NHS Greater Glasgow and Clyde

CLINICAL GUIDELINE

Prednisolone therapy safe withdrawal in patients with non-endocrine disease

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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Important Note:

The Intranet version of this document is the only version that is maintained.
Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

Guidance for safe withdrawal of prednisolone therapy in patients with non-endocrine disease

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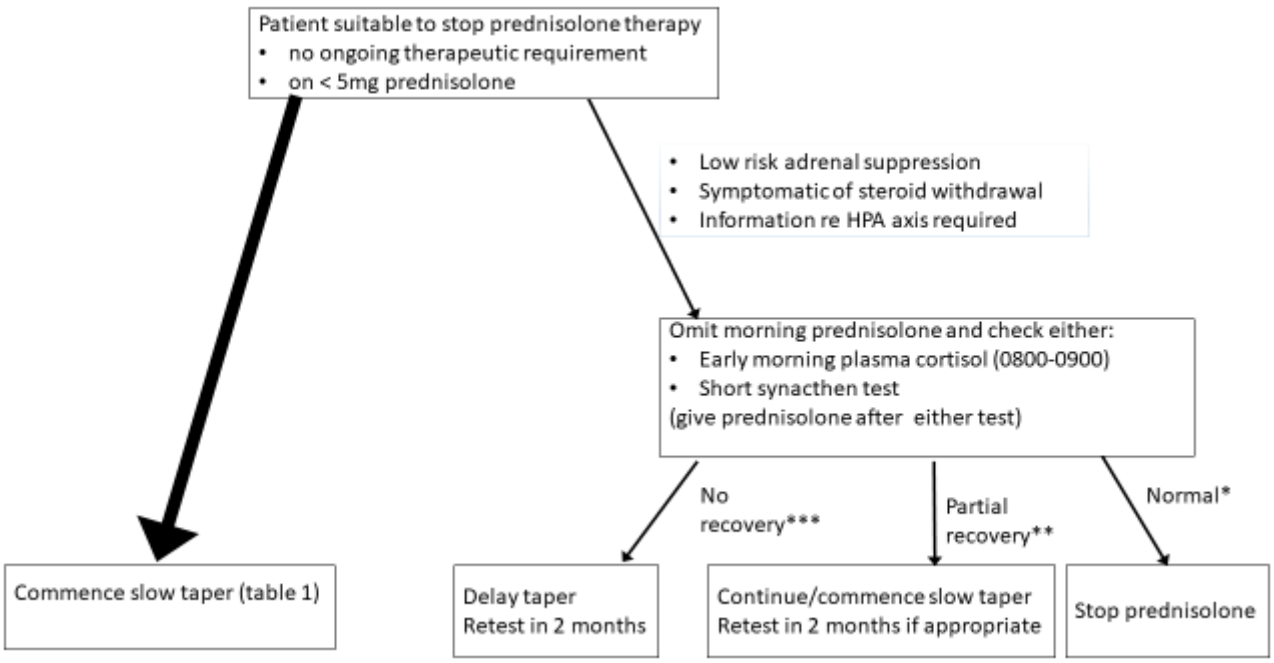

Figure 1. Approach to safe withdrawal of prednisolone therapy

*Normal: early morning cortisol ≥ 300 nmol/L/; post synacthen cortisol ≥ 430nmol/L

**Partial recovery: early morning cortisol 100- 300 nmol/L or post synacthen cortisol 250-430 nmol/L

***No recovery: early morning cortisol ≤ 100 nmol/L or post synacthen cortisol ≤ 250 nmol/L

Week	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
0	5	5	5	5	5	5	5
1	5	4	5	4	5	4	5
2	4	4	4	4	4	4	4
3	4	3	4	3	4	3	4
4	3	3	3	3	3	3	3
5	3	3	3	2	3	3	3
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20	1	0	1	1	0	1	1
21	1	0	1	0	1	0	1
22	0	1	0	1	0	1	0
23	0	1	0	0	1	0	0
24	0	0	0	1	0	0	0

Table 1. Suggested tapering regimen for steroid dependent patients on 5mg prednisolone

Adapted with kind permission Professor Karim Meeran (Prednisolone withdrawal (impendo.co.uk))

