

# Analgesic effects of gabapentin and buprenorphine in cats undergoing ovariohysterectomy using two pain-scoring systems: a randomized clinical trial - PubMed

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## Abstract

**Objectives** The aim of the study was to evaluate the analgesic efficacy of gabapentin-buprenorphine in comparison with meloxicam-buprenorphine or buprenorphine alone, and the correlation between two pain-scoring systems in cats. **Methods** Fifty-two adult cats were included in a randomized, controlled, blinded study. Anesthetic protocol included acepromazine-buprenorphine-propofol-isoflurane. The gabapentin-buprenorphine group (GBG, n = 19) received gabapentin capsules (50 mg PO) and buprenorphine (0.02 mg/kg IM). The meloxicam-buprenorphine group (MBG, n = 15) received meloxicam (0.2 mg/kg SC), buprenorphine and placebo capsules (PO). The buprenorphine group (BG, n = 18) received buprenorphine and placebo capsules (PO). Gabapentin (GBG) and placebo (MBG and BG) capsules were administered 12 h and 1 h before surgery. Postoperative pain was evaluated up to 8 h after ovariohysterectomy using a multidimensional composite pain scale (MCPS) and the Glasgow pain scale (rCMPS-F). A dynamic interactive visual analog scale (DIVAS) was used to evaluate sedation. Rescue analgesia included buprenorphine and/or meloxicam if the MCPS  $\geq 6$ . A repeated measures linear model was used for statistical analysis (P < 0.05). Spearman's rank correlation between the MCPS and rCMPS-F was evaluated. **Results** The prevalence of rescue analgesia with a MCPS was not different (P = 0.08; GBG, n = 5 [26%]; MBG, n = 2 [13%]; BG, n = 9 [50%]), but it would have been significantly higher in the BG (n = 14 [78%]) than GBG (P = 0.003; n = 5 [26%]) and MBG (P = 0.005; n = 4 [27%]) if intervention was based on the rCMPS-F. DIVAS and MCPS/rCMPS-F scores were not different among treatments. A strong correlation was observed between scoring systems (P < 0.0001). **Conclusions and relevance** Analgesia was not significantly different among treatments using an MCPS. Despite a strong correlation between scoring systems, GBG/MBG would have been superior to the BG with the rCMPS-F demonstrating a potential type II error with an MCPS due to small sample size.

## Publication types

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## MeSH terms

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- Animals
- Buprenorphine / administration & dosage\*
- Cat Diseases / drug therapy\*
- Cat Diseases / surgery\*
- Cats
- Gabapentin / administration & dosage\*
- Hysterectomy / adverse effects
- Hysterectomy / veterinary\*
- Ovariectomy / adverse effects
- Ovariectomy / veterinary
- Pain Management / veterinary
- Pain Measurement / veterinary
- Pain, Postoperative / drug therapy
- Pain, Postoperative / veterinary\*
- Random Allocation

## Substances

- Analgesics, Opioid
- Buprenorphine
- Gabapentin

## Dangerous Pet Medication Mixes to Avoid

By Jennifer Coates, DVM

Pets with multiple and/or serious health problems often end up taking many medications, and the more they take, the greater the risk that an adverse reaction might occur. Drug interactions develop as a result of changes in the body's ability to absorb, metabolize, or excrete medications (among other, less common reasons), but the effects fall into just two categories:

- A decrease in the effectiveness of one or more of the drugs
- An increased chance of unwanted side effects

Let's look at some of the drugs that can be involved in adverse interactions and what can be done to protect our pets.

### NSAIDs and Corticosteroids

Nonsteroidal anti-inflammatory medications (Rimadyl, Metacam, Deramaxx, Etogesic, etc.) and corticosteroids (prednisone, triamcinolone, dexamethasone, etc.) are two of the most frequently prescribed classes of medications in veterinary medicine. Unfortunately, when they are given at the same time, or even within a few days of one another, gastrointestinal problems are likely. Affected pets may have a poor appetite, vomiting, or diarrhea, and can develop ulcers that bleed or even create holes within the GI tract.

As a general rule of thumb, pets should never take NSAIDs and corticosteroids at the same time. If it is necessary for a pet who is on one of these types of medications to start taking the other, veterinarians will typically recommend a "wash-out" period of around five days or so to prevent interactions between the drugs within the pet's body.

### Cimetidine

Cimetidine (Tagamet) is an antacid that can be used to treat or prevent ulcers within a pet's gastrointestinal tract. It also inhibits (partially blocks) a specific type of enzyme called Cytochrome P450 (CYP). Many different medications use CYP as part of the process of being cleared from the body. Therefore, if you give a pet cimetidine and one of these other drugs (theophylline, aminophylline, lidocaine, and diazepam, to name a few), it is more likely that a pet will develop side effects similar to those seen with overdoses of the drug in question. For example, a pet who is taking cimetidine and theophylline may become hyper-excitable, have a rapid heart rate, or even develop seizures.

Cimetidine is not the only drug that inhibits CYP. Other commonly prescribed medications that have a similar affect include the antifungal drug ketoconazole, the stomach acid reducer omeprazole, and some antibiotics like erythromycin and enrofloxacin. If a drug interaction involving CYP is likely, an alternate medication should be used. For example, the antacids ranitidine (Zantac) and famotidine (Pepcid) can often be substituted for cimetidine.

### Phenobarbital

In comparison to cimetidine, phenobarbital presents the opposite problem when it comes to drug interactions. A commonly prescribed anti-seizure medication, phenobarbital makes the body produce more CYP enzymes, which increases the clearance and decreases the effectiveness of many types of medications, including digoxin, glucocorticoids, amitriptyline, clonipramine, theophylline, and lidocaine. This effect has been observed in dogs but not in cats.

Interestingly, phenobarbital's effect on CYP enzymes also increases the clearance of phenobarbital from the body. Therefore, many dogs require increases in their phenobarbital dose over time to maintain the same level of seizure control. To help determine if a pet is receiving an appropriate dose of a medication, veterinarians may monitor the amount present in the bloodstream, a procedure that is called therapeutic drug monitoring.

### Serotonin Syndrome

Serotonin is a neurotransmitter, a naturally occurring chemical within the brain (and other parts of the body) that affects the way in which nerves "talk" to each other. Several types of drugs commonly prescribed to pets increase serotonin levels within the brain, and when they are used together, their combined effect may result in a dangerous and possibly fatal reaction called serotonin syndrome.

Drugs that can play a role in serotonin syndrome in pets include Anipryl (selegiline or L-deprenyl), Mitaban and Preventic (amitraz), Clomicalm (clomipramine), Reconcile and Prozac (fluoxetine), and amitriptyline. These medications should not be given concurrently and wash-out periods that last several weeks may be necessary when switching from one to another. Symptoms of serotonin syndrome include poor appetite, vomiting, diarrhea, abdominal pain, elevated heart rate and body temperature, tremors, twitching, unsteadiness, blindness, high blood pressure, and death.

## **Preventing Drug Interactions in Pets**

Of course, there are many more drug interactions than those mentioned here. To protect your pets, make sure to keep your veterinarian up-to-date on all the pet medications (including supplements, over-the-counter products, unusual ingredients in the diet, etc.) that you are currently giving. If your pet's health takes a turn for the worse and a cause can't be quickly identified, it doesn't hurt to ask whether a drug interaction is a possible culprit. Unfortunately, veterinary-specific research is rather spotty in this area, so less common drug interactions are sometimes diagnosed using information taken from the field of human medicine or simply by modifying a pet's medications to see if that solves the problem.