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ASBESTOS RELATED LUNG DISEASE

A Brief History

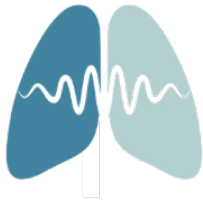
Asbestos (from the Greek 'amiantus' meaning unquenchable) has been known and used since antiquity – for as long as 4,500 years. Many centuries before Christ, Finnish peasants mixed it in pottery and sealed cracks in their log huts with it. The ancient Romans wove asbestos fibres into fabrics to make towels, nets and even head coverings for women. In medieval times, Emperor Charlemagne reportedly used an asbestos tablecloth to convince some Barbarian guests that he had supernatural powers – by throwing it into a fire and pulling it out unsinged! Some enterprising medieval merchants even sold asbestos crosses, citing their resistance to fire as evidence that they were made from wood from 'the true cross'. Until the 19th Century, asbestos remained little more than a curiosity. This changed, however, with the advent of the Industrial Age in the 1800's when industry realised its potential uses. Before long, asbestos supported a flourishing global industry. In the early 1900's, doctors in Europe knew that asbestos workers were dying from respiratory ailments. In 1924, Dr W E Cooke reported in the British Medical Journal cases of pulmonary fibrosis (asbestosis) in workers employed in the asbestos industry.

Why was Asbestos so Useful?

Asbestos is a term applied to some mineral silicates present in a fibre form. There are many members of the family: common among these are blue asbestos (crocidolite), white (chrysotile) and brown or grey asbestos (amosite). Other forms of asbestos include anthophyllite, used mainly in Finland, and tremolite, present in some commercial talcs. Because of its unique properties – flexibility, tensile strength, insulation (from heat and electricity) and chemical inertness – asbestos is one of the most useful and versatile minerals known to mankind. It is the only natural mineral that can be spun and woven like cotton or wool into useful fibres and fabrics.

Where is it Mainly Found?

Large deposits of asbestos have been discovered in the Ural Mountains in the Soviet, in the Alps of northern Italy, Canada, USA, South Africa and Rhodesia. In Australia, large deposits of crocidolite were found in the north of Western Australia and Wittenoom Gorge in the Hammersley Ranges, and some deposits of white asbestos have been mined in Northern New South Wales. Asbestos is no longer mined in Australia. Uses of asbestos have included fibro-sheeting, corrugated roofing, asbestos cement pipes, thermal insulation and fire proofing. It has also been used as an additive in paints and sealants, in textiles such as felts and theatre curtains, in gaskets, and in friction products like brake linings and clutches. During the peak building years, ie 1950's, 60's and 70's, asbestos found its way into most public buildings, including hospitals, schools, libraries, office blocks and factories. Workplaces such as ships' engine rooms and power stations were heavily insulated with asbestos. There are active programs in most areas to safely remove any asbestos where it remains a health risk.



How Does Asbestos Enter The Lungs?

Any particle gaining entry to the air passages must by-pass a number of protective mechanisms in order to reach the tiny air sacs or alveoli. These protective systems remove all but a very small number of inhaled particles. If asbestos fibres are inhaled, they must first pass the filtration mechanisms lining the nose and the mouth down to the fine airways that lead to the small alveoli. Hence, only very small particles barely visible with a high powered microscope, may eventually reach the alveoli. Fibres such as blue asbestos which are relatively long and very fine are more likely to reach the alveoli.

What happens to asbestos within the lungs?

Asbestos fibres reaching the alveoli are handled in different ways by the body. Scavenger cells may entirely engulf a very small fibre and carry it away out of the lung through the lymphatic system. Some fibres may also be covered with a yellowish-brown coating composed of iron and protein. These coated fibres are known as 'asbestos bodies'. Other fibres may, however, remain untouched by these mechanisms and can remain in the body over a lifetime with no apparent ill effect. Other fibres can lead to the lung changes listed below.

What Sort of Lung Diseases Can Asbestos Cause?

Asbestos-related diseases are believed to be caused more by the physical nature of asbestos fibres rather than their chemical properties.

