

Perioperative Medicine: Management of chronic steroids

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Your patient

Ms. L is a 55 year-old F w/ h/o RA who presents for pre-op evaluation for right hip arthroplasty for avascular necrosis of the right hip.

Current medications:

Methotrexate 20mg/week

Etanercept 50mg/week

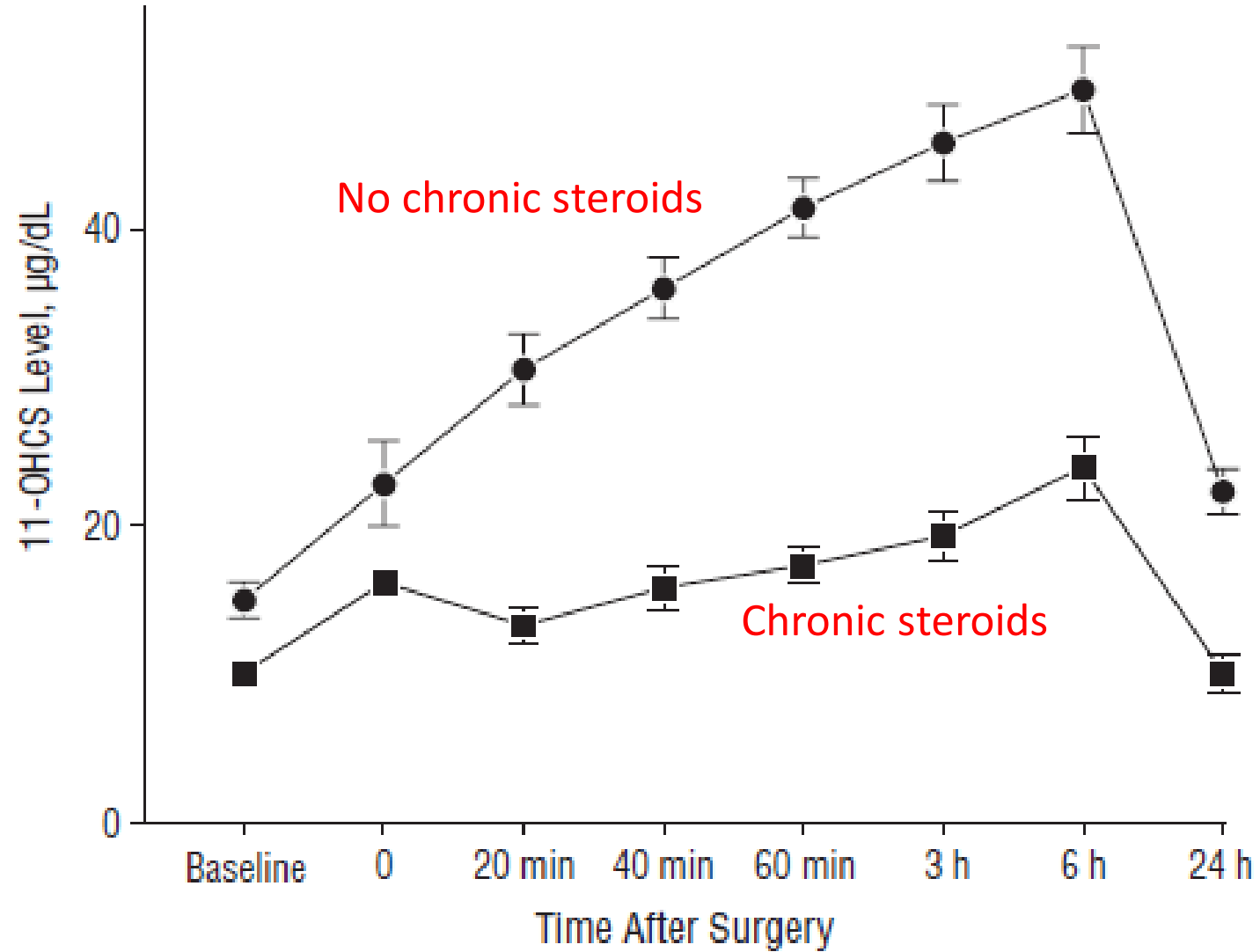
Prednisone 10mg daily

She receives long steroid tapers or bursts 2 times per year.

