

Herbs and Chronic Insomnia

By Jay Bartel

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This paper will discuss the relevant pathophysiology for chronic insomnia and elucidate a general herbal protocol as well as highlight a few key herbs. I will explore relevant research related to herbal strategies as well as discuss the relationship between chronic insomnia and mood disorders including depression and anxiety.

Sleep is important for maintaining overall health and vitality. The impact of impaired or reduced sleep, as in chronic insomnia, is severe. Those with chronic insomnia experience a decrease in functionality across social, emotional and physical domains. This includes impaired memory, concentration, attention, reasoning, learning capacity, decreased reaction time, and hallucinations. Impaired sleep is also linked to an increased pain perception and incidence of chronic pain as well as decreased immune function and an increased risk of hypertension, stroke, diabetes mellitus, obesity, and cardiac events. The link between chronic insomnia and diabetes is clear also in that sleep loss leads to increased insulin resistance and sugar and stimulant cravings. Mood disorders such as depression and anxiety are linked to insomnia as well (Henningsen, K “Chronic Insomnia”). To be sure, it is imperative that herbal protocols to address chronic insomnia also holistically address the related conditions associated with chronic sleep loss.

Physiology of Sleep and Pathophysiology of Chronic Insomnia

To begin, a review of the relevant physiology of sleep and how the condition of chronic insomnia manifests. Sleep is regulated by the neuroendocrine system. The hypothalamus is the center where the nervous system and endocrine system interface. The ventrolateral preoptic nucleus (VLPO or VLPN) of the hypothalamus is involved in the switch between wakefulness and sleep (Henningsen, K. “Chronic Insomnia”). The suprachiasmatic nucleus (SCN) regulates sleep cycles, hunger, thirst, breathing, and other vital functions. To sleep, the typical signals of wakefulness are interrupted at the thalamus, which serves as the “gatekeeper” to the cerebral cortex. Its role is to disconnect the cortex from internal and external signals in order to sleep. .

There are several hormones involved in the sleep-wake cycle. Cortisol is one hormone released from the adrenals. It is one “awake” hormone and stress hormone. Ideally, cortisol spikes shortly after waking and levels diminish as the day progresses. Melatonin is released from the pineal gland. It is the “sleep” hormone. Ideally, levels are low during the day and high at night. There are also several neurotransmitters involved in the circadian cycle, including: histamine, serotonin, dopamine, norepinephrine, acetylcholine, and orexin. Adenosine is another neurotransmitter involved. Adenosine levels build throughout the day and acts to inhibit wakefulness. In chronic insomnia, the melatonin-cortisol cycle and other neuroendocrine functions are often imbalanced.

Insomnia is defined as repeated difficulty with sleep initiation, maintenance, consolidation, or quality that occurs despite adequate time and opportunity for sleep, and that results in some form of daytime impairment. Criteria for insomnia include the following:

- taking longer than 30 minutes to fall asleep

- staying asleep for less than 6 hours
- waking more than 3 times a night,
- experiencing sleep that is chronically non-restorative or poor in quality

Insomnia is further subdivided into primary and secondary insomnia. Primary insomnia arises from no co-existing pathology, and is sleeplessness that is not attributable to medical, psychiatric, or environmental cause. Those experiencing primary insomnia have difficulty initiating or maintaining sleep, or suffering from non-restorative sleep, for at least 1 month. Sleep disruption or associated daytime fatigue causes clinically significant distress or impairment in social, occupational, or other important areas of functioning for those affected. Secondary insomnia is chronic insomnia that lasts a month or longer. Most cases of chronic insomnia are secondary to medical or psychiatric conditions or due to medication or substance use. Common medical conditions that are linked to chronic insomnia include the following: Restless leg syndrome, apnea, muscle pain, arthritis, headaches, hot flashes, GERD, heartburn, asthma, endocrine shifts, and urinary issues. Many pharmaceutical medications and substances are linked to chronic insomnia as well. Common substances that affect sleep are nicotine, caffeine, and alcohol. Common pharmaceuticals are steroids, calcium channel blockers, and thyroid hormones (Henningesen, K. "Chronic Insomnia").

