Specialty Medicine Compounding Pharmacy

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Circadian Rhythm Disorders

As winter approaches and the days begin to shorten, our circadian rhythms can be affected by the decreased amount of daylight. Circadian rhythm is the body's internal "time clock" that regulates biological processes during a 24 hour time period. Circadian rhythms control the patterns of the sleep-wake cycle, body temperature, and hormone production. Circadian rhythms are controlled by chemicals produced in the hypothalamus of the brain and can also be affected by external cues, particularly daylight.

There are several factors that can temporarily disrupt a person's circadian rhythm. Among potential factors is the beginning or ending of daylight savings time, night shift work, traveling across time zones, pregnancy, and certain medications. These factors can often cause transient disruptions in sleep due to fatigue or insomnia.

Chronic disruptions of circadian rhythms can be the result of different factors. These include delayed sleep phase syndrome, advanced sleep phase syndrome, and non-24 hour sleep-wake syndrome. Delayed sleep phase syndrome (DSPS) is characterized by the inability to fall asleep when desired or at a "normal" socially accepted time. This results in staying up late and sleeping in late which can have a negative effect on a person's work and social life. Advanced sleep phase syndrome (ASPS) is the opposite of DSPS in which the person consistently falls asleep earlier than desired (defined as between 6pm and 9pm) and therefore awakens earlier than desired. This is less common than DSPS and tends to occur more commonly in elderly or depressed patients. Non-24 hour sleep-wake syndrome is characterized by a person having a circadian rhythm of longer than 24 hours, meaning that they will fall asleep later and later each day. This disorder is most commonly seen in patients who are blind but it can still occur in those with sight.

Patients with transient or chronic circadian rhythm disorders often experience daytime sleepiness, difficulty concentrating, headaches, and gastrointestinal issues. These disorders can be treated with lifestyle modifications, behavioral therapy, light therapy, and medications. Lifestyle modifications involve implementing proper sleep hygiene strategies such as avoiding napping during the day, using the bedroom only for sleep, following a consistent sleep-wake schedule, avoiding alcohol and caffeine at least 4 to 6 hours prior to bedtime, and engaging in regular exercise. If medication therapy is used, the choice of drug often depends on the type of circadian disorder. Melatonin is available over the counter and is often used to treat jet lag and other sleep disorders. There are several different classes of prescription sleep aids that can help in the initiation of sleep that is needed in some chronic circadian rhythm disorders.

Whether transient or chronic, circadian rhythm disorders can have a significant effect on all aspects of life. Though disruptions in circadian rhythms are often unavoidable, the best way to avoid any long term effects involve proper sleep hygiene whenever possible.

Cushing's Disease in Dogs

Cushing's disease, also known as hyperadrenocorticism, is a disease that primarily affects older dogs. The disease occurs when the adrenal glands make an excessive amount of corticosteroids. In a healthy dog, the pituitary gland in the brain releases a hormone called adrenocorticotropic hormone (ACTH) which travels through the blood and stimulates the adrenal glands to make and secrete corticosteroids. Corticosteroids are important hormones that are required for many functions of the body. When too many

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corticosteroids are produced, the effects can be detrimental to a dog's health. Cushing's disease can be the result of a problem with the adrenal glands or with the pituitary gland. Pituitary problems are more commonly the cause of Cushing's disease in dogs and account for about 85 percent of cases.

The average age of onset is around six to seven years, but the disease has been seen to occur in dogs as young as two years old. Some breeds are considered to be more susceptible to developing Cushing's disease including: poodle, beagle, Yorkshire terrier, boxer, German shepherd, Golden retriever, and Labrador retriever. Although these breeds are more likely to develop Cushing's disease, the disease can occur in any breed. Signs and symptoms of Cushing's disease present gradually and are often mistaken for normal aging. Symptoms include: increased thirst and urination, hair loss, thinning of the skin, increased appetite, increased abdominal size, muscle weakness, and calcified skin lumps. Dogs may experience one or a number of these symptoms. To diagnose Cushing's disease, your veterinarian should perform a complete blood count, a blood chemistry panel, and a urinalysis. Your veterinarian will also be able to perform tests to determine whether the problem is in the adrenal glands or the pituitary gland.

Cushing's disease is very treatable and dogs can continue to live active lives. There are a number of treatment options available. Surgery may be an option if the problem is found to be a tumor in the adrenal gland. If surgery is not an option, medications are effective in both adrenal and pituitary disease. These options include: mitotane, ketoconazole, and selegiline. Mitotane (Lysodren®) is the most common drug used to treat Cushing's disease resulting from a pituitary problem. This drug causes destruction of the adrenal gland resulting in a decreased hormone output. For dogs that do not respond to mitotane, ketoconazole is often used. Ketoconazole is an antifungal that also has properties that decrease hormone release. Unlike mitotane, ketoconazole is effective in both adrenal and pituitary dependent Cushing's disease. Trilostane (Vetoryl®) inhibits the synthesis of adrenal hormones and can be used in adrenal dependent or pituitary dependent Cushing's disease. Selegiline (Anipryl®) reduces the amount of ACTH released from the pituitary gland and is therefore used to treat pituitary dependent Cushing's disease.

Cushing's disease can occur in both cats and dogs; however it is more common in dogs. In cats, Cushing's disease is often seen with diabetes.

Boric Acid Use in Vaginal Fungal Infections

Boric acid is the most common form of the trace mineral boron. While the mechanism of action is largely unknown, boric acid is known to have antifungal and antibacterial properties. Boric acid capsules are often used as vaginal suppositories for the treatment of current and recurrent vaginal fungal infections. A recent study by Guaschino et al compared using boric acid vaginal suppositories with by mouth itraconazole for the treatment of recurrent vaginal fungal infections and found no difference between treatments. Another study performed by Ray et al studied the use of boric acid versus fluconazole in patients with diabetes and vaginal fungal infections and found that boric acid was more effective than fluconazole in resolving infection. In both of the mentioned studies, a dose of boric acid 600 mg twice daily was used. For the prevention of recurrent infection, a dose of 600 mg twice weekly is typically used.

Side effects reported from the use of vaginal boric acid include watery discharge, redness, and burning sensation. Boric acid vaginal suppositories should not be used in pregnancy because of the potential for birth defects.