

# Perioperative Stress Dose Steroid Pathway

**Pathway Purpose:** To guide the management of glucocorticoid treatment in the peri-operative period for patients on chronic steroid therapy, using standardized stress-dose steroids for high-risk individuals. It aims to prevent perioperative adrenal crisis, aiming for zero occurrences and contributing to reduced morbidity.

## Inclusion Criteria:

Patients undergoing procedures with anesthesia who have:

- **Adrenal insufficiency or are on chronic systemic steroids (including oral synthetic steroid vamorolone (Agamree®)), defined as:**
  - The use of at least 2 weeks of systemic steroids (any dose) during the 1 month prior to the procedure
- **“Partial” adrenal insufficiency, defined as:**
  - Borderline hypothalamic-pituitary-adrenal (HPA) axis testing
  - No use of maintenance steroids
  - Use of stress dose steroids only

Diagnoses may include, but are not limited to, congenital adrenal hyperplasia, primary adrenal insufficiency, and hypopituitarism

## Exclusion Criteria:

- Patients < 1 year of age
- Hematology, oncology patients
- Patients who have undergone ANY organ transplant (i.e. stem cell, kidney, liver, small bowel, heart, lung)

1. Review any endocrinology or primary steroid prescribing team stress dose steroid recommendations in progress notes and care coordination notes. Please note that not all patients on chronic steroids are followed by endocrinology.
2. Contact primary steroid prescribing team to confirm plan based on recommendations, or to discuss plan if no recommendations identified on review. Primary team to consult endocrinology if unsure of perioperative recommendations.
3. If patient is on daily steroids, ensure patient continues to receive prescribed daily steroids without delay in dosing

Please review the pre-anesthesia evaluation note. If the patient is evaluated by the Pediatric Anesthesia Resource Center (PARC), PARC will consult primary steroid prescribing team as needed and will place the recommendations in the pre-anesthesia evaluation note.

## What is the procedure type?

### Superficial/Minor Procedures

Including, but not limited to, non-invasive procedures such as imaging studies (MRI, CT) and minimally invasive procedures such as myringotomy tube placement, lumbar puncture, biopsy, and vascular access

Anesthesiologist will give ONE of the following:

1. Hydrocortisone IV 0.8 mg/kg, maximum dose 100 mg  
OR
2. Otolaryngology airway edema prophylaxis (dexamethasone IV 0.5 mg/kg, maximum dose 12 mg)  
OR
3. Postoperative nausea and vomiting prophylaxis (dexamethasone IV 0.1 mg/kg, maximum dose 12 mg)

### Moderate/Major Procedures

Including but not limited to subtotal colectomy, abdominoperineal resection, trauma, and total joint replacement

If emergent dose required: give hydrocortisone IV 2 mg/kg, maximum dose 100 mg

Follow primary steroid prescribing team recommendations within 6 months of procedure or more recently if there were changes in daily steroid dosing. If not available or clarification required, primary team to consult endocrinology

- OR
1. Give otolaryngology airway edema prophylaxis (dexamethasone IV 0.5 mg/kg, maximum dose 12 mg)  
OR
  2. Give postoperative nausea and vomiting prophylaxis (dexamethasone IV 0.1 mg/kg, maximum dose 12 mg)



Owner: Genevieve D'souza (Anesthesia/PARC), Sejal Shah (Endocrine)  
Pathway Team: Ellen Wang (Anesthesia/PARC), Julianne Mendoza (Transplant Anesthesia)  
Pathway Liaison: Claudia Algaze, MD  
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Associated Policies: none

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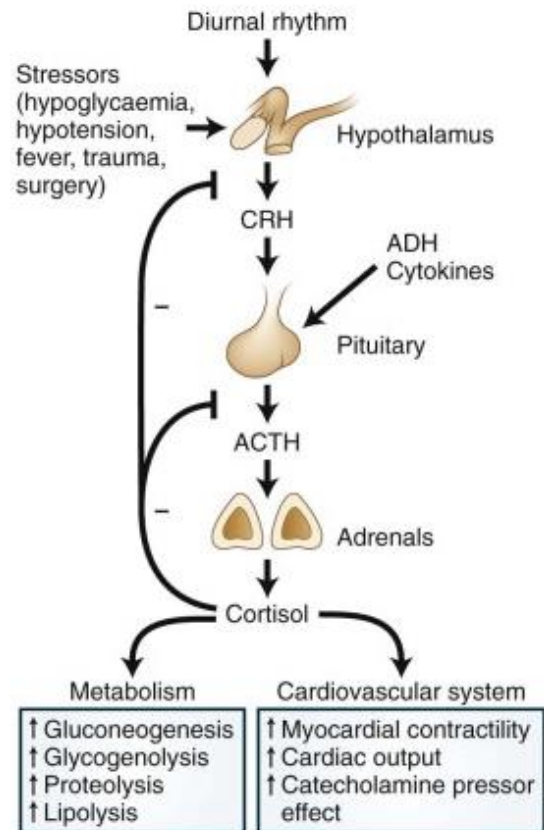
## Pathophysiology

### Primary Adrenal Insufficiency

- adrenal glands are affected
- glucocorticoid and mineralocorticoid deficiency
- fatigue, anorexia/nausea, hyperpigmentation, low serum sodium, low glucose, high potassium, hypotension

### Secondary Adrenal Insufficiency

- pituitary gland/hypothalamus is affected from endogenous cause or from chronic exogenous steroid use
- glucocorticoid deficiency
- fatigue, anorexia/nausea, hypotension



## Pathway Rationale

Chronic glucocorticoid therapy can suppress the hypothalamic-pituitary-adrenal (HPA) axis and, during times of stress such as surgery, the adrenal glands may not respond appropriately. However, a balanced approach is needed, as overtreatment with steroids is also not indicated. Perioperative glucocorticoid coverage should be determined based upon the patient's history of glucocorticoid intake, as well as the type and duration of surgery planned. Full recovery of the HPA axis can take 3-6 months.

Prevention of acute adrenal insufficiency includes maintenance of glucocorticoid replacement therapy as well as clear and consistent guidelines for caregivers and providers regarding appropriate stress dosing during illness and/or procedures to prevent and treat adrenal crisis. Patients may be at increased risk for adrenal insufficiency in the perioperative period due to nausea, or changes in appetite or gastrointestinal absorption.

## Physiologic Dosing and Steroid Potency

Physiologic dosing of hydrocortisone is 7-12 mg/m<sup>2</sup>/day. To facilitate calculations in the clinical setting, the pathway team has estimated that hydrocortisone 0.8 mg/kg approximates a 30 mg/m<sup>2</sup>/dose.

Dexamethasone is 40-70 times more potent than hydrocortisone. Typical dosing for postoperative nausea and vomiting prophylaxis of dexamethasone 0.1 mg/kg ≈ hydrocortisone 4 mg/kg which approximates a 100 mg/m<sup>2</sup>/dose.

### References:

- Taylor LK, et al. "Cortisol Response to Operative Stress With Anesthesia in Healthy Children." *Clin Endocrinol Metab*, September 2013, 98(9):3687-3693.
- Kohl BA, Schwartz S. "How to Manage Perioperative Endocrine Insufficiency." *Anesthesiol Clin*. 2010 Mar;28(1):139-55
- Liu MM, et al. "Perioperative Steroid Management: Approaches Based on Current Evidence." *Anesthesiology*. 2017 Jul;127(1):166-172.
- Rains PC, et al. "Cortisol response to general anaesthesia for medical imaging in children." *Clin Endocrinol (Oxf)*. 2009 Dec;71(6):834-9.