PULMONARY FIBROSIS CAUSED BY SYNTHETIC TEXTILE FIBRES?

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INTRODUCTION

In 1975, Pimentel et al.[1] described respiratory disease caused by synthetic textile fibres. Since then, to the authors' knowledge, no further reports on this have been published. We have now seen three patients with pulmonary fibrosis, probably due to this cause.

PATIENTS

Case 1. A 52-year old woman was referred because of pulmonary infiltrates on her chest X-ray and a dry cough combined with increasing dyspnoea. She had previously been healthy and had never smoked. Chest X-ray showed a reticular pattern with some confluent areas in the upper lobes (Figure 1). The tuberculine test was negative, as were tests for auto-antibodies of various kinds. Routine blood tests, including erythrocyte sedimentation rate, were completely normal.

The patient started working in a textile shop fifteen years before admission. She measured and cut cloth that was mainly synthetic (acrylic fabrics, polyesters, imitation leather etc) and occasionally also glass fibre, but she was not otherwise exposed to silica or other dust. The work was very dusty.

Figure 1. (Case 1). Diffuse pulmonary fibrosis, more marked apically and at the periphery.

In the first years the patients was only slightly irritated by this dust, but she then developed an irritating dry cough which was much worse in the afternoons of working days. After 12 years she had to stop, as she found it too disturbing. She also noticed that during weekends and prolonged absence from work, she was very much better, and was not bothered by perfumes and other strong smells which on weekdays gave her coughing attacks.

Pulmonary function tests showed lung volumes within low normal values. The compliance was abnormal and the elastic recoil remarkably high (max 45 cm H_2O). The nitrogen washout curve was abnormal, with a steep alveolar plateau. A needle biopsy (Tru-Cut^R) of the right lung showed a late stage of interstitial fibrosis with considerable alveolar thickening (Figure 2). In polarized light, there were multiple small foreign bodies within the fibrotic areas.

The patient has been followed for seven years after the biopsy. She was awarded workmens compensation and retired from her work. There has been a slow progression of her fibrosis with an increasing dyspnoea, despite the fact that she is no longer in contact with textile dust.

Case 2. A 66-year old woman was seen because of dyspnoea and pulmonary infiltrates on chest X-ray (Figure 3). 40 years earlier she started working in a textile shop with very similar working conditions as case 1. Routine blood tests were normal. Lung function test showed a slight restrictive disease. Bronchoscopy revealed small hyperplastic infiltrates in many places in the bronchial tree. Biopsy showed granulation tissue, histiocytes, multinuclear giant cells, and foreign bodies which looked like small fibres. The changes were diagnosed as inflammation due to foreign body inhalation.

Case 3. A 47-year old woman presented with bilateral pulmonary fibrosis clinically and radiologically. She had a restrictive lung disease with a lung function about 75% of predicted. Like the former two patients, this patient had been working with textiles and particularly with synthetic textiles, which she had cut and measured. An open lung biopsy revealed the same type of change as in case 1 with diffuse pulmonary fibrosis, foreign body granulomas and foreign bodies.

DISCUSSION

The histories of the patients strongly suggest that the pulmonary fibrosis was caused by the exposure to synthetic fibres, and this is supported by the biopsies. Unfortunately, as the foreign bodies were in minuscule pieces, it was not possible to analyze them. Glass fibres are unlikely to reach