1 Scope

1.1 This guidance applies to (non pregnant) adult patients **who fulfil all 3 criteria** outlined below:

a. Patients who have been treated with long-term (≥ 4 weeks) supraphysiological doses (≥ 5mg prednisolone daily dose) of glucocorticoid for a non-endocrine condition

b. Patients no longer require prednisolone treatment for their non-endocrine condition

c. Patients are now on ≤5mg prednisolone (or equivalent preparation) daily

1.2 This guidance can be read in conjunction with the following protocols and guidelines:

a. Society for Endocrinology Emergency Endocrine Guidance: Acute Adrenal Insufficiency-Adrenal Crisis. (Available at: http://www.endocrinology.org/adrenal-crisis).

b. Beuchlein F, Bancos I, Else T et al. European Society of Endocrinology and Endocrine Society Joint Clinical Guideline: Diagnosis and therapy of glucocorticoid-induced adrenal insufficiency 2024 *European Journal of Endocrinology 190*: G25-G51

1.3 This guidance is relevant to primary care patients as well as those attending relevant out-patient clinics, it is unlikely to be relevant for inpatients.

1.4 This guidance applies to patients treated with oral prednisolone only. For advice on weaning of alternative glucocorticoid preparations, please contact local endocrine department (via switchboard)

2 Do patients require assessment of adrenal function before commencing prednisolone withdrawal?

2.1 Most patients on oral prednisolone do not need assessment of adrenal function

2.2 If patients no longer require oral prednisolone, they can simply commence a gradual taper without testing (Broad arrow in figure 1 and Table 1).

2.3 This can take a prolonged period of time (often 6 months or more) and patients may become symptomatic of steroid withdrawal. However, if followed carefully, the hypothalamic-pituitary axis should recover in almost all individuals and does not require formal assessment.

2.4 It should be noted that, while reducing glucocorticoid dosing, patients should be considered steroid dependent. Therefore, they require education around sick day rules and the need for steroid warning cards. (**Appendix 1/2**)

2.5 For advice please contact relevant endocrine specialist nurses as outlined section 5 or consult Addison's Disease Self-Help Group (addisonsdisease.org.uk)

3 Patient assessment during steroid taper

3.1 We would counsel against routine assessment of plasma cortisol or short synacthen test in patients suitable for slow taper of oral prednisolone therapy

3.2 However, patients will require regular clinical assessment for both flare of underlying disease and/or development of adrenal insufficiency symptoms during glucocorticoid tapering regimen. Symptoms of adrenal insufficiency are often non-specific (fatigue/myalgia/weight loss) and can mimic the underlying initial disease for which they were treated.

3.3 Therefore, consider measuring early morning cortisol or performing a short synacthen test to assess adrenal function **only** in patients in whom there is difficulty in reducing glucocorticoid dose due to perceived symptoms of adrenal insufficiency (for interpretation, see section 4 and Figure 1).

4 Assessment of adrenal function in selected patients

4.1 This can be considered in the following patients:

a. those felt to be at low risk of adrenal insufficiency (eg. use for less than 3-4 weeks and/or on doses <5mg prednisolone or equivalent) and may not require a prolonged taper,

b. those who are about to undergo an acute stress (eg elective surgery) where information about adrenal function is important

c. those who feel they are symptomatic of adrenal insufficiency when reducing their glucocorticoid dose (see section 3.3).

4.2 In order to assess adrenal function, patients should be advised to omit their prednisolone on the morning of the test and re-start their daily prednisolone dose immediately after the test until told otherwise (eg if test is taking place on Monday morning, patient should take their dose on Sunday morning as usual and delay their Monday dose until the test is completed).

4.3 Adrenal function can be assessed by measuring the following:

<u>a. Early morning cortisol (checked between 0800-1000hr)</u>

- Prednisolone can be safely stopped without taper if morning cortisol ≥ 300 nmol/L
- If morning cortisol 100-350 nmol/L, patient should commence prednisolone taper as outlined in Table 1
- If morning cortisol ≤100 nmol/L, then consider delaying prednisolone taper and repeat testing in 2 months

b. Short synacthen test

- Should be performed between 0800-1000 ideally
-
- Measure serum cortisol before and 30 minutes after Synacthen 250mcg IV or IM
- Prednisolone can be safely stopped if post-synacthen cortisol is ≥ 430 nmol/L
- If post-synacthen cortisol 250-430 nmol/L, then continue/commence slow taper as outlined in Table 1
- If post synacthen cortisol ≤ 250 nmol/L, then consider delaying prednisolone and taper and retest in 2 months
- Ensure patients aware of consequences of current glucocorticoid dependence (see appendix 1/2)