Pleural Plaques

Unrelated to the appearance of any scar tissue within the lung themselves, discrete patches of thickening may appear on the lining of the chest wall and over the diaphragms in the pleural membranes that surround the lungs. It usually takes over fifteen years before they can be seen on a chest x-ray and are better seen on a CT or CAT scan. They usually do not produce any symptoms and do not lead to lung cancer or mesothelioma (see below).

Benign Asbestos-Related Pleural Effusion

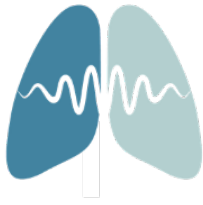
In this condition, fluid called an effusion appears between the lung and the chest wall. Many other diseases, such as cancer and tuberculosis, can also give rise to an effusion, so they all have to be excluded before this diagnosis can be made. Typically, a benign pleural effusion occurs a long time after asbestos exposure but is sometimes seen within ten years of exposure. It can begin with symptoms such as chest pain (called pleurisy) or more commonly without any symptoms at all. It is sometimes associated with pleural plaques, but not always. The amount of fluid is usually small compared with other causes, and it goes away without any treatment. However, in a number of cases, it may recur some time later.

Diffuse Pleural Thickening

These are different from pleural plaques and affect a bigger area of lung lining. The thickening can be seen on chest x-ray. Although most people don't have any symptoms, a dull chest ache and breathlessness can occur if the thickened areas become quite large. Another problem occasionally seen on chest x-ray is a condition called 'rounded atelectasis' or 'pseudotumour', which may require further investigation.

Asbestosis

With the passage of time, inhaled asbestos fibres can sometimes cause inflammation to occur in the lung tissues leading to scar tissue or fibrosis. This is often called 'interstitial fibrosis'. It causes the lungs to stiffen and cut down on the passage of oxygen between the air and the blood. Such reduced oxygen movement may be measured by pulmonary function testing.



On chest x-rays, fibrosis is seen as a cloudiness or 'ground glass appearance'. Asbestosis is usually progressive and does not reverse. It leads to respiratory disability and sometimes death from respiratory failure. Symptoms include shortness of breath, coughing, chest tightness and bluish skin discoloration called cyanosis, which occurs when the body's oxygen is too low.

Lung Cancer

Lung cancers have occurred whenever workers have been exposed to asbestos of any kind. However, asbestos-exposed workers who smoke cigarettes are particularly prone to develop lung cancer. If diagnosed early, such cancers may be totally removed by surgery. Chemotherapy and radiotherapy are also often used in treating lung cancer. Some studies have also suggested a link between laryngeal and bowel cancer, but much more research is needed before these can be directly linked to asbestos exposure.

Malignant Mesothelioma

Malignant Pleural Mesothelioma – Persons exposed to asbestos either within or outside the asbestos industry may, after many years, develop malignant mesothelioma. This cancer occurs in the cells covering the surface of the lung and lining the inside of the chest wall and diaphragm (the pleura). Crocidolite (blue asbestos) has the most potent effect in producing this cancer. Mesothelioma tumours have no relationship with tobacco smoking. This tumour may eventually totally envelope the lung, with a malignant growth sometimes several centimetres thick. The tumour is irreversible, poorly responsive to any current cancer treatments, and always fatal. It is often accompanied by severe chest pain, fluid in the chest cavity (pleural effusion) and breathlessness.

Peritoneal Mesothelioma – Around the outside of the coils of intestine and also lining the abdominal cavity is a membrane (the peritoneum) similar in character and thickness to the pleura. It is similar tissue to the pleura and, like it, can give rise to a malignant tumour called peritoneal mesothelioma.

What should I do if my exposure to Asbestos occurred in the workplace?

When an asbestos-related problem is first diagnosed, discuss with your doctor whether you should seek further information from a respiratory physician, your employer, union, or the Dust Diseases Board. There are several patient support groups around Australia catering for the needs of patients with an asbestos related condition. Phone **1800 654 301** for more information and a referral to a group near you.

Please Note: This information is intended as a guide only and is not an authoritative statement. Please consult your family doctor or specialist respiratory physician if you have further questions relating to the information provided here.