Top 5 Corticosteroids for Use in Emergency Settings

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Corticosteroids are a diverse group of medications used to treat a wide array of illnesses. At lower dose ranges, they provide anti-inflammatory effects, whereas higher doses are immunosuppressive. These properties make them valuable tools in the emergency and critical care setting. Clinicians must be familiar with the appropriate indications for each drug, along with their relative potencies and adverse effects. Following are the author's top 5 corticosteroids used in emergency settings.

1 Prednisone/Prednisolone

Prednisone is used for both anti-inflammatory and immunosuppressive purposes because of its effectiveness, low cost, small tablet size, innocuous taste, and variable dose sizes.

When used for anti-inflammatory effects, prednisone is administered at 0.5-1.0 mg/kg/day, often for only a few days to limit local or systemic inflammation.[1-3] Inflammatory or traumatic disorders of emergency patients (eg, oropharyngeal trauma, oropharyngeal biopsy, decompensation secondary to laryngeal collapse or tracheal collapse) are often short in duration, and treatment with steroids for 2 to 3 days allows

TOP 5 CORTICOSTEROIDS FOR USE IN EMERGENCY SETTINGS

1. Prednisone/Prednisolone
2. Dexamethasone Sodium Phosphate
3. Hydrocortisone
4. Methylprednisolone Sodium Succinate
5. Fluticasone

the initial insult or exacerbation to subside. In patients with transient inflammatory disorders, the common side effects of steroids (see ***Glucocorticoid Adverse Effects***) are mild because of the relatively low dose and short duration of treatment.[3]

Immunosuppressive doses of prednisone range from 1-2 mg/kg q12h.[1,4] Some overlap of the dosing ranges for anti-inflammatory and immunosuppressive effects may be noted, most likely because those effects are not entirely distinct.

Steroids, particularly prednisone, are used to treat many autoimmune disorders, including immune-mediated hemolytic anemia, immune-mediated thrombocytopenia, and immune-mediated polyarthropathy. Because these diseases often require long-term treatment with high doses of steroids, adverse effects are more common. A second or third immunosuppressive agent is often used with prednisone to maintain immunosuppression and allow rapid reduction of prednisone doses to maintenance levels.

Because cats and animals with severe hepatic disease have difficulty converting prednisone into the active metabolite prednisolone, some sources suggest that prednisolone may be a better choice in these patients.[5,6]

GLUCOCORTICOID ADVERSE EFFECTS

- Polyuria/polydipsia
- GI ulceration
- Increased liver enzyme activity
- Muscle atrophy
- Weakness
- Insulin resistance and hyperglycemia
- Symmetric hair loss
- Panting
- Polyphagia
- Impaired wound healing
- Hypercoagulability/thromboembolism

2 Dexamethasone Sodium Phosphate

Dexamethasone is often used as the first-line steroid for urgent conditions because it has a rapid onset of action and can be administered parenterally.[1,2] Most patients that require continued steroid therapy are switched to oral prednisone. Dexamethasone is approximately 7 times more potent than prednisone, so the prednisone dose should be approximately 7 times greater than an equivalent dexamethasone dose.[1,2] For example, a patient receiving 5 mg dexamethasone would be switched to 30-35 mg prednisone.

When using different steroids, clinicians must be careful to recognize the relative glucocorticoid potency of each drug.[1,2] Dexamethasone has a longer duration of action than other steroids.[1] When switching from injectable dexamethasone to an oral steroid, the oral steroid is usually started 24 hours after dexamethasone has been discontinued. Dexamethasone does not affect cortisol assays, so it can be administered to patients with suspected hypoadrenocorticism before an ACTH stimulation test or before blood is obtained for cortisol testing. However, continued use of dexamethasone (or any other steroid) will suppress the hypothalamic-pituitary-adrenal axis, which in turn will suppress endogenous cortisol concentrations.[1]

3 Hydrocortisone

Many topical medications contain hydrocortisone as an anti-inflammatory agent. Even with topical application, some systemic absorption of hydrocortisone can occur.[7] Hydrocortisone is used in shampoos and in various topical, ocular, and otic preparations to manage superficial irritation.

Hydrocortisone is also an appropriate treatment choice for critical illness-related corticosteroid insufficiency (CIRCI; formerly relative adrenal

insufficiency). CIRCI affects patients with severe sepsis that are hypotensive despite fluid therapy and vasopressor support. In some CIRCI patients, low doses of IV corticosteroids can improve blood pressure.[8,9] Because there is no consensus on how best to diagnose this syndrome, an appropriate response to therapy is used as a surrogate for an objective diagnosis. The best treatment of CIRCI is not established, but hydrocortisone has been used at 0.5-1.0 mg/kg IV q6h or as a CRI at 2.5-3.0 mg/kg/day.[9,10] If blood pressure improves within 24 hours of starting hydrocortisone, steroid supplementation should be continued at a tapering dose for approximately 1 week.[9,10]

4 Methylprednisolone Sodium Succinate

IV methylprednisolone sodium succinate (MPSS) is often administered to dogs and cats with acute spinal cord injury before and after a decompressive spinal surgery. Strong opinions for and against the use of MPSS (and other steroids) exist within the veterinary community, despite the lack of evidence to support its benefits.[11,12] The human literature also shows little consensus regarding the use of MPSS for acute spinal cord injury.[2] The potential benefits of MPSS are likely associated with the limitation of ischemic and oxidative damage in the area of the damaged spine.[2] Side effects of aggressive MPSS therapy include diarrhea, vomiting, melena, hematemesis, and anorexia.[13] MPSS should be considered only when it can be administered within 8 hours of the initial injury.[2,14] The author suggests 2 protocols for administration of MPSS. Both require an initial loading dose of 30 mg/kg IV followed either by a decreased dose (15 mg/kg) in 2 hours and then 8 hours after the initial bolus or by a CRI of 5.4 mg/kg/hr for 24 hours.[2]

5 Fluticasone

Fluticasone is the most commonly used inhaled steroid of those available.[15] Because they can be delivered directly to the site of inflammation with minimal systemic absorption, inhaled steroids are used to efficiently treat inflammatory pulmonary diseases in dogs and cats (eg, asthma, chronic bronchitis, eosinophilic bronchopneumopathy).[15-17]

Although it can take 1 to 2 weeks for inhaled steroids to decrease inflammation, clinicians commonly begin this course of therapy at the time of diagnosis, which is often in the emergency room.[15] Most of these inflammatory pulmonary conditions are initially managed with oral steroids, but treatment is switched to inhaled steroids as soon as possible to avoid side effects. Pet owners should be shown how to use the inhaler and delivery chamber (preferably species-specific) while their pet is still in the clinic to provide them with multiple opportunities for supervised practice. Hands-on instruction can increase owner confidence in performing this technique at home and can hasten the transition from oral to inhaled steroids. Fluticasone is available through human pharmacies.

Conclusion

Corticosteroids comprise a broad group of pharmacologic agents with a choice of administration routes. In the critical care setting, these drugs treat conditions ranging from allergic reactions to acute soft tissue inflammation, autoimmune disease, asthma, spinal cord injury, and vasopressor nonresponsive hypotension in sepsis. Corticosteroids cause predictable dose-dependent side effects but remain a valuable drug class for use by critical care and emergency clinicians.

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Corticosteroids cause predictable dose-dependent side effects but remain a valuable drug class for use by critical care and emergency clinicians.

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