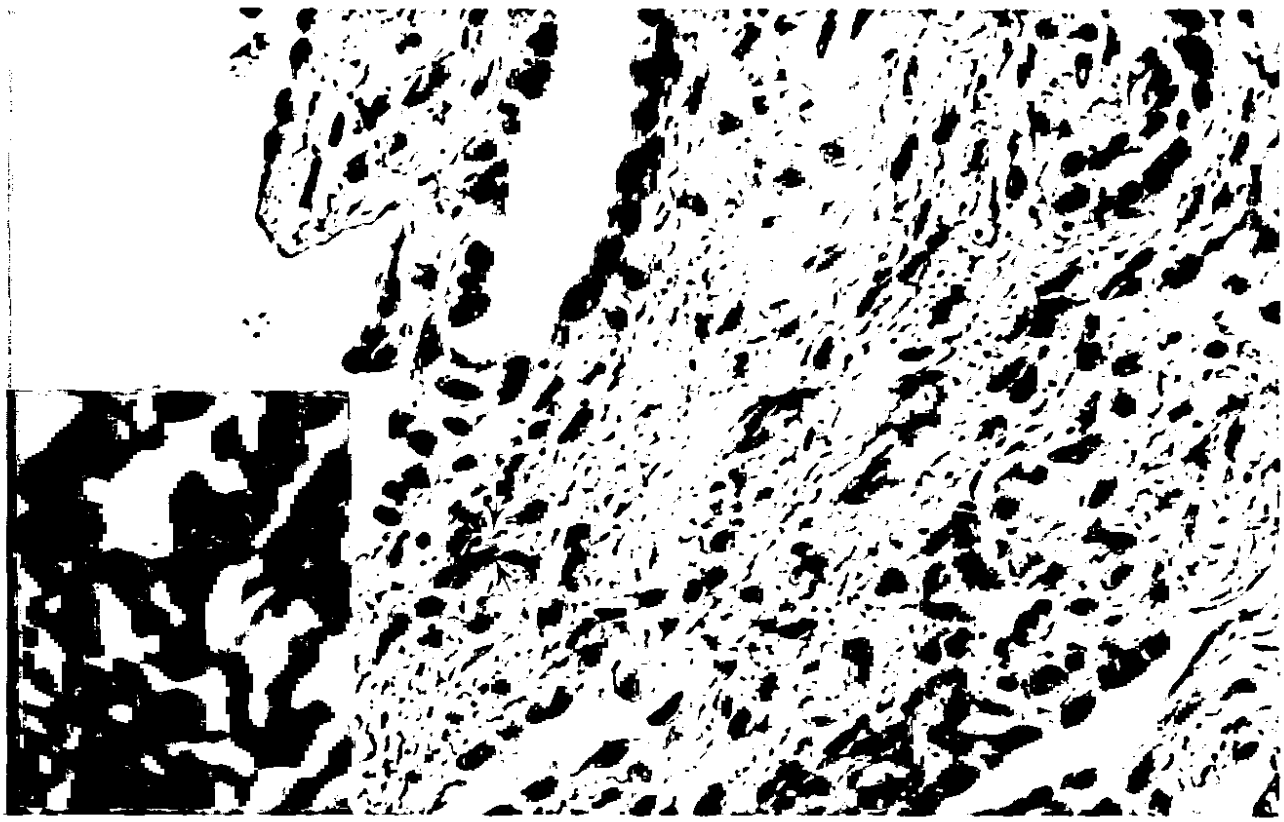

Figure 2. (Case 1). Lung biopsy. Interstitial fibrosis with marked thickening of alveolar septa. A macrophage (arrows and inserted detail) contains birefringent foreign material.

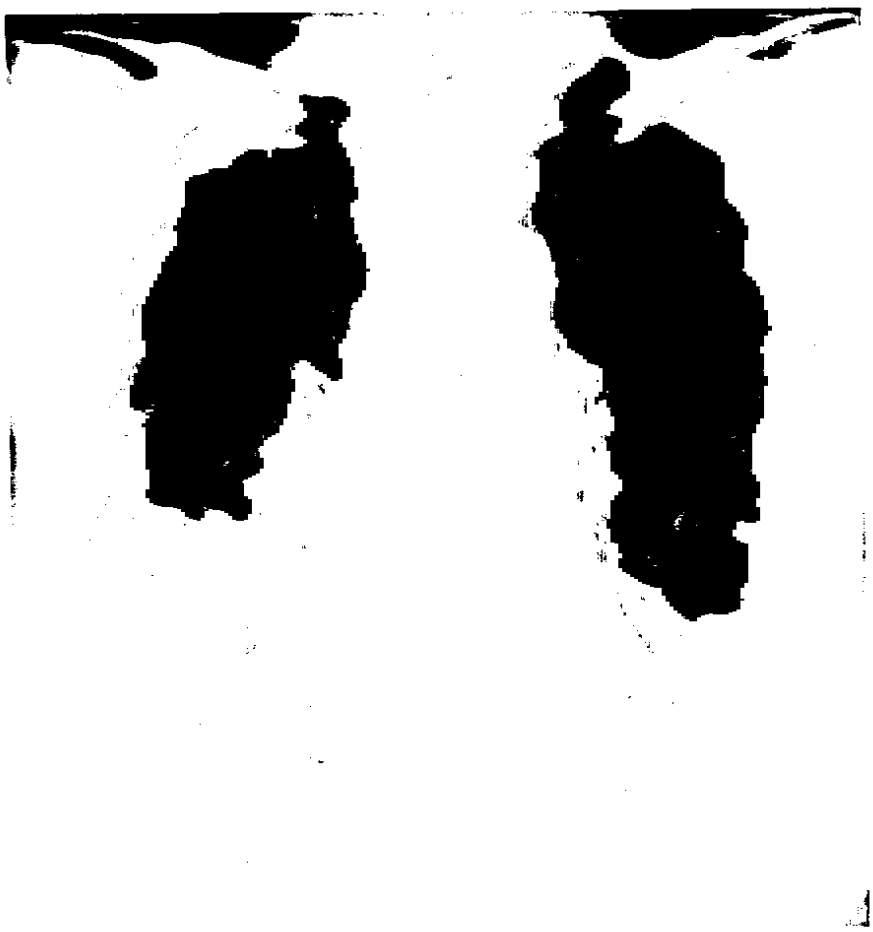

Figure 3. (Case 2). Pulmonary fibrosis.

the alveoli because of their size, and no fibrogenic effect of these fibres in humans has been described. We believe that the small foreign bodies were in fact small pieces of synthetic fibres, but so far this remains unproven.

Synthetic textile fibres consist of a number of different substances. Some of them are polyesters which are difficult to degrade biologically. The lung disease radiologically and microscopically is very similar to that described from polyvinyl chloride.[2,3] This type of agent is also very resistant to biological degradation, and it is quite possible that inhaled small particles of this type, with a great resistance against biological enzymes, in selected patients can cause inflammatory reactions of foreign body type, leading to pulmonary fibrosis.

Thus, synthetic fibres seem to be one more possible cause for pulmonary fibrosis. No doubt, there are many other exogenic agents that can also be fibrogenic when inhaled, and a thorough occupational history of any patient with "idiopathic" pulmonary fibrosis is mandatory.

REFERENCE

1. Pimentel, J.C., Avila, R., Lorenco, A.G.: Respiratory disease caused by synthetic fibres: a new occupational disease. *Thorax* 30:204-219 (1975).

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