SLEEP: ARE WE GETTING ENOUGH?

"Disturbed sleep is a common comorbidity of patients who experience pain." ([1])

This rather medical sentence is quite an important statement. Not only does it state what is obvious to anyone who has chronic pain, but it implies that not sleeping well is a medical condition that causes illness (morbidity). This reflects an upsurge in interest in sleep medicine which has yielded some important findings. Important not only to the researchers, but also to the people experiencing these problems.

I've written about sleep and pain before. What follows is hopefully an update and an abbreviated look at sleep, pain and depression that will be of some practical help to the reader. (Symptoms - Insomnia)

Some facts about sleep:

The National Sleep Foundation in the US conducted a large survey of 1500 people ([2]) and found that about a quarter of this population only experienced “a good night’s sleep” less than a few nights a month and 3% of these people said they never had one. 54% reported experiencing at least one symptom of disturbed sleep and 33% reported suffering insomnia almost every night. Half of the participants in the survey reported feeling tired, fatigued or below par at least one day a week.

Looking at the number of hours’ sleep 16% had less than 6 hours a night on weekdays and 10% had less than 6 hours on weekends. 49% reported 8 hours’ sleep at weekends, compared with 26% on weekdays. The average was 6.8 hours on weekdays and 7.4 hours on weekends.

Definition of Insomnia

- Complaint of inadequate sleep despite sufficient opportunity
- Typically complains of trouble falling asleep and/or staying asleep
- Results in daytime impairment
- Insomnia is a 24-hour condition

The most common symptoms of insomnia were

- Waking up feeling unrefreshed (38%)

- Waking up a lot during the night (32%)

Some facts about sleep:

- There are 4 stages of Non-REM sleep

- Stage 1 is when you think you are awake but are actually asleep: for example in a boring meeting or in the evening in front of the TV
- Stage 2
- Stage 3 and 4 are deep or Slow wave sleep which seems to play a key role in determining sleep quality
- REM (Rapid Eye Movement) sleep is when dreams occur, and there is a degree of muscle paralysis
- Cycles of light sleep and REM sleep occur throughout the night, every 90 minutes or so
- Length of REM (dream) sleep is longer as the night goes on: you dream most just before you wake up in the morning
- Everyone tends to go into Stage 1 sleep every hour and a half : most people aren't aware of this
- People in pain tend at this point to stay awake and have trouble falling asleep again
- The pattern of sleep is called *SLEEP ARCHITECTURE*
- Twice a day our alertness levels peak
- Twice a day our sleepiness peaks (often particularly around 3-4pm)

The sleep and wakefulness promoting centres are mutually inhibitory with a 'flip-flop switch' which can produce quick and stable transitions from wake to sleep and sleep to wake.

Dreams that are spontaneously recalled tend to be associated with anxiety or other negative feelings([3]).Patients suffering from an episode of major depression typically have reduced recall of dreams and absence of dream affect.

EFFECTS OF SLEEP DEPRIVATION

Studies ([4] , [5] , [6] , [7]) have shown that short-term sleep restriction leads to a variety of adverse effects including:

- Impaired sugar metabolism
- Increased cortisol
- Increased blood pressure
- Activation of the fight/fright/flight system (sympathetic nervous system)
- Increased appetite
- Increased inflammatory proteins
- Change in immune function

Many of these are problems we see in patients with chronic pain.

So we can see that deprivation of sleep can impact on weight, diabetes and cardiovascular problems. In fact, studies show that insomnia has negative effects on mental health, vitality and social functions as well

- Increased future risk of psychiatric disorders
- Decreased job performance, increased absenteeism
- Increased risk of accidents
- Increased healthcare costs

Pain and sleep

The relationship between sleep and pain is complex. 50-88% of patients with chronic pain have been shown to have sleep disturbances([8] , [9]) .Conversely, in a large European study ([10]), more than 40% of people with insomnia reported having at least one chronic painful physical condition.

If we think of pain as a state of hypervigilance or 'red alert', we can also consider sleep as a state of hypovigilance, with loss of awareness of sensory signals.

Patients in pain report:

- Less sleep time
- Delayed sleep onset (also called *initial insomnia*)
- Increased night-time awakening (*middle insomnia*)

More specifically:

- Tension headaches are associated with low sleep efficiency, frequent awakening, reduced slow wave sleep
- Some migraine studies show increased REM
- Neuropathic pain disorders are associated with decreased slow wave and REM sleep with resulting reduced sleep efficiency and fragmented sleep
- Musculoskeletal pain especially fibromyalgia is associated with an increased prevalence of underlying primary sleep disorders such as sleep apnoea or restless legs syndrome (periodic leg movements)
- Fibromyalgia is associated with abnormal slow wave sleep

Sleep and depression

Depression is a common problem in patients with chronic pain. There is also some suggestion that there may be a physiological link between insomnia and depression ([11]) and insomnia is certainly recognised as an early marker for depression. 40-60% of outpatients and up to 90% of inpatients with major depression experience sleep problems.

Patients with depression experience difficulty falling asleep (often due to feelings of anxiety or ruminating on depressive thoughts), frequent awakenings, waking early in the morning (also called terminal or late insomnia) and fatigue during the day. 29% of patients with excessive daytime sleepiness were diagnosed with major depression in one study([12]).