Adrenal Physiology

- Baseline daily cortisol secretion $\sim 5.7 \text{ mg/m}^2$
- Surgical stress increases baseline secretion
 - Has high as 50-200mg of cortisol²
- Exogenous steroids inhibit CRH and ACTH secretion (HPA axis)
 - Adrenal atrophy may result and blunt normal stress response

Adrenal Physiology



Perioperative adrenal insufficiency

- Incidence reported to be 0.01% to 0.7%¹
- Symptoms include nausea, vomiting, muscle cramps, weakness, dizziness
- Signs include hypotension, leading to shock/CV collapse and death

Secondary adrenal insufficiency

Assume HPA suppression

- Greater than 20mg/day prednisone > 3 weeks
- Clinically Cushingoid

Assume no HPA suppression

- Any daily dose < 3 weeks
- Less than 5mg/d prednisone for any duration
- Alternate day regimen

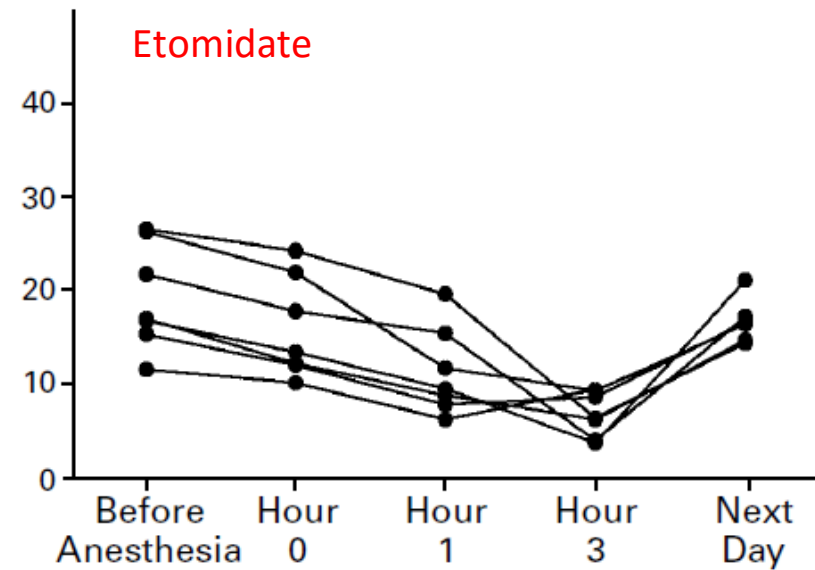
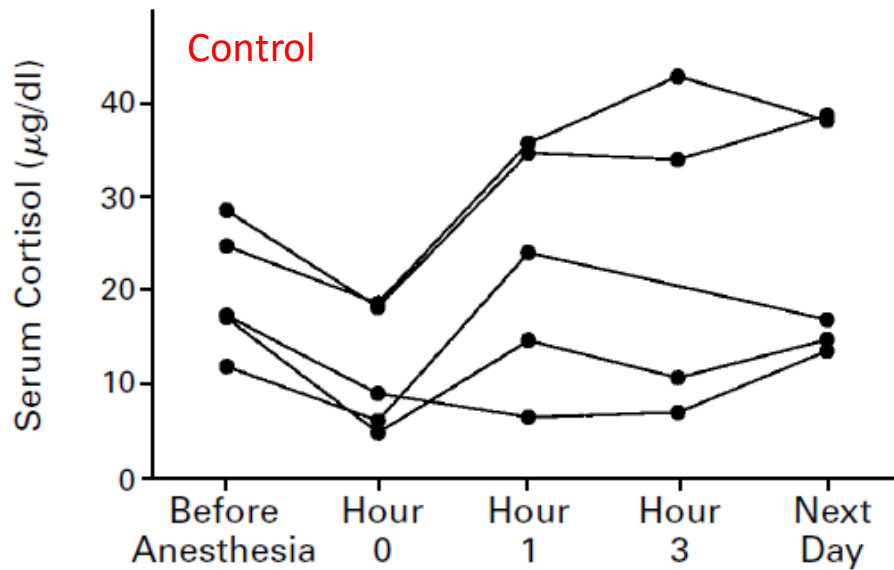
Secondary adrenal insufficiency

