

Dexamethasone Use in Virginia Opossums

AT A GLANCE

- Dexamethasone is a corticosteroid and glucocorticoid used frequently in small- and large-animal medicine for its anti-inflammatory and immunosuppressive effects.
- Like all corticosteroids, dexamethasone can have serious side effects.
- Long-term use and use before surgery have been shown to induce hyperglycemia in some species, but it is unknown if isolated doses would cause this in the Virginia opossum.
- Efficacy in cases of head trauma is questionable, though dexamethasone may be used to prevent swelling.
- Best and safest use in the opossum is likely a single dose to address inflammation and/or swelling.
- Recommended dosing is highly variable and should only be administered per the specific instructions of a qualified attending veterinarian.

Drug Class

Dexamethasone is a potent synthetic corticosteroid used frequently in both large- and small-animal veterinary medicine. It is roughly 25-30 times more potent than naturally-synthesized cortisol.¹ Corticosteroids can be classified as either glucocorticoids, like dexamethasone, or mineralocorticoids. The main difference between the two is that synthetic glucocorticoids have metabolic as well as anti-inflammatory and immunosuppressive effects.² Glucocorticoids are used most often to control inflammation and in doing so can be effective pain-relievers. (*Note: Dexamethasone is not to be confused with dextromethorphan, an antitussive drug also used in veterinary medicine.*)

Uses

In small-animal medicine, dexamethasone is often a first-choice drug in cases of anaphylaxis, less severe allergic reactions, and asthma. It may be used in emergency situations involving serious trauma or shock, though its use for the latter is somewhat controversial.³ The anti-inflammatory and immunosuppressive effects of dexamethasone also make it a viable option for treatment of common autoimmune disorders (such as immune-mediated hemolytic anemia), certain neurological conditions, and even some cancers.

Available Forms

Dexamethasone may be given orally, topically, by injection, or by inhalation. Topical formulas may be used to treat inflammatory skin and eye ailments.¹ When given by injection, a dexamethasone sodium phosphate solution (4 mg/ml, which is equivalent to 3 mg/ml of straight dexamethasone solution) is used due to its suitability for intravenous administration. This is the form recommended for use in opossums by Dr. Anita Henness of the National Opossum Society (NOS).⁴ Her recommended dosing regimen and administration methods are included in Figure 1 on page 3.

Corticosteroids vs. NSAIDs

Both corticosteroids and NSAIDs have anti-inflammatory action. Corticosteroids are also immunosuppressive and may also have metabolic effects, while NSAIDs are used to reduce inflammation and fever. These are entirely different classes of drug that have vastly different mechanisms of action. NSAIDs should not be used in concert with corticosteroids due to risk of ulceration in the stomach and/or intestines.⁵ For example, dexamethasone and Metacam should never be administered at the same time.

Safety and Efficacy Concerns

All corticosteroids can potentially induce severe side effects including polyuria/polydipsia, ulceration, and, as a result of immunosuppression, secondary infections and/or delayed wound healing. Dexamethasone use is not advised in animals prone to ulcers or infections, diabetic animals, or those with renal disease or in renal failure.³ Dexamethasone should not be used with other corticosteroids or NSAIDs. Dexamethasone may also upset calcium and potassium levels, leading to electrolyte imbalance,¹ in patients taking furosemide for cardiac concerns, such as elderly and/or male opossums. Its use in such instances is therefore not recommended. There is also experimental evidence that dexamethasone may induce a hyperglycemic state in several species. One study found that goats became hyperglycemic after long-term, low-dose administration of dexamethasone,⁶ while another study in dogs suggested that a single dose of the drug before surgery achieved an elevation in blood glucose 45 minutes post-operation.⁷ It is unclear if a single dose administered to an opossum under non-surgical conditions would be enough to induce hyperglycemia, and Sanctuari will advise further on this topic in the future should more information become available.

