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ASBESTOSIS

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ABSTRACT
Asbestosis is a chronic disease caused by the retention of asbestos fibers. It is caused due to over exposure to high intensity of asbestos. Asbestos is one of the naturally occurring minerals. The causes, symptoms, treatment and medication for asbestosis have been explained in detail.

KEYWORDS: Asbestosis is a chronic disease been explained in detail.

INTRODUCTION

The term "asbestos" collectively references a group of naturally occurring fibrous minerals which have been exploited in numerous commercial and industrial settings and applications dating to antiquity. Its myriad uses as a "miracle mineral" owe to its remarkable properties of extreme resistance to thermal and chemical breakdown, tensile strength and fibrous habit which allows it to spun and woven into textiles. Abundant in nature, it has been mined considerably and in all continents. The nomenclature concerning asbestos and its related species is complex, owing to the interest held by scientific disciplines such as mineralogy, medicine and geology.

ASBESTOSIS

Asbestosis is a chronic inflammatory and fibrotic medical condition affecting the parenchymal tissue of the lungs caused by the inhalation and retention of asbestos fibers. It usually occurs after high intensity and/or long-term exposure to asbestos (particularly in those individuals working on the production or end-use of products containing asbestos) and is therefore regarded as an occupational lung disease.[1] People with extensive occupational exposure to the mining, manufacturing, handling, or removal of asbestos are at risk of developing asbestosis. Sufferers may experience severe dyspnea (shortness of breath) and are at an increased risk for certain malignancies, including lung cancer but especially mesothelioma. Asbestosis specifically refers to interstitial (parenchymal) fibrosis from asbestos, and not pleural fibrosis or plaquing.[2]

The signs and symptoms of asbestosis do not manifest until after an appreciable latency (time since first exposure), often several decades under current conditions in the US. The primary symptom of asbestosis is generally the slow onset of dyspnea, especially on exertion. Clinically advanced cases of asbestosis may lead to respiratory failure. On auscultation of the lungs, the physician may hear inspiratory rales.[3] The characteristic pulmonary function finding in asbestosis is a restrictive ventilatory defect. This manifests as a reduction in lung volumes, particularly the vital capacity (VC) and total lung capacity (TLC). The TLC may be reduced through alveolar wall thickening; however this is not always the case. Large airway function, as reflected by FEV1/FVC, is generally well preserved. In the more severe cases, the drastic reduction in lung function due to the stiffening of the lungs and reduced TLC may induce right-sided heart failure (cor pulmonale). In addition to a restrictive defect, asbestosis may produce reduction in diffusion capacity and arterial hypoxemia.[4]

Asbestosis is the scarring of lung tissue (around terminal bronchioles and alveolar ducts) resulting from the inhalation of asbestos fibers. There are two types of fibers: amphibole (thin and straight) and serpentine (curved). The former are primarily responsible for human disease as they are able to penetrate deeply into the lungs. When such fibers reach the alveoli (air sacs) in the lung, where oxygen is transferred into the blood, the foreign bodies (asbestos fibers) cause the activation of the lung's local immune system and provoke an inflammatory reaction.

This inflammatory reaction can be described as chronic rather than acute, with a slow ongoing progression of the immune system in an attempt to eliminate the foreign fibers. Macrophages phagocytose (ingest) the fibers and stimulate fibroblasts to deposit connective tissue.[5] Due to the asbestos fibers' natural resistance to digestion, the macrophage dies off, releasing cytokines and attracting further lung macrophages and fibrolastic cells to lay down fibrous tissue, which eventually forms a fibrous

mass. This mass can be seen microscopically, with the asbestos fiber layered by an iron-containing proteinaceous material (ferruginous body). The result is interstitial fibrosis. The fibrotic scar tissue causes alveolar walls to thicken, which reduces elasticity and gas diffusion, reducing oxygen transfer to the blood as well as the removal of carbon dioxide.

Asbestosis resembles many other diffuse interstitial lung diseases, including other pneumoconioses. The differential diagnosis includes Idiopathic Pulmonary Fibrosis (IPF), Hypersensitivity pneumonitis, sarcoidosis, and others. The presence of pleural plaquing may provide supportive evidence of causation by asbestos. Although lung biopsy is usually not necessary, the presence of asbestos bodies in association with pulmonary fibrosis establishes the diagnosis. Conversely, interstitial pulmonary fibrosis in the absence of asbestos bodies is most likely not asbestosis. Asbestos bodies in the absence of fibrosis indicate exposure, not disease. There is no curative treatment for asbestosis. Oxygen therapy at home is often necessary to relieve the shortness of breath and correct underlying hypoxia. Supportive treatment of symptoms includes respiratory physiotherapy to remove secretions from the lungs by postural drainage, chest percussion, and vibration. Nebulized medications may be prescribed in order to loosen secretions or treat underlying Chronic Obstructive Pulmonary Disease. Immunization against pneumococcal pneumonia and annual influenza vaccination is administered due to increased sensitivity to the diseases. Patients are at increased risk for certain malignancies. If the patient smokes, cessation reduces further damage. Periodic PFTs, chest x-rays, and clinical evaluations, including cancer screening/evaluations, are given to detect additional hazards.