Intermediate risk of suppression

- Prednisone 5-20mg daily
- Inhaled glucocorticoids¹
 - ≥ 750 mcg daily of fluticasone; > 1500 mg/daily of others
- Topical steroids
 - ≥ 2 g/day of high potency or super high potency topical corticosteroids
- Significant/intermittent use of oral steroids over the last year

Contributing factors

- Etomidate inhibits the conversion of 11β -deoxycortisol into cortisol (\downarrow cortisol synthesis) for up 48 hours after single intubating dose



Pre-operative testing for adrenal suppression

- Can be considered in patients with intermediate use of steroids
 - Not routinely recommended, because...
- Poor sensitivity for secondary adrenal insufficiency (57%)¹
- Positive testing is not correlated with clinical outcomes
 - Correlated with poor intra- and postoperative cortisol response (labs)

Testing

- Morning cortisol
 - <5 mcg → likely suppressed
 - >10 mcg → likely not suppressed
- ACTH stimulation test
 - Hold morning steroid dose
 - Check cortisol 30 min after 250mcg of cosyntropin
 - >18 mcg → not suppressed

Data on use of stress dose steroids

- No formal guidelines
- Marik, et al. systematic review (2008)¹
 - 2 RCTs and 7 cohort studies
 - 315 patients and 379 surgical procedures
- One additional RCT published in 2014 comparing “high-dose” stress dose steroids vs. “low-dose” stress dose steroids²

1. Marik PE and Varon J. Arch Surg. 2008;143(12): 1222-1226

2. Zaghiyan K, et al. Ann Surg. 2014;259:32–37

Data on use of stress dose steroids

- No study has reported a statistically significant difference in hypotension when patients are treated with their chronic steroids alone compared to chronic steroids + stress dose steroids¹
- No data on adverse effects of steroid use
- No difference between “high-dose” and “low-dose” stress dose steroids²

1. Marik PE and Varon J. *Arch Surg.* 2008;143(12): 1222-1226

2. Zaghiyan K, et al. *Ann Surg.* 2014;259:32–37

Important ?'s when obtaining steroid exposure history

- Indication for steroid use (acute or chronic)
- Current steroid type and dose
- Duration of steroid therapy (present or past)
- History of underlying disease flare with steroid cessation
- History of adrenal insufficiency with steroid cessation

Clinical use of stress dose steroids

- Patients with PRIMARY adrenal insufficiency require stress dose steroids to prevent adrenal crisis
 - Includes patients with primary adrenal failure, congenital adrenal hyperplasia, hypopituitarism, and adrenalectomy

Clinical use of stress dose steroids

- No universal agreement on use and dosing of stress dose steroids in patients on chronic steroids
- *Given theoretical risk of adrenal insufficiency and absence of data on adverse effects of steroids, seems reasonable to administer to high risk patients*
- Patients should be continued on chronic steroid dose perioperatively

Steroid equivalents

Name	Equivalent dose (mg)
Hydrocortisone	20
Prednisone	5
Prednisolone	5
Methylprednisolone	4
Dexamethasone	0.75

Recommendations for stress dose steroids*

All patients should continue their home steroid regimen

Prednisone (mg/day)	Surgical Stress		
	Minor (ie. inguinal hernia)	Moderate (ie. colectomy, hysterectomy, joint replacements)	Major (ie. CABG, Whipple, multiple traumas)
≤ 5	None	None	None
6-20	None	Hydrocortisone 25mg IV x 1	Hydrocortisone 50mg IV x1, +/- taper
> 20	None	Hydrocortisone 25mg IV Taper over 1-2 days	Hydrocortisone 50mg IV Taper over 2-3 days

* Suggested approach, based on “expert” opinion

Ms. L

- Continue prednisone 10mg daily through surgery
- Hydrocortisone 25mg IV x 1 pre- or intra-operatively
- Discuss with surgical team and anesthesia

Take Home Points

- Determine steroid use over last 12 months
- Patients should continue home steroids in the perioperative period
- Testing for adrenal insufficiency is not recommended
- Dosing based on chronic steroid dose, surgical risk, history of post-op stressors (n/v, pain)
- Discuss with surgeon and anesthesiologist

References

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