These problems are often associated with other symptoms of depression such as anhedonia (inability to find enjoyment in activities previously enjoyed), loss of appetite, feelings of hopelessness, helplessness or even active suicidal ideas and plans.

There is reduced slow wave sleep in depression and increased waking after sleep onset. There is also prolonged first REM period (dreams early in the night).

Even in patients in remission from depression after treatment, problems with sleep-wake disturbances and fatigue seem to persist. Patients with anxiety may have their sleep disturbed by nocturnal panic attacks or flashbacks (Post traumatic stress disorder).

Sleep disorders

- Obstructive sleep apnoea
- Restless legs/periodic limb movements

Sleep apnoea: often linked with depression; for patients with either disorder, there is a 1 in 5 risk of having both disorders([13]). There are overlapping symptoms between apnea and depression, particularly

Fatigue, decreased attention/concentration, lack of motivation, decreased enjoyment

Restless legs may be worsened by SSRIs (Prozac, Seroxat etc.) and Venlafaxine.

TREATING SLEEP PROBLEMS:

SLEEP HYGIENE

1. Increase exposure to bright light during the day
2. Time regular exercise for the morning and/or afternoon
3. Enhance sleep environment: dark, quiet, cool temperature

Avoid:

1. “Watching the clock” (better to get up and do something boring)
2. Use of stimulants, eg, caffeine, nicotine, particularly near bedtime
3. Heavy meals or drinking alcohol within 3 hours of bed
4. Exposure to bright light during the night
5. **Practice** a relaxing routine around bedtime
6. Reduce time in bed; regular sleep/wake cycle (people with chronic pain tend to have some day/night reversal, being up at night and sleeping in the daytime)

MEDICATION

- Over-the-counter (OTC) agents
- Antihistamines
- Herbs (e.g Valerian, Hops)
- Melatonin

23% Of patients with insomnia use OTC remedies to self-medicate([14]

28% Of patients with insomnia use alcohol to self-medicate(14)

Prescription agents

Benzodiazepine receptor agonists e.g Temazepam, Zopiclone, Zolpidem

Melatonin receptor agonists

Antidepressants, sedating

Anticonvulsants

Effects of medication

Benzodiazepines reduce slow wave sleep

Zolpidem reduces the time taken to fall asleep

Limitations to benzodiazepines: potential adverse effects include residual sedation with

potential impairment of psychomotor skills, tolerance which leads to the need for increasing doses and risk of symptoms on withdrawal. There is a substantial risk of addiction. The newer agents such as zolpidem carry less risk of these problems.

Antidepressants

- Most antidepressants disrupt sleep, although a minority of patients may report sedation
- SSRIs (fluoxetine, sertraline, paroxetine, citalopram) which suppress REM sleep
- Dual reuptake inhibitors (venlafaxine, duloxetine) may suppress REM sleep
- Bupropion
- Monoamine oxidase inhibitors tend to suppress REM sleep, sleep duration and impair sleep continuity

Sedating antidepressants are frequently used to treat insomnia associated with depression

Trazodone

Tricyclics (amitriptyline, doxepin) cause REM suppression

Mirtazapine

Pros: Low abuse potential

Cons: daytime sedation, weight gain, anticholinergic effects (dry mouth in particular) and cardiotoxicity

Antidepressants are also used in pain, usually at lower dose than when treating depression.

Anticonvulsants such as Gabapentin and Pregabalin are effective in promoting a relatively normal ‘sleep architecture’.

Reducing Gabapentin or sedating antidepressants may trigger insomnia

Pros: Slow wave sleep may be enhanced and has low abuse potential

Cons: cognitive impairment and daytime sedation

BEHAVIOURAL TECHNIQUES

1. **Stimulus control therapy:** positive association made between the bed and bedroom
2. **Sleep restriction:** limit time in bed to increase homeostatic sleep drive
3. **Relaxation training:** decrease arousal and anxiety

4. **Circadian rhythm entrainment:** reinforce or reset biological rhythm using light and/or chronotherapy

SUMMARY (from National Institutes of Health State of the Science Conference Statement. *Sleep*. 2005;28:1049-1057)

- Cognitive behavior therapy is effective, unlikely to have adverse effects, and may provide long-lasting benefits
- More practitioners need to provide this therapy
- Treatment should begin with behavioral therapy before turning to pharmacotherapy

- Pharmacotherapy is effective in treating insomnia related to psychiatric illness

- Many medications approved for insomnia have not been evaluated for long-term use

- Newer benzodiazepine receptor agonists appear to have fewer side effects and less severe reactions than benzodiazepines

- Some studies suggest that treating insomnia in patients with psychiatric disorders may improve the response to treatment for depression

CONCLUSION

So we can see that sleep problems, whilst not exclusively something people with chronic pain experience, are often a significant part of the problem in chronic pain. In addition, being low in mood (again a common problem for people with chronic pain) can be related to insomnia although it can be a bit of a chicken and egg situation. It can be difficult to tackle, and often it is best to try simple measures before medication which can cause more problems than it solves. It is also worth bearing in mind that some of the medication used to treat chronic pain can have effects on sleep, which may be helpful (anticonvulsants) or less so (reduced dream sleep from antidepressants.)

Any comments? Contact Me.

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December 2008

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