The pathophysiology of chronic insomnia focuses on brain and hypothalamic-pituitary-adrenal (HPA) axis dysregulation. Those with chronic insomnia show evidence of increased brain arousal. Signs of hyperarousal include increased fast-frequency activity during non-rapid eye movement (NREM) sleep as well as reduced deactivation in key sleep/wake regions during NREM sleep. Other signs of hyperarousal include the following: higher day and night body temperatures; higher urinary cortisol and adrenaline secretion; and higher adrenocorticotropic hormone (ACTH) levels than average.

Additionally, insomnia is linked with HPA axis overactivity and excess secretion of wakefulness hormones, including cortisol. Recurrent stress and subsequent HPA activation can lead to a state of hyperarousal similar to --or comorbid with-- psychiatric conditions such as generalized anxiety. To be sure, there are emotional and cognitive causes of HPA hyperarousal, and excess excitatory activity with neurotransmitters serotonin, dopamine, norepinephrine, and acetylcholine.

Insomnia, whether acute or chronic, has various presentations. For some, insomnia means continuous night waking. For others, it means difficulty falling asleep or early wakefulness. For many, chronic insomnia includes some combination of various presentations. It is also important to consider the energetic nature of the imbalance, which many depend on constitution and other factors. From an Ayurvedic perspective, excess Vata can lead to restlessness and anxiety, which may include insomnia. In Chinese Medicine, deficient yin can lead to restlessness and lack of groundedness, which may manifest as insomnia. Qi deficiency leads to lack of vitality in which someone may not have the reserves needed to relax and sleep. In that case, there may be night wakefulness (Bancroft, Betzy "Insomnia").

Herbal Therapeutics for Chronic Insomnia

Herbal goals for chronic insomnia depend largely on symptom presentations. Herbal goals can be drawn from the energetic presentation of the insomnia pattern. Energetics may vary person-to-person, and in general are irritated and tense and/or stagnant and damp. Chronic insomnia may be related to yin or Blood deficiency as well. Goals that follow could include the following: relax the musculoskeletal system; down-regulate HPA hyperarousal; support overall vitality; improve sleep quality and habits; reduce pain (if applicable); improve daytime energy levels; regulate cortisol release, and support mood. Where

relevant, it might also be appropriate to move stagnation, nourish Blood and Yin, support the liver, and address any related digestive or respiratory conditions (Henningsen, K. “Chronic Insomnia”). Herbal actions which support these goals include the following:

- Relaxing nervines, nervine tonics, and anxiolytics such as lemon balm, milky oats, chamomile, passion flower, skullcap, catnip, linden, california poppy, motherwort, and lavender
- Sedatives and hypnotics such as hops, valerian, california poppy, and kava
- Endocrine modulators
- Adaptogens such as reishi, ashwagandha, and jujube
- Nutritive tonics

Where applicable, it might also be appropriate to include antispasmodics and analgesics; respiratory tonics and bronchodilators; and/or relaxing carminatives.

In addition to energetically, herbal protocol can be further differentiated based on symptom presentation. For those who have trouble falling asleep, dryness, and a tense, fast pulse, relaxing nervines and adaptogens may be appropriate. Examples include hops, wood betony, lavender, dong gui, cal pop, milky oats, and shatavari. For those with restless sleep and occasional night waking, we would look for signs of Heat (heart palpitations, red tongue, nightmares, Liver heat). Herbs such as mugwort, mimosa, linden, hawthorn berry, and jujube would be appropriate. For those with a deficiency pattern--difficulty falling asleep, deficient Blood and Yin, general fatigue, night sweats-- building and relaxing herbs such as ashwagandha, dong gui, shatavari, white peony, and rehmannia are a good fit. For the pattern of menopausal hot flashes and waking to urinate, skullcap, passionflower, milky oats, shatavari, and jujube provide needed relaxing and cooling. The general protocol recommended by Kristin Henningsen in her lecture on Sept 7th, 2018 is to use adaptogens morning and midday and consume a relaxing tea 1-2 hours before sleep. Additionally, a calming to sedative tincture can be used before bed and for hyperarousal during the day (Henningsen, K. “Chronic Insomnia”).

Chronic Insomnia and Mental Wellbeing

There is a myriad of related research on the connections between chronic insomnia and mental health. To be sure, there is a two-directional relationship between sleep and mood.

