University College London Hospitals
NHS Foundation Trust

Prevention and Management of Adrenal Crisis (Adults)

Omission of steroids in patients with **Adrenal Insufficiency (AI)**, or if not dose adjusted during physiological stress (e.g. intercurrent illness or surgery), can lead to adrenal crisis. Failure to identify and appropriately treat adrenal crisis is life-threatening. See Society for Endocrinology Guidelines and Adrenal Crisis Information Page for further information

PREVENTION OF ADRENAL CRISIS

Patients AT RISK of Adrenal Crisis
(list not exhaustive: see Society of Endocrinology Guidelines)

Primary AI: Addison's disease, congenital adrenal hyperplasia, bilateral adrenalectomy, bilateral adrenal haemorrhage, bilateral adrenal metastases

Secondary/Tertiary AI:
Pituitary disease, hypothalamo-pituitary damage from tumours or surgery, drug induced, exogenous steroids (**see page 2 for patients at risk**)

Risk increased during intercurrent illness, surgery, childbirth or interruption in glucocorticoid replacement therapy

Intercurrent illness
Moderate intercurrent illness (e.g. fever, infection, vomiting, diarrhoea)
- Hydrocortisone 20mg stat dose, followed by 10mg every 6 hours (or prednisolone 5mg BD)
  [See guidance on Sick Day rules for more information]

Severe intercurrent illness (e.g. persistent vomiting, sepsis), acute trauma: Follow **MANAGEMENT of Adrenal Crisis** box

Peri-operative management
(for detailed advice see full peri-operative guidelines and use Epic SmartPhrase)
- **All patients at risk of AI should be given extra glucocorticoid when undergoing surgery or an invasive diagnostic procedure.**
- Consider '*first on the list*' priority for all AI patients in order to minimise fasting or dehydration
- Liaise with the Endocrinology team when planning elective surgery, and when caring for post-surgical cases.

Use **'Adrenal Crisis' order set** on Epic:
Hydrocortisone (sodium succinate) 100 mg IV (or IM) on induction, followed by:
- 50 mg IV or IM 6 hourly, or
- 200 mg over 24 h continuous IV infusion (if practical)

Never omit or delay doses
- Continue this regimen while NBM or if postoperative vomiting
- Resume '*double*' regular oral dose for 2-7 days depending on type/extent of surgery (**See Epic SmartPhrase**)
- Please refer to endocrinology for further advice [redacted]

MANAGEMENT OF ADRENAL CRISIS

Signs and Symptoms of Adrenal Crisis
- Fatigue, malaise, weight loss
- Low BP, dizziness, postural hypotension, collapse, hypovolaemic shock
- Abdominal pain, tenderness and guarding, nausea, vomiting
- Fever
- Confusion, somnolence, delirium, coma
- Back and leg cramps/spasms
- Skin hyperpigmentation (PAI only)
- Hyponatraemia, hypoglycaemia

History and Investigations
NEVER delay treatment with hydrocortisone if Adrenal Crisis suspected
- **Drug history** – establish pre-admission steroid use across all routes (oral, inhaled, topical, eye/nasal drops, intra-articular, IM), or recent courses of steroids
- **BP** (supine and standing if possible)
- **Bloods**: U&E, FBC, blood glucose, Serum cortisol

MANAGEMENT of Adrenal Crisis
Use **'Adrenal Crisis' order set on Epic**
Hydrocortisone (sodium succinate) 100 mg IV (or IM), followed by:
- 50 mg IV (or IM) 6 hourly, or 200 mg over 24 h continuous IV infusion (if practical do so)

Fluids (patients can be very volume deplete)
- **If shocked** (sBP <90mmHg) resuscitate with boluses of sodium chloride 0.9% (250-500ml over 15 minutes)
  - Check sodium first (PAI may have severe hyponatraemia)
  - **Senior +/- ICU review if not responding**
- **When/if haemodynamically stable** rehydrate with IV fluids or as clinically appropriate

Monitoring
U&E, strict fluid balance, cardiac monitoring (consider ICU transfer). Extra care if pituitary/hypothalamic disease or if diabetes insipidus (ensure desmopressin is given)

Referral
Refer to **Endocrinology** [redacted] or all patients with suspected adrenal crisis for further advice on diagnosis, starting regular oral steroids or tapering steroids back to usual dose, and education regarding 'sick day rules' prior to discharge

[redacted]

Steroid Emergency Card

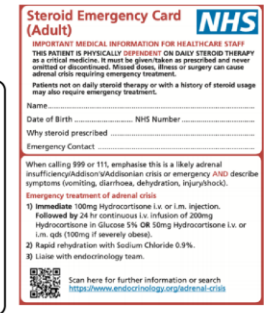
All patients at risk of Adrenal Crisis must now be issued with a Steroid Emergency Card

It is the prescriber's responsibility to identify patients who are *AT RISK* of Adrenal Crisis, provide education and ensure a Steroid Emergency Card is issued
(Cards will not be automatically issued by pharmacy unless requested)

Steroid cards are available from pharmacy and can be requested by:
a) Contacting your ward pharmacist or the outpatient pharmacy
b) On a discharge or outpatient prescription for steroids, write ***'Supply Steroid Emergency Card'*** in the ***'Note to Pharmacy'*** on Epic

Note to Pharmacy: + Add Note to Pharmacy

Document that a card has been issued by adding 'Steroid Emergency Card Given' [20316711 to the problem list