Causes of Asbestosis

Asbestosis is caused by breathing in asbestos fibres. Certain trades are more likely to have been exposed to asbestos in the past.

Asbestos fibres

When you inhale a foreign body, such as a dust particle, cells called macrophages (found in the alveoli) usually hunt and break the particle down before it gets into your lung tissues and blood stream.

However, asbestos fibres are too tough for the macrophages to break down. In an attempt to break down the asbestos fibres, the macrophages release substances to destroy the fibres. These substances can permanently damage the tiny air sacs in your lungs, known as alveoli.[6]

Alveoli

When you breathe in, the alveoli help to transfer oxygen from your lungs into your blood. When you breathe out, the alveoli help to transfer carbon dioxide out of your blood, through your lungs and out of your mouth.

If you are exposed to asbestos fibres for a long period of time, the alveoli can become more severely damaged and scarred. The scarring is known as fibrosis. Fibrosis of the alveoli caused by large amounts of asbestos is known as asbestosis.

If the alveoli are scarred, your ability to inhale oxygen and exhale carbon dioxide will be affected, resulting in breathlessness.

Occupations associated with asbestos exposure

The use of asbestos increased significantly after World War II. It peaked during the 1970s before declining during the 1980s and 1990s. You may have been exposed to asbestos if you worked in an industry such as building or construction, where asbestos was used during this time period.

Occupations particularly associated with exposure to asbestos include:

- insulation workers
- boilermakers
- plumbers, pipefitters and steamfitters
- shipyard workers
- sheet metal workers
- plasterers
- chemical technicians
- heating, air-conditioning and refrigeration mechanics.[7]

Industries known to have used asbestos during these times include:

- construction
- shipbuilding and repair
- chemical manufacturing
- non-metallic mineral stone production
- railways
- yarn, thread and fabric mills
- rubber and plastic production
- trucking services

Other factors

How asbestos affects individuals can also depend on other factors, including:

- the type of asbestos fibre they were exposed to – blue asbestos is more dangerous than brown asbestos, and both blue and brown asbestos are much more dangerous than white asbestos
- how much asbestos was breathed in
- the individual's health – for example, symptoms are likely to be more severe in people who smoked or had lung disease before being exposed to asbestos.[8]

Symptoms

Common symptoms of asbestosis include:

- shortness of breath
- tightness in the chest
- persistent cough with mucus
- chest pain

- appetite loss
- finger clubbing (enlarged fingertips)
- nail deformities.[9]

Treatment

Although asbestosis is an irreversible condition, treatment options do exist to slow its progression and help someone with the disease live many years after a diagnosis. Medication and breathing treatments are the two most common treatments, and surgery may come into play as well. All of the treatment options are palliative, which means they are not potentially curative and are designed to improve a patient's quality of life.[10]

Treatments focus on a patient's ability to breathe. Caused by an inhalation of asbestos fibers, asbestosis is a lung disease that, over time, creates labored and painful breathing. Lung tissues that are scarred from embedded fibers impede the natural breathing process.

Doctors often prescribe inhalers and medications like bronchodilators, aspirin and antibiotics to help those diagnosed with asbestosis.[11] In some patients, treatments such as a humidifier, oxygen therapy, chest percussion or postural drainage may also be recommended to relieve symptoms of chest congestion, tightness and difficulty breathing. If a patient's symptoms are so severe that medications don't work, a doctor may recommend surgery to remove scar tissue.

Patients with asbestosis should avoid smoking, as numerous medical studies show that smoking tobacco accelerates and worsens asbestosis.

Medications

- Bronchodilators (inhalers): Typically prescribed for patients with asthma, inhalers help relax the airway muscles and may provide relief. Some of the most common brands prescribed include Maxair, Ventolin, Serevent, Proventil, Primatene, Accu-Hale and Xopenex.[12]
- Medications to thin secretions: There are a number of medications that can thin secretions and open up airways. One is Gauifenesin, which makes it easier to cough.
- Supplemental oxygen: To help with breathing and getting more air into the lungs, oxygen may be prescribed. Oxygen is transferred from a tank through a plastic tube that has two prongs that fit into your nostrils.
- Antibiotics: If surgery is performed for asbestosis, antibiotics may be prescribed to control pain and also to reduce the risk of infection.[13]
- Pain medications: Aspirin and Tylenol can be effective in reducing pain and inflammation caused by asbestosis. A doctor may prescribe stronger pain medication if these do not provide relief from chest pain and other symptoms.

Corticosteroids (anti-inflammatory medication) and immunosuppressants, which are typically prescribed when treating lung diseases, are largely ineffective in the treatment of asbestosis symptoms.[14]

DISCUSSION

Asbestosis is a disease that involves scarring of lung tissue as a result of breathing in asbestos fibers. The scarring makes it hard for you to breathe and for oxygen to get into the blood. The disease worsens slowly over time. In some people the disease causes no symptoms, while in others it can cause severe symptoms.

There is no cure for asbestosis. A doctor can help you manage your symptoms. If you have trouble breathing, shortness of breath and a very low blood oxygen level, your doctor may recommend oxygen therapy.

CONCLUSION

Thus the causes, symptoms, treatments, medications and other informations on asbestosis have been briefly discussed above.

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