A 2017 study by Lind et al. looked at the overlap between insomnia and so-called “externalizing disorders” such as ADD and ADHD to delve into the etiologic factors related to chronic insomnia and mood disorders. The study, titled “An examination of the etiologic overlap between the genetic and environmental influences on insomnia and common psychopathology”, showed substantial genetic overlap between insomnia and stable aspects of both internalizing disorders suggests that there may be few insomnia-specific genes and investigation into unique environmental factors is important for understanding insomnia development. (Lind et al., 2017). Similarly, a 2016 study titled “Insomnia and Relationship with Anxiety in University Students: A Cross-Sectional Designed Study” looks at the relationship between sleep disorders and anxiety.

The study concluded that there is a relationship and that comprehensive treatment for sleep issues should also include mental health care (Choueiry et al., 2016). A 2015 study titled “Herbal Medicine for Anxiety, Depression and Insomnia” recognizes the comorbidity of sleep disorders and mood disorders and researches various herbal protocols to address both issues. Key herbs highlighted in this article include: white peony root, rhodiola, bacopa, valerian, hops, ginkgo, california poppy, and others (Liu, et al, 2015). A 2015 systematic review of Chinese herbal protocols for insomnia titled “Updated clinical evidence of Chinese herbal medicine for insomnia: a systematic review and meta-analysis of randomized

controlled trials” looked at the efficacy and risks associated with modern Chinese herbal protocols and associated herbs. Though the study reported that further research was warranted, it concluded that herbal protocols for insomnia are safe and possibly helpful as monotherapy or adjunct to other insomnia treatments (Ni et al., 2015).

Additionally, a systematic review of nutritional and herbal support for insomnia and anxiety disorders concludes that herbs and nutritional changes may significantly reduce symptoms in both conditions. The review found strong evidence for passionflower and kava as well as supplements containing amino acids L-lysine and L-arginine. More research was needed for magnesium supplements and St. John’s Wort monotherapy, though the study concluded that more study was warranted. As treatments for anxiety symptoms and disorders. Magnesium-containing supplements and other herbal combinations may hold promise, but more research is needed before these products can be recommended to patients. St. John’s wort monotherapy has insufficient evidence for use as an effective anxiolytic treatment (Lakhan, S. E. et al. 2010).

Key Herbs

To highlight a few key herbs highlighted in the research:

Valerian (*Valeriana officinalis*)

Valerian can be useful for its antispasmodic and nervine relaxant actions. However, some people find valerian overly stimulating. The pharmacology of *Valeriana officinalis* is as follows: sesquiterpenes and sesquiterpenoids act as antispasmodics and sedatives along with iridoids and volatile oils. Namely, valerenic acid, isovaleric acid, valeric acid act as anti-spasmodics while valeranone and isovaleric acid act as sedatives. Scientific research on Valerian is inconclusive for its sedative qualities for severe insomnia and anxiety disorders, but indicates its usefulness in mild to moderate chronic insomnia (Nunes et. al 2011). Valerian combines well with other nervines and antispasmodics such as St. John’s Wort, lemon balm, chamomile, and skullcap. However, because of its stimulating action for some, Ember Peters, in their lecture at the Vermont Center for Integrative Herbalism, suggests starting with valerian as a simple to test responsiveness before combining in a formula.

Hops (*Humulus lupulus*)

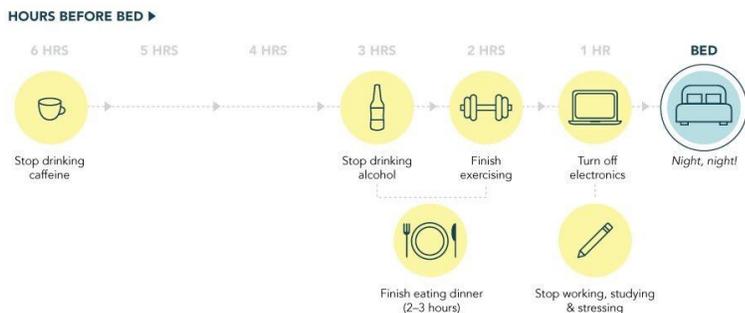
Hops has specific indications for restless and insomnia, and has historically been used for restlessness, insomnia, anxiety, nervous palpitations, and “a brooding disposition” (King’s dispensary). Clinical use

today includes hops as part of a formula for sleeplessness, anxiety, and insomnia in “hot-headed” people. The sedative effects of hops are likely due to its volatile oils (myrcene, caryophyllene, and humulene) as well as its flavonoids (xanthohumol, isoxanthohumol) as well as other anti-inflammatory and analgesic constituents.

