the plaques are always sharply demarcated against the lung parenchyma, while the visceral lesions blend more diffusely with it. This is particularly evident on CT scan but with some experience it can be seen on standard chest roentgenograms as well. Fibrous strands, or "crows feet", can occur and reach into the lung parenchyma and deform bronchi when shrinking of the fibrous tissue occurs with time. When the bronchi are bent, there might be an obstruction of them – with an atelectasis of the lung parenchyma peripheral to the deformation as a result. This is the so called "rounded atelectasis" which today is by far most commonly seen in patients exposed to asbestos. The diffuse pleural fibrosis can cause compression of the lung and can cause considerable decrease in lung function.

In a patient with a typical plain chest roentgenogram and CT scan suggesting rounded atelectasis and a normal bronchoscopy, one needs only to follow the patient with chest roentgenogram. If there is uncertainty, fine-needle biopsy can be performed.

Mesothelioma

The most common first symptoms are dyspnoea and chest pain. More rarely, patients present with fever, cough and fatigue. Radiologically, fluid is usually seen. The exudate can be bloody but is almost as often serous. Ten to 20 percent of mesotheliomas will not cause exudates, and as the disease advances the fluid will usually diminish or disappear. If the exudate is small and the pleural thickening slight, pulmonary embolism or unspecific pleurisy can be suspected at first. Sooner or later invasion by the tumour will cause severe pain, necessitating strong analgetics. The affected hemithorax will shrink and not move with breathing. A CT scan should always be made, but the suspicion must always be confirmed by a pleural biopsy. In some cases, diagnosis can be very difficult and therefore considerably delayed despite large biopsies.

Therapy is unfortunately difficult. Very early cases can be treated with surgery, followed by radiation and/or chemotherapy; in inoperable cases, we now have some chemotherapy regimes which have shown definite effect. Thus, diagnosis is very important.

PARENCHYMAL DISEASES

Asbestosis

The term asbestosis should be restricted to parenchymal fibrosis due to asbestos exposure. In other words, pleural changes only are not asbestosis – though they can, of course, occur at the same time as true asbestosis.

Symptoms and signs

The cardinal symptom is dyspnoea (shortness of breath). This is a nonspecific symptom, common in many other cardiopulmonary disorders. An early sign is crepitating rales, especially at the lung bases. However, they are not specific for asbestosis. Clubbing of fingers can occur but is in fact fairly rare, seen in less than a third of the cases.

Radiology

A diffuse irregular interstitial pattern coupled with evidence of pleural disease, e.g., plaques or extensive pleural thickening in a person with known exposure, presents little diagnostic difficulty. The early stage of asbestosis can be impossible or very difficult to see on a chest roentgenogram, and both over- and under-diagnosis can occur. A confounding factor is smoking, which will cause a significantly higher incidence of small irregular opacities. The radiological changes become more evident when the disease progresses.

CT scanning, especially with the high resolution technique, can discover asbestosis earlier than ordinary chest X-ray.

Pulmonary function

The classical finding in asbestosis is the same as in all types of lung fibrosis, i.e. a restrictive lung disease. There is convincing evidence that an asbestos related pulmonary abnormality can occur in the absence of definite radiologic change.

Clinical Diagnosis

For the diagnosis of asbestosis one should have:

1. A reliable history of exposure.
2. An appropriate time interval between exposure and detection.
3. X-ray changes compatible with lung fibrosis.
4. A restrictive lung function.
5. Inspiratory rales at the lung bases (not obligatory).

It should be noted that other types of lung fibrosis can occur even if the patient has been exposed to asbestos; some of these might be possible to treat, so in severe cases it is advisable to have a lung biopsy for a definite diagnosis.

Lung cancer

The lung cancer caused by asbestos is no different from other lung cancers. It should be investigated and treated as any other lung cancer. The important thing is to elucidate the asbestos exposure, because this could have economical importance for the patient.

Should we follow persons exposed to asbestos? What would be the purpose of such surveillance?

The purpose could be to find diseases related to exposure for either scientific or compensatory purposes, or to find signs of diseases in order to be able to prevent further morbidity or mortality. Surveillance could also be due to legal causes or to psychological reasons (the surveilled persons or the doctor feel safer; however, this is not a good reason to do surveys unless it does have some medical benefits).

The most important of these purposes (for patient, doctor and society) is the medical one. The only disease at the moment which could be cured by early discovery is lung cancer. Thus, there are those who suggest that CT scans should be performed at regular intervals. Until the cost-benefit of this has been proven, it cannot be recommended, however.