5 Useful Contact Details

ST Endocrinology (South) gg-uhb.endocrinereferralsouthglasgow@nhs.scot

ST Endocrinology (North) gg-uhb.endocrinereferralsnorthglasgow@nhs.scot

Endocrine specialist nurses (South) 0141 452 3115

Endocrine specialist nurses (North) 0141 355 1078

NHS
Greater Glasgow and Clyde

Information about

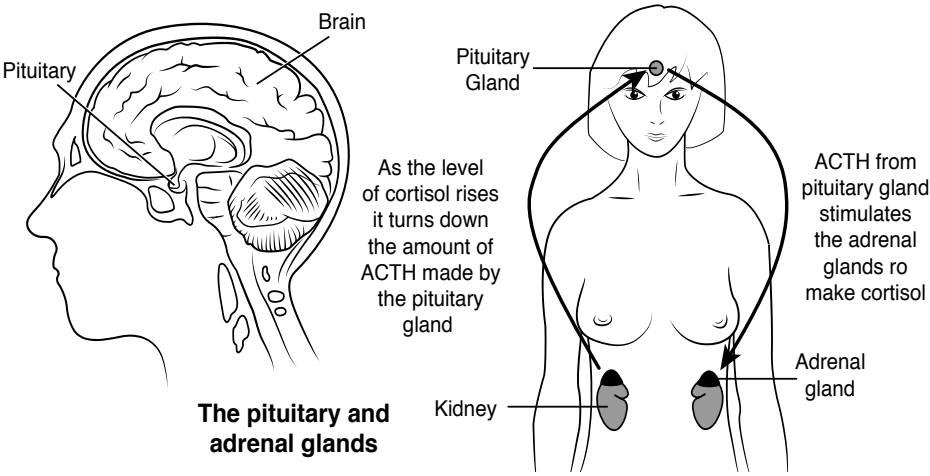
Steroid Replacement Therapy

This leaflet will give you information about Steroid Replacement Therapy including:

- What is Cortisol?
- What causes cortisol deficiency?
- How do you treat cortisol deficiency?
- What if I am unable to take my medication?
- When to increase your dose of Hydrocortisone?
- Special precautions
- Side Effects
- Is there anything else I should know?
- Contact Details
- Further Information

What is Cortisol?

Cortisol is the most important natural steroid and is produced from the adrenal gland under the control of the pituitary gland.



The pituitary and adrenal glands

Cortisol has three main roles:

To control blood pressure.

To help control blood sugar levels.

To help the body deal with the stress of illness and injury.

What causes steroid Deficiency?

Steroid deficiency occurs when the adrenal glands do not produce enough cortisol. There are several reasons why this can happen:

- ☐ **Pituitary**

  If the pituitary gland is unable to send the chemicals needed to tell the adrenal gland to make cortisol.

- ☐ **Adrenal**

  If the adrenal glands are surgically removed or the gland itself fails.

- ☐ **Congenital Adrenal Hyperplasia (CAH)**

  This is caused by an inherited blockage within the adrenal gland, which does not allow cortisol to be produced.

- ☐ **Iatrogenic – Suppression by other steroids**

  The adrenal gland stops making cortisol because high doses of steroid medication have been used to treat some other disease or health problem.

How do you treat Steroid Deficiency?

If your body cannot produce cortisol, you can take tablets known as steroid replacement therapy.

The most common of these therapies is called Hydrocortisone. Other steroids, which can do the same job, include **Prednisolone** and **Dexamethasone**.

The dose you are prescribed is individual to you.

You will need to take your medication at certain times throughout the day. This is to mimic the body's natural cortisol production, which is higher in the morning.

A member of the endocrine team will discuss your individual requirements and how best to take your medication.

What if I am unable to take my medication?

When we become unwell (any illness, injury such as broken bones or any operation) the adrenal gland helps recovery by increasing the production of cortisol. When you have a steroid deficiency your adrenal gland cannot make more cortisol. To help you deal with this **you have to take extra steroids for a few days.**

In these circumstances it is vital to increase the amount of hydrocortisone quickly.

