Coal worker´s pneumoconiosis

Template:Infobox - onemocnění Coal pneumoconiosis is an occupational disease caused by long-term exposure to coal dust, which may contain various (usually not very significant) admixtures of SiO 2.

Etiopathogenesis and exposure

Coal dust is normally phagocytosed by macrophages (they turn black and are then called coniophages) and removed by ciliary transport or lymph. However, if the capacity of these two latter mechanisms is exceeded, excessive phagocytosis and stimulation of inflammation will occur, which may lead to fibrotic changes in the lungs . If there is a significant SiO 2 content in the coal dust , the same mechanisms as in silicosis will be activated and the lung damage will be significantly worse. A progressive silicosis-like disease is induced by coal dust with a SiO 2 content of more than 15%.

Professional exposure

Miners, especially deep-sea black coal mines (black coal has a higher proportion of SiO 2) are at risk, especially during hand-mining and harvester-mining. The disease rarely develops after less than twenty years of exposure.

Pathological picture

Macroscopic

- The tattoo of the pleura is typical, parallel to the course of the ribs , the pleura is as if marbled, not thickened,
- nodes only slightly enlarged.

Microscopic

- Initial changes include a lanceolate macula (a centriacinar accumulation of coal-dust macrophages) around which there is not particularly much fibrotization and is therefore not palpable;
- perifocal emphysema around the macula;
- in more advanced stages, nodules are formed (they have more collagen).

Investigative methods

- History – symptoms (cough, shortness of breath), work and social history,
- X-ray of lungs,
- functional examination of the lungs (spirometry) - obstructive disorders will appear, or combined disorders (obstruction+restriction), X-ray findings may not correlate with spirometry and subjective description of difficulties
- BAL – if we need a certificate of inorganic particles.

Disease types

Similar to silicosis, angle pneumoconiosis is divided into simple and complicated.

- **Simple angular pneumoconiosis** is usually asymptomatic, there are macules and nodules up to 10 mm.
- **Complicated angular pneumoconiosis** includes cough, exertional and later shortness of breath at rest (resembles silicosis). Complications of the disease include COPD , tuberculosis , focal necrosis (it can spread into the bronchus).

- **Caplan's syndrome** is the coincidence of angular pneumoconiosis with rheumatoid arthritis (rheumatoid factor positive).

Differential diagnosis

It is often very difficult to distinguish this disease from silicosis (work history is decisive), the definitive diagnosis is revealed only by autopsy and dust analysis. Furthermore, other disseminated pulmonary processes such as sarcoidosis and tuberculosis .

Therapy

There is no causal treatment, only symptomatic treatment is available:

- bronchodilation in obstructive dyspnea,
- oxygen therapy,
- antibiotics in the treatment of infections,

- lung transplantation.

Professionalism Assessment

- X-ray evaluation according to the ILO (International Labor Organization) International Classification of pneumoconioses,
  - designation of nodules - "**p**" (up to 1.5 mm), "**q**" (1.5-3 mm), "**r**" (3-10 mm),
  - designation of nodes - "**A**" (one deposit 10-50 mm, or several deposits over 10 mm, the sum of which does not exceed 50), " **B**" (more than A, not exceeding the right upper lung field in total), "**C** " (exceeds the equivalent upper right field),
  - frequency designation – **1, 2, 3**
- we consider *p3, q2, q3, r2* , r3 and *all complicated ones (A, B, C)* as **occupational diseases**, *"ones" (p1, q1, r1 and above) are sufficient in connection with tuberculosis, we further describe the so-called dynamic form, which occurs in individuals under the age of 40 who have not exceeded 15 years (3000 shifts) at risk of exposure and yet have at least p2, q1, r1 and above.*

Related Articles

- Pneumoconiosis
- Silicosis
- Asbestosis
- Anthracosis
- Pigment

Source

- BENEŠ, George. *Study Materials* [online]. [cit. 2010-02-24]. <http://jirbe>.

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