Steroids for Head Trauma

There is some confusion among rehabilitators as to the safety of steroid use in head trauma cases, and both veterinary and human medicine lack definitive treatments for this type of injury. Historically,

glucocorticoids were routinely used for nervous system trauma to prevent secondary brain injury,⁸ though the literature is divided on this topic, and any beneficial effects of this class of drugs in trauma cases are still under investigation. Some veterinarians use anti-inflammatory doses of dexamethasone (0.1 mg/kg) when treating a traumatic brain injury if there is significant swelling present.⁹ When consulted on the potential danger of steroid use in head trauma cases, an affiliated veterinarian informed Sanctuari that while dexamethasone itself would not be their treatment of choice, they would consider using other corticosteroids for such injuries in their practice.

Dosing

Recommended dosage of dexamethasone depends on the condition being treated, and references are incredibly varied. Some claim inflammation is best treated at a general range of 0.1-0.2 mg/kg of bodyweight, while immunosuppression can be induced at a higher dose of 0.2-0.5 mg/kg.³ Dr. Hennessy's recommendations are widely variable, with her advised dosage ranging from approximately 0.07 mg dexamethasone/kg to 1.3 mg/kg, once to twice daily. Due to the severe side effects possible with glucocorticoid use, she urged rehabilitators to exercise caution when administering to opossums.⁴ One of Sanctuari's consulting veterinarians regularly uses an anti-inflammatory dose of 0.20 mg/10 lbs (approximately 0.045 mg/kg) with reported success, while some small animal literature suggests a higher dosage of 0.07-0.15 mg/kg once to twice daily for inflammation. The same literature cites 0.125-0.250 mg/kg once daily as appropriate therapy for immunosuppression. Cats typically receive a higher dose.³

Figure 1: Glucocorticoid dosing for Virginia opossums per Dr. Hennessy of the National Opossum Society

| GLUCOCORTICOIDS | | | |
|--|--|---|--|
| NAME | ACTIONS and/or INDICATIONS | PRECAUTIONS and/or ADVERSE EFFECTS | DOSE, FREQUENCY, ETC. |
| Prednisone Prednisolone Tabs and injectable in variety of sizes, etc. | <ul style="list-style-type: none"> - Various uses, best for: - Shock - Specific dermatologic diseases and/or immunologic disorders <p><u>Do not</u> use for flea bite allergic dermatitis! Hemorrhagic gastritis a frequent complication.</p> | <ul style="list-style-type: none"> - EXTREME CAUTION!! The opossum is susceptible to gastric ulceration with prolonged use or doses beyond the minimum to accomplish one's purpose. - Discontinue use as soon as possible, or use other treatment measures (where available) so you can decrease dose. | PO or SQ <u>Max.</u> 1-2mg/lb. no more than 2 days. <u>then</u> 0.25-0.5mg (or less)/lb. every other day. |
| Dexamethasone Tabs and injectable in variety of sizes, etc. Dexamethasone Sodium Phosphate 4mg/ml is preferred. | <ul style="list-style-type: none"> - Same as above; more commonly the drug of choice in shock. - Longer duration and effect. | <ul style="list-style-type: none"> - ALL OF ABOVE APPLIES!! It is if even more importance to use this drug cautiously <u>because</u> of its longer duration. | Phosphate form: SQ More usual route. 0.01-0.2(or less)/ml/lb. Or 0.04-0.9mg/lb. <u>Once</u> , then decrease dose as above. |

Hennessy, A., DVM. (1998). "Medications for Opossums" *POSSUM TALES*, 11, 2-3

Current Recommendations

Again, dosing of dexamethasone is highly variable and condition-dependent, and literature is divided. Sanctuari continues to investigate. Use and proper dosage in opossums should only be determined by a veterinarian familiar with the patient receiving this medication.

Sanctuari is always striving to keep its content current. If you have questions or additions you would like to ask or offer, contact us at sanctuari.org@gmail.com and reference the title of this piece.

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