PNEUMOCONIOSIS IN CENTRAL INDIAN COAL-MINES

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Extensive surveys carried out in Europe and America have shown the incidence of coalworkers’ pneumoconiosis to be widespread (Flinn, Seifert, Brinton, Jones, and Franks, 1941; Fletcher, 1955). In India, however, the prevalence of this disease has never been investigated, and a report published by the Government of India in 1946 (Deshpande, 1946) stated that there was no conclusive evidence that pneumoconiosis occurred to any great extent. The present paper describes five cases of pneumoconiosis in Indian coal-miners.

Mining Conditions

The group of mines where these five patients have worked are in the state of Madhya Pradesh in central India.

In each mine the environment is similar. The coal seams of ligno-bituminous or semi-bituminous coal are usually 4-6 ft. thick and 7-8% of the mined material consists of shale. The ash content of the coal varies between 18 and 28%, 10% of which is probably free silica. Only a rough estimate of the free silica is possible since there are no available measurements of the free silica content of the dust in Indian coal-mines.

The roof and floor of the mines consist mainly of shale and the mines are dry except during the rainy season.

All the mines are either unmechanized or only partly mechanized. Three shifts of eight hours each are worked. “Hand holing” (undercutting the coal face and digging holes into it for insertion of explosive) is done by the miner with an ordinary pick. After firing, the miner again uses the pick to bring down the loosened coal. Large lumps are broken into smaller ones for loading into coal cars. All these processes are dusty and no dust suppression is used in any of the mines. Power-driven coal-cutters and drills, introduced during the past six years, aggravate the dust problem.

Ventilation depends on the “natural” method, with “upcast” and “downcast” shafts placed at intervals and aided by exhaust fans at the mouths of some of the shafts. The absence of coal gas enables the miners to use naked kerosene oil lamps for illumination. These give poor illumination and produce much soot. The prevailing system of piece rate wages leads miners to ignore the largely invisible dust clouds after blasting in order to bring down as much coal as quickly as possible.

Case Reports

Case 1.—Sahadeo, aged 40 years, had been a miner for 20 years. He had no symptoms, disability, or abnormal physical signs. The erythrocyte sedimentation rate was 20 mm./hour (Westergren). A chest radiograph showed uniformly distributed, homogeneous nodulation in both lung fields with a tendency to coalescence in the middle zones.
Case 2.—Swarupnarayan, aged 52 years, had been a miner for 31 years. Five years previously disability had compelled him to give up mining. Since then he had been employed as a watchman at the pit mouth. He complained of exertional breathlessness and recurrent attacks of dyspnoea for the past seven years, and minimal cough productive of a small amount of mucoid sputum.

He had had an attack of lobar pneumonia 10 years before, from which he had made a complete recovery. The father had been a coal-miner and had died of a long-standing respiratory complaint.

On physical examination, slight clubbing of the fingers was seen. There was moderate kyphosis. The percussion note was impaired, breath sounds and vocal resonance were diminished, and medium-pitched rhonchi were heard in both lower zones.

A chest radiograph (Fig. 1) showed progressive massive fibrosis in the left upper zone on a background of advanced simple pneumoconiosis (international classification, 3B 0/3).

The diaphragm, particularly the right dome, was distorted, due to adhesions.

The E.S.R. was 17 mm. in one hour (Westergren) and Hb 68%.

No acid-fast bacilli were seen on repeated examinations. Disability was assessed at 40%.

Case 3.—Bharosa, aged 40 years, had been a miner for 22 years. He had been compelled by disability to give up mining three years before and since this time had been employed as a casual labourer on the surface.

He was breathless on exertion. The percussion note was impaired, and breath sounds and vocal resonance were diminished with a few basal rales in both lungs.

A chest radiograph (Fig. 2) showed progressive massive fibrosis in the right side on a background of moderately advanced simple pneumoconiosis (international classification 2C 5/0). There were diaphragmatic adhesions on the right side.

The E.S.R. was 15 mm. in one hour (Westergren) and Hb 75%.

No acid-fast bacilli were found in the sputum. Disability was assessed at 30%.

Case 4.—Jogeswar, aged 40 years, had been a miner for 20 years. He gave up six years before because of disability and at present was employed in odd jobs on the surface.

He had been breathless on exertion for eight years. A chest radiograph (Fig. 3) showed well marked simple pneumoconiosis with an early massive shadow on the right (international classification 3A 2/0).

No acid-fast bacilli seen in the sputum.

The E.S.R. was 22 mm. in one hour (Westergren) and Hb 65%.

Disability was assessed at 35%.

Case 5.—Ramlal, aged 45 years, had been a miner for 15 years, for the past 14 years as a supervisor underground.

He had had increasing breathlessness on exertion for
the past five years, and recurrent attacks of cough with sputum, particularly in the winter. For the past two years he had only been able to work one to two hours each day underground on account of breathlessness.

The percussion note was impaired, and breath sounds were diminished with rales in both lungs.

A chest radiograph (Fig. 4) showed a moderate degree of simple pneumoconiosis with an early massive shadow on the right side (international classification, 2A 2/0), and adhesions at the right base.

The E.S.R. was 17 mm. in one hour, and Hb 70%. No acid-fast bacilli seen on repeated examinations of the sputum.

Disability was assessed at 35%.

Discussion

The four cases showing radiological evidence of complicated pneumoconiosis have been observed by the author for the last six years. They have suffered only from shortness of breath; cough as a major complaint, chest pain (despite radiographic evidence of pleural adhesions) and melanoptysis have been absent. There have been no clinical signs of tuberculosis and repeated examinations of the sputum for acid-fast bacilli have been negative. The E.S.R. in all these cases showed a slight increase, the average figure for healthy Indian males being 3 to 15 mm. in one hour (Napier and Das Gupta, 1945).

Summary

Five cases of coalworkers' pneumoconiosis in Indian coal-miners working in bituminous mines are described.

The dustiness of the mines, due to the methods of mining and absence of dust suppression, are considered responsible for the development of the disease.

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REFERENCES


