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MENTAL HEALTH PHARMACEUTICAL POISONING IN DOGS AND CATS

Mental health plays a vital role in well-being, quality of life, and productivity for everyone. While there are many different modalities for supporting positive mental health, pharmaceutical use often puts our four-legged companions at risk for poisoning. Pet Poison Helpline receives a large volume of calls each year due to accidental ingestion of medications used for various mental health conditions. Below is a brief overview of common medications veterinary patients may be exposed to in the home.

Antidepressants and amphetamines

Written by Michelle Carlino, DVM, DABT, DABVT, Veterinary Toxicologist, Pet Poison Helpline

Antidepressants and amphetamines are medications frequently used in human healthcare and occasionally used in veterinary medicine. With the frequent use of pharmaceuticals to improve mental wellbeing, these medications are fairly common to have in the household, making accidental exposures in companion animals common. There are a variety of different antidepressants and the most common are categorized as tricyclic antidepressants (TCAs), serotonin reuptake inhibitors (SSRIs), serotonin norepinephrine reuptake inhibitors (SNRIs), or atypical antidepressants. TCA's include medications such as amitriptyline, clomipramine, doxepin, and nortriptyline. SSRIs include citalopram, fluoxetine, escitalopram, and sertraline. Examples of SNRIs are venlafaxine, and duloxetine. Atypical antidepressants include bupropion and mirtazapine. Amphetamines are prescription medications used for ADHD, narcolepsy, and occasionally obesity. They include drugs such as mixed amphetamine salts, lisdexamfetamine, dextroamphetamine, amphetamine and methamphetamine HCl. These medications are available in prompt release or extended-release formulations.

Amphetamines are sympathomimetic compounds that are structurally related to norepinephrine. They increase the release and decrease the storage of catecholamines such as norepinephrine and dopamine from presynaptic adrenergic nerve terminals. They also decrease the reuptake of these catecholamines through inhibition of monoamine oxidase. This increased concentration of catecholamines leads to the clinical effects seen with overdoses. There are several different classes of antidepressants, and their mechanism of action can vary depending on the individual drug. However, in general, these medications block the reuptake of neurotransmitters such as serotonin, norepinephrine, and/or dopamine. With high doses, this leads to excessive concentrations of these neurotransmitters in the synapses, causing toxicity. Clinical signs seen with amphetamine and antidepressant toxicosis include GI upset and CNS stimulation including

agitation, hyperactivity, restlessness, mydriasis, vocalization, tachycardia, hyperthermia, panting, hypersalivation, and serotonin syndrome.

On rare occasions, tremors and seizures may be observed as well.

Decontamination is ideal after ingestion of a toxic dose of amphetamines or antidepressants, if the timeframe is appropriate and the patient is stable and asymptomatic. Emesis may be attempted and activated charcoal may be indicated. Treatment is centered around symptomatic and supportive care based on the patient's clinical signs. With prompt treatment, patients tend to do well, and prognosis is good to excellent. If patients have protracted seizures or hyperthermia, prognosis is guarded. If complications such as DIC, rhabdomyolysis with acute kidney injury, or respiratory failure occur, prognosis is poor.

Selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors

Written by: Leah Swanson DVM, DABT, DABVT, Veterinary Toxicologist, Pet Poison Helpline

Selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs) are among the most commonly prescribed medications for the treatment of depression, anxiety, and various other mood disorders. These pharmaceuticals are widely used in both human and veterinary medicine and are generally well tolerated at therapeutic doses. However, overdose or inappropriate administration of these medications can lead to significant clinical signs due to increased monoaminergic (serotonin and norepinephrine) activity in the brain.

SSRIs selectively inhibit the reuptake of serotonin in the synaptic cleft, thereby increasing serotonin levels in the brain. Frequently prescribed SSRIs include fluoxetine, sertraline, escitalopram, citalopram, fluvoxamine, and paroxetine. In contrast, SNRIs such as venlafaxine, desvenlafaxine, and duloxetine, block the reuptake of serotonin and norepinephrine, increasing monoaminergic activity. The inhibition of reuptake for both serotonin and norepinephrine by SNRIs enhances their effectiveness but also carries an increased risk of more severe and complicated signs that develop in overdose situations.

Increased monoaminergic activity is therapeutically beneficial in treating mood-disorders by increasing serotonin and norepinephrine (as seen with SNRIs) in the brain. However, excessive stimulation, particularly with SNRIs, can result in significant gastrointestinal, neurological, and cardiovascular disturbances, reflecting a narrower margin of safety compared to SSRIs. The risk is further heightened with the co-ingestion of antidepressants that also increase monoaminergic activity, including tricyclic antidepressants (TCAs), monoamine oxidase inhibitors (MAOIs), and atypical antidepressants.

In cases of overdose, overstimulation of these receptors may result in serotonin syndrome. Clinical signs are variable but may include

vomiting, diarrhea, agitation, restlessness, ataxia, mydriasis, tremors, seizures, hyperthermia, tachycardia, and fluctuations in blood pressure.

Signs can develop within 1-12 hours, varying by specific drug and formulation, and persist for 24 to 48 hours.

In asymptomatic patients presenting within a few hours post ingestion, decontamination including induction of emesis and administration of activated charcoal may be of benefit. Clinical management for the symptomatic patient encompasses fluid therapy tailoring to gastrointestinal losses and hydration status, appropriate sedation, thermoregulation, and medications that antagonize serotonin receptors such as cyproheptadine when indicated. Additional supportive therapy may include gastrointestinal support, muscle relaxants, and anticonvulsants as needed.

With prompt recognition and appropriate symptomatic and supportive treatment, the prognosis in most cases is favorable. Early intervention and monitoring are important in minimizing complications and ensuring complete recovery.