Steroid Emergency Card (Adult)
NHS
IMPORTANT MEDICAL INFORMATION FOR HEALTHCARE STAFF
THIS PATIENT IS PHYSICALLY DEPENDENT ON DAILY STEROID THERAPY as a critical medicine. It must be given/taken as prescribed and never omitted or discontinued. Missed doses, illness or surgery can cause adrenal crisis requiring emergency treatment.
Patients not on daily steroid therapy or with a history of steroid usage may also require emergency treatment.
Name
Date of Birth ... NHS Number
Why steroid prescribed
Emergency Contact
When calling 999 or 111, emphasise this is a likely adrenal insufficiency/Addison's/Addisonian crisis or emergency AND describe symptoms (vomiting, diarrhoea, dehydration, injury/shock).
Emergency treatment of adrenal crisis
1) **Immediate** 100mg Hydrocortisone i.v. or i.m. injection.
Followed by 24 hr continuous i.v. infusion of 200mg Hydrocortisone in Glucose 5% OR 50mg Hydrocortisone i.v. or i.m. qds (100mg if severely obese).
2) Rapid rehydration with Sodium Chloride 0.9%.
3) Liaise with endocrinology team.
Scan here for further information or search https://www.endocrinology.org/adrenal-crisis

Patients at risk of Adrenal Crisis who should be issued a Steroid Emergency Card
(see SPS Guidance for further information)

- Primary Adrenal Insufficiency
- Hypothalamo-pituitary dysfunction requiring regular steroids or during intercurrent illness

Systemic Glucocorticoids
- Long-term (≥4 wks) oral prednisolone ≥5mg/day (or equivalent – **Table 1**)*
- ≥ 3 short-term courses (≥1wk) oral prednisolone ≥40mg/day in past year* (or equivalent –in past year (**Table 2**)
- Repeated anti-emetic dexamethasone for anticancer regimens*
- Prolonged course of oral/IV dexamethasone (> 10 days) for treatment of COVID-19

Other Glucocorticoid Routes
- ***Inhaled***:
  - High-dose inhaled therapy* (**Table 5**)
  - Moderate-dose inhaled therapy AND any other form of glucocorticoid therapy (any route)* (**Table 5**)
- ***Intra-articular / Intramuscular:*** ≥3 injections in past year
- ***Topical***:
  - ≥ 200g/wk of a *potent* or *very potent* product to a **large area of skin** for ≥ 4wks* (**Table 6**)
  - ≥ 30g/month of a *potent* or *very potent* product to the rectal or genital mucosa for ≥ 4wks* (**Table 6**)
- ***Rectal:*** products with significant amounts of glucocorticoid (**Table 3**)

Drug Interactions
Patients prescribed any form of **ongoing** glucocorticoid treatment, at any dose, with a potent CYP3A4 inhibitor (**Table 4**) (except small amounts of topical mild or moderate potency glucocorticoid)

* and for 12 months after stopping

Table 1: Daily doses of ***LONG-TERM*** (≥ 4 wks) oral glucocorticoids

Beclometasone	≥ 625microgram
Betamethasone	≥ 750microgram
Budesonide	≥ 1.5mg
Deflazcort	≥ 6mg
Dexamethasone	≥ 500microgram
Hydrocortisone	≥ 15mg
Methylprednisolone	≥ 4mg
Prednisone	≥ 5mg
Prednisolone	≥ 5mg

Table 2: Daily doses of ***SHORT-TERM*** (≥1wk) oral glucocorticoids repeated 3 or more times in last 12 months

Beclometasone	≥ 5mg
Betamethasone	≥ 6mg
Budesonide	≥ 12mg
Deflazcort	≥ 48mg
Dexamethasone	≥ 4mg
Hydrocortisone	≥ 120mg
Methylprednisolone	≥ 32mg
Prednisone	≥ 40mg
Prednisolone	≥ 40mg

Table 3: ***RECTAL*** preparations which contain significant amounts of glucocorticoid

Budesonide enema	contains 2mg per dose
Budesonide rectal foam	contains 2mg per dose
Prednisolone rectal solution	contains 20mg per dose
Prednisolone suppositories	contains 5mg per dose

Table 4: Potent CYPA4 enzyme inhibitors

Potent protease inhibitors	Atazanavir; Darunavir; Fosamprenavir; Ritonavir (+/- lopinavir); Saquinavir; Tipranavir
Antifungals	Itraconazole; Ketoconazole; Voriconazole; Posaconazole
Antibiotics	Clarithromycin (long term courses only)

Table 5: Daily doses of ***INHALED*** glucocorticoids

	High Dose	Moderate Dose + any other form of glucocorticoid therapy
Beclometasone (standard particles e.g. Clenil®)	>1000 microgram	800-1000 microgram
Beclometasone (extra fine particles e.g. Qvar®, Fostair®)	>500 microgram	400-500 microgram
Budesonide (e.g. Pulmicort®, Symbicort®, Duoresp®)	>1000 microgram	800-1000 microgram
Ciclesonide (e.g. Alvesco®)	>480 microgram	320-480 microgram
Fluticasone propionate (e.g. Flixotide®, Seretide®)	>500 microgram	400-500 microgram
Fluticasone furorate (e.g. Relvar Ellipta®)	>200 microgram	100-200 microgram
Mometasone (e.g. Asmanex®)	>800 microgram	400-800 microgram

Table 6: Potent or very potent **TOPICAL** glucocorticoids

Beclometasone dipropionate 0.025%
Betamethasone dipropionate 0.05%
Betamethasone valerate 0.1%
Clobetasol propionate 0.05%
Diflucortolone valerate 0.1%
Diflucortolone valerate 0.3%
Fluocinonide 0.05%
Fluocinolone acetonide 0.025%
Fluticasone propionate 0.05%
Hydrocortisone butyrate 0.1%
Mometasone 0.1%
Triamcinolone acetonide 0.1%