This is done by either:

- Increasing the dose of oral hydrocortisone.
- Having an intra-muscular injection of hydrocortisone (an injection into your thigh).

When to increase your dose of Hydrocortisone?

Coughs and Colds	A simple cold with a cough and "runny nose" **No need to increase your hydrocortisone.**
Temperature	If you have a temperature above 37.5C. This would indicate that you have some sort of infection. **Double your dose of hydrocortisone for 2-3 days.**
Antibiotics	If you are prescribed antibiotics. **Double your dose of hydrocortisone whilst taking your antibiotics.**
Diarrhoea	There is a risk that the oral hydrocortisone will pass through the gut too quickly and not be absorbed. **Double your dose of hydrocortisone until the diarrhoea stops. If you have severe diarrhoea and vomiting you will need more hydrocortisone and you will also need to get immediate medical advice. (From your GP, Accident and Emergency Department, NHS 24 or 999).**

Vomiting	It takes about one hour for the body to absorb hydrocortisone. If you are sick within one hour of taking your medication – repeat the dose. If you are sick again take double the dose and get urgent medical advice. If you are continually sick and unable to "keep anything down" you will need to take the intra-muscular injection of hydrocortisone and get medical advice immediately.

Special Precautions

Dental Appointments

Check Up	No extra hydrocortisone
Treatment	Double dose for 24 hours

General Anaesthetics

If you need surgery either routine or emergency it is vital that you tell the surgeons that you take steroid replacement therapy. Usually you will take extra steroids by injection before and after the surgery for at least a few days.

The endocrine team looking after you are available for advice and you can contact your local treatment centre.

Emotional Stress

Current recommendations are there is no requirement for increased steroids during periods of psychological or emotional stress.

Intramuscular Injection of Hydrocortisone

We will give you instructions on how to give yourself an intramuscular injection of hydrocortisone.

If you ever need to use your injection of hydrocortisone, you should also get immediate medical attention in case you need additional treatment.

Side Effects

The dose of hydrocortisone that you have been prescribed is calculated to mimic the normal production levels and therefore it should not cause side effects.

You may be aware that steroids can also be given as a treatment for a range of other inflammatory diseases (e.g. asthma).

In these conditions a much higher dose is used and this can be associated with a number of side effects such as: high blood pressure, diabetes, weight gain and osteoporosis. It is very unlikely that you would be at risk of these on your current steroid dose.

Is there anything else I should know?

It is very important that you carry a "steroid card" with you at all times.

You should let anyone looking after you – for example a doctor or dentist, know that you are taking steroid replacement therapy.

We recommend that you purchase a **Medic-alert** or **Talisman bracelet or necklace.** This is not compulsory but it is an easy way for anyone to see at a glance that you are taking steroids.

Medic Alert Foundation
1 Bridge Wharf,
156 Caledonian Road
London N1 9UU
0800 581 420 (Freephone)
www.medicalert.org.uk

Talisman Jewellery Ltd.
21 Grays corner,
Ley Street
Ilford
EssexI G2 7RQ
020 8554 5579
www.sostalisman.org

Contact Details

Endocrine Nurses (direct line) **0141 452 3115**

Answering machine (24 hours) **0141 451 6186**

Via E-mail at Donna.Grant@ggc.scot.nhs.uk
Frances.Smith@ggc.scot.nhs.uk
Roberta.Forsyth2@ggc.scot.nhs.uk

Consultant: .....

Secretary: .....

You can contact the endocrine nurses for additional advice or support on the above telephone numbers, or you can discuss any concerns with hospital staff at your follow-up appointment.

Further Information

This booklet is for general information only. The endocrine team can give the ward staff personalised information if required.

While we have taken every care to compile accurate information and to keep it up-to-date, we cannot guarantee its correctness and completeness.

Useful Websites

www.pituitary.org

www.adshg.org.uk

Acute Services Division

NHS
Greater Glasgow and Clyde

Information about ...

Steroid Replacement Therapy

Glasgow Royal Infirmary

New Stobhill Hospital

What are steroids?