In their lecture at the Vermont Center for Integrative Herbalism on April 27th, 2018, Ember Peters contrasts hops to other herbs used for anxiety and insomnia. Ember considers hops

The Perfect Night’s Sleep Starts Long Before You Get Into Bed

Searching for the ever-elusive perfect night’s sleep? Prevent sleep sabotage by sticking to this pre-bedtime timeline.



Sources: National Sleep Foundation, Michael A. Grandner, Ph.D., WebMD

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energetically opposite of valerian in some ways, since valerian will increase circulation to the brain. By contrast, hops is more of a bitter that works metabolically for a grounding effect, whereas valerian's sedative qualities are primarily through its antispasmodic actions. Similarly, the use of hops for anxiety patterns can be contrasted to passionflower (*Passiflora incarnata*). Passionflower is indicated for anxiety patterns that focus on worries, list-making, busy-ness whereas hops is more for plotting, brooding, and tumultuous emotions. Ember considers hops for people who need a "clobbering sedative" in patterns of chronic fatigue and insomnia that includes anxiety and depression. However, hops is not indicated for Cold presentations, but rather for insomnia with heat signs (Peters, E. "Hops" 2018)

Skullcap (*Scutellaria lateriflora*)

Skullcap is a relaxing nervine, antispasmodic, and nervous trophorestorative indicated for anxiety with tension and restlessness. It is specific for people who are sensitive to their environment, hold tension, experience panic attacks and unknown fears, feel overwhelmed without an outlet, and experience insomnia due to restlessness. Skullcap can be considered on a sedating spectrum as more mild than other sedatives like hops or kava. Skullcap allows a small "reset" to relax and go to sleep, but won't be as hard-hitting as other herbs in the sedative category. For energetic balance, it pairs well with more stimulating herbs like damiana or tulsi.

Skullcap's sedative action is likely due to its effects on GABA receptors in the brain which affect the serotonin-melatonin cycle. It's shown that flavonoids baicalin and baicalein bind to benzodiazepine site of GABA_A receptor in a way similar to benzodiazepine medications, but without the same concerns for dependence and withdrawal symptoms. Additionally, catalpal is a bitter constituent which increase adrenal cortical hormones and thus increase sex hormone synthesis, potentially improving hormone metabolism and modulating sleep cycles. A 2011 study by Sarris et al., looked at multiple herbs--including skullcap--for insomnia, depression, and anxiety. The study concluded that Skullcap's anxiolytic actions may be helpful for anxiety, depression, and insomnia (Sarris, et al, 2011).

Other nervine relaxants, anxiolytics, and nervine tonics include passionflower, motherwort, oats, ashwagandha, linden, kava and St. John's Wort. Other herbal strategies focus on reducing associate issues that affect sleep, including nutritives, adaptogens, and hormonal modulators. These same herbal actions may be helpful in mood dysregulation as well.

Supportive Strategies

There are other supportive strategies that may be helpful for chronic insomnia, including practicing good sleep hygiene. Rest-inducing sleep hygiene involves maximizing natural light exposure earlier in the day and minimizing light exposure as the evening progresses. This can look like exercising outdoors in the morning, and turning off electronics a few hours before bed. Good sleep hygiene also involves relaxing the mind before trying to sleep. This looks like taking a warm bath, deep breathing, light reading or yoga, journaling, or otherwise "chilling out". Making sure the body has a few hours to metabolize food, caffeine, and/or alcohol is also helpful.

Conventional treatment for insomnia includes pharmaceutical medication that can be habit-forming. These include GABA-a agonists such as Ambien, antidepressants, selective melatonin receptor agonists, benzodiazepines, and others. Though these medications undoubtedly provide needed support for many, they can also lead to unpleasant side-effects like morning grogginess. Strongly sleeping meds, like

benzodiazepines, can have long-lasting side effects on the brain if used chronically and long-term (Betzy Bancroft, 2017).

Though much of the scientific literature suggests that more research is needed, it is clear that there is value in using herbs and nutritional changes to address chronic insomnia and associated conditions, including depression and anxiety. There are several key herbs, such as valerian, skullcap, and passionflower, that have researched for the efficacy in reducing symptoms. It is clear that not every herb is appropriate for every person, so herbal protocol for chronic insomnia, especially when secondary to psychiatric and other health issues, need to be differentiated both energetically and physiologically.

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