

## **SLEEP DISORDERS IN ASBESTOS-RELATED DISEASES**

Asbestos pleural diseases ie benign asbestos pleural plaques, diffuse pleural thickening, benign asbestos pleurisy, benign asbestos pleural effusions and asbestosis as well as the more common asbestos-related malignancies ie lung cancer and mesothelioma all have a significant impact on the function of sufferers during the day. However, we spend approximately one-third of our life asleep. There is very little in the literature regarding the impact of asbestos diseases in all its varied forms on sleep. Sleep disorders are also common in the community and by middle age, sleep apnoea and periodic leg movement disorder is found in increasing frequency particular as patient's age and gain weight. Other conditions such as insomnia are also extremely common.

### **BENIGN ASBESTOS DISEASES**

I have recently conducted a study of approximately 300 patients at the Wesley Hospital, most in middle age and older, presenting with asbestos-related diseases referred either by their general practitioner or for medico-legal assessment. About one-third had obstructive apnoea. Although this is a common condition, asbestos diseases may precipitate the obstructive sleep apnoea by causing weight gain as a result of reduced physical activity, exertional dyspnoea and chest pain. Other comorbidities often follow with weight gain including diabetes mellitus type 2, hypertension, ischaemic heart disease and cerebrovascular disease as well as back pain and musculoskeletal problems.

In my experience of over 20 years of seeing patients with asbestos diseases and also in my capacity of a sleep physician, I frequently diagnose sleep apnoea in patients with asbestos disease which has either occurred a result of weight gain or been aggravated by significant weight gain. This is also compounded in the subgroup of patients with significant asbestos pleural pain who require drugs such as gabapentin and Lyrica and tricyclic and other antidepressants, all of which may have a significant impact on weight gain.

Although the majority of patients with asbestos diseases and obstructive sleep apnoea can be treated with standard CPAP pumps. Autotitrating devices which cost roughly around \$2,000 and fixed pressure pumps are approximately half this cost.

There is another subgroup of patients who have significant restrictive lung disease and who require more sophisticated CPAP pumps which are called bi-level pumps (Bi-PAP for short) and which range from \$4,000 to \$6,000. The more restrictive lung function present, the more difficult it is to inflate the chest and to overcome the sleep apnoea. Some patients also require entrained oxygen due to resting low oxygen saturations which are aggravated by sleep.

In the normal individual, lying supine ie on one's back, causes the diaphragm to elevate and this is accentuated by gravitational effect on abdominal contents. In patients who are obese, this problem is accentuated and in those with coexisting restrictive defects from asbestos pleural disease and asbestosis as well as mesothelioma and lung cancer find that this problem is even worse, to the extent that the resting oxygen saturation may be well below normal even while they are awake.

During sleep the skeletal muscles and diaphragm maintain respiration and control oxygen saturation in the blood. However, during REM sleep the skeletal muscles become atonic ie floppy and the only muscle which maintains respiration is the diaphragm. In patients with impaired diaphragmatic function ie due to eventration or those with a paralysed hemidiaphragm ie after surgery or idiopathic, find themselves at increasing disadvantage during REM sleep particularly in the supine position and even worse so in the presence of obesity or significant restrictive lung pathology. Many of such patients require CPAP at night even in the absence of significant obstructive sleep apnoea and a subgroup require Bi-PAP.

The diaphragm can be likened to both a piston and a bellows and by its contraction, the abdominal contents are pushed down and the chest cavity made larger causing an indrawing of air. However, in patients who have significant diaphragmatic pleural plaques, diffuse pleural thickening and/or asbestosis combined with obesity, this function is impaired leading to reduced oxygen saturations at rest and particularly in the supine position and even worse so during sleep and with elevated carbon dioxide levels in the blood which can be monitored by transcutaneous CO<sub>2</sub> monitoring during a sleep study.

There is also a subgroup of patients with diffuse asbestos pleural thickening who have severe pleural thickening in the apices of the lungs as well as in the costovertebral gutters. The reason for this is unclear and this occurs in a minority of patients. In my experience these patients are those who often require bi-level respiratory support at night due to the severe decrease in lung and chest wall compliance ie making the chest wall and lungs stiffer and therefore more difficult to inflate.

Obstructive sleep apnoea is not restricted to men and more commonly occurs in post-menopausal women and also in those who are overweight.

### **MESOTHELIOMA**

Patients with mesothelioma always have reduced lung and chest wall compliance as a result of growth of the tumour and this therefore may precipitate or aggravate coexisting obstructive sleep apnoea and the medications used to control pain ie narcotics may precipitate or aggravate coexisting central sleep apnoea and lead to a worsening of control of obstructive sleep apnoea. Although most patients eventually lose weight because of tumour, a subgroup of patients will have significant weight gain eg from corticosteroids administered at the time of chemotherapy and some patients also require antidepressants and have weight gain as a result of these drugs.

Insomnia due to concerns about the future, interruption of sleep from pain, constipation and general dysthymia all may have a significant impact on the quality of life and also sleep. This may also have a significant impact on the spouse with whom the patient sleeps.

As the mesothelioma worsens, patients may frequently develop worsening insomnia, a sense of alienation, frustration and have numerous side-effects from a whole range of medications required during the treatment process and including effects of chemotherapy.

## **PERIODIC LEG MOVEMENT DISORDER**

This condition is a form of restless legs which occurs during sleep causing phasic contraction of the feet and sometimes the arms for reasons incompletely understood but probably due to some form of nervous irritation of the lower spinal nerves and aggravated by the presence of renal dysfunction and iron-deficiency anaemia. The condition becomes increasingly more common in the elderly and each contraction of the feet and sometimes arms can produce arousals which lead to excessive daytime somnolence similar to that of sleep apnoea.

I find this condition increasingly common in older patients and coincidentally in those with asbestos diseases but are not caused by the latter. Treatment of this usually consists either of clonazepam (Rivotril) at night, anti-Parkinsonian drugs such as Sinemet and more recently other drugs such as Repreve and more recently Sifrol. This condition also commonly accompanies obstructive sleep apnoea and sometimes can be ameliorated by treating the latter.

## **REM-BEHAVIOUR DISORDER**

This a condition which is found more commonly in older males and is characterised by acting out of violent dreams with the affected subject sometimes inadvertently hitting or even punching the sleeping partner or objects by the bedside. Although this is not caused by obstructive sleep apnoea or asbestos diseases, it occurs in a small proportion of patients in this age group ie middle-aged to elderly. It may be induced or aggravated by emotional stress e.g. with regards asbestos diseases.

## **INSOMNIA**

Many patients with asbestos disease develop insomnia, difficulty with sleep onset ie initial insomnia, poor sleep maintenance or middle insomnia and thirdly, early-morning wakening. The latter two are more common in depression and the first is more common in patients with anxiety. However, there is an overlap in all these conditions.

In my experience, patients with asbestos diseases often are perturbed by the diagnosis of asbestos diseases and are fearful of their future particularly having read medico-legal reports, with fears also with regard the possibility of their developing mesothelioma or lung cancer, concerns about their spouse and family, their financial affairs, their ability to

continue work for those who are still employed and compounded by the stress of medico-legal proceedings, having medico-legal reports done by specialists (ie expert witnesses) and concerns about court appearances and the costs thereof.

There is a significant subgroup of patients who develop very significant anxiety, adjustment disorders and also overt depression which require treatment by psychiatrists as well as sleep physicians. However, as many of the medications used for treating depression lead to weight gain, this often compounds pre-existing problems in control of sleep apnoea as well as the problems that obesity causes by reducing respiratory function via a worsening restrictive defect. Indeed the most common cause of a restrictive defect in my experience in Queensland is obesity.

### **CHEST PAIN**

In a recent study of mine, approximately 40% to 50% of patients had significant asbestos pleural pain from asbestos pleural plaques. In a subgroup of patients this led to significant disability, the need for them to see pain specialists and in some cases also to have psychiatric support. A significant subgroup of such patients require drugs such as Lyrica and gabapentin for the control of the neuropathic pain, which frequently causes weight gain which therefore compounds obstructive sleep apnoea. In addition, some patients also require narcotics for control of pain and this has a deleterious effect on sleep apnoea by causing significant depression of ventilatory drive during sleep and therefore predisposing to central sleep apnoea and aggravating coexisting obstructive sleep apnoea.

Asbestos diseases therefore have a significant interaction with sleep disorders and this dimension needs to be more widely recognised by general practitioners, the expert witnesses and the legal fraternity. In my experience, few medical reports outline the effects of asbestos diseases on sleep or the interaction between common sleep pathologies and asbestos-related diseases.

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