Steroids are natural hormones produced by the body. The most important steroid hormone is called cortisol, which is essential for life. Its main roles include:

- Control of our blood pressure and circulation
- Control of our blood sugar levels
- Allows our bodies to deal with stress, illness and injury

Cortisol is produced by two small glands that sit "like hats" on top of the kidneys, these are called the adrenal glands. The adrenal glands release cortisol when given hormone instructions by a pea-sized gland in the brain called the pituitary gland.

Why don't I have enough cortisol?

Sometimes our adrenal glands do not produce enough cortisol, this can happen for different reasons:

- **Pituitary Gland**

  The pituitary does not send enough signals to the adrenal glands to release cortisol.

- **Adrenal Glands**

  Sometimes the adrenal glands themselves fail to produce enough hormones, or, if the glands are surgically removed, cortisol will not be produced.

- **Congenital Adrenal Hyperplasia**

  This is a rare, inherited condition which blocks the cortisol "production line" inside the adrenal glands.

- **Drug Induced**

  Man-made steroids are often used as part of treatment for conditions such as asthma or joint diseases. Since the body is being given extra steroids, the adrenal glands sometimes "switch off" production. When the extra steroid treatment is stopped, the adrenal glands can take time to restart production, and sometimes, do not restart production at all.

How is cortisol replaced?

Cortisol is easily replaced with tablets; the aim of tablet treatment is to mimic your body's normal cortisol production. Cortisol levels are highest in the morning and fall throughout the day, therefore doses of steroid tablets are given to copy this.

The most common tablet we use is called **hydrocortisone**. Sometimes we prescribe other tablets such as **prednisolone** or **dexamethasone.**

What are the side effects of taking steroid replacement?

There are no side effects from normal production of steroids by the body. As the dose of your tablet treatment is prescribed to replace your normal cortisol levels, you should not experience any side effects. The staff at the endocrine clinic will help to find the most appropriate tablets and dosage for you.

What happens during stress, illness or injury?

When we become unwell (any illness, injury such as broken bones or any surgery) the adrenal glands help recovery by increasing the production of cortisol. When you have **steroid deficiency** your adrenal glands cannot make more cortisol. To help you deal with this **you have to take extra steroids for a few days.**

If you are on steroid treatment, it is crucial to increase your dose of steroids quickly, this is usually through doubling the dose of your tablets, or an intramuscular injection in more severe illness.

You must never stop your steroids without getting medical advice

Intramuscular injection of hydrocortisone

You will be given instruction on how to give yourself an intramuscular injection of hydrocortisone. **It is vital that you get medical advice if you have to give yourself an injection of hydrocortisone.**

Sick Day Rules

The endocrine clinic will teach you when to take extra steroid tablets to cover illness, these are called "sick day rules":

- **Emotional Stress**

  You do not need to increase your steroid dose during times of psychological or emotional stress

- **Coughs and Colds**

  If you have a simple cold, i.e. cough and "runny nose"

  No need to increase your steroid dose

- **Temperature**

  If you have a temperature above 37.5°:

  Double your steroid dose for 2 – 3 days

- **Antibiotics**

  If you are on antibiotics for an infection:

  Double your dose of steroids for the period you are on antibiotics

- **Diarrhoea**

  Diarrhoea alters the way your gut moves and absorbs your tablets

  Double your dose of steroids until the diarrhoea stops

- **Vomiting**

  Vomiting also affects the absorption of steroids

  If you are sick within one hour after taking your steroids, you should repeat the dose

  If you are sick again, take double your normal dose and get medical advice

  If you have ongoing vomiting and can't keep anything down you will require an intramuscular injection of hydrocortisone and should get medical attention immediately.

What happens if I am having a procedure?

Just as in illness, procedures put stress on the body and require it to produce more cortisol. Similar rules apply to your steroid tablets to help you:

- **Dental Appointments**

  Routine check-ups

  No need to increase your steroid dose

  Dental treatment

  Double your dose for 24 hours

- **General Anaesthetic**

  If you require surgery (routine or emergency) it is vital that you tell the surgical team that you are on steroids. The surgical and anaesthetic teams will need to prescribe you extra steroids through a hydrocortisone drip to help your body with the physical stress of the surgery.

  If you are having surgery, and are unsure what to do, please contact the endocrine clinic using the telephone numbers at the end of this leaflet.

How do I let people know that I am on steroids?

The endocrine clinic will give you a "steroid card", you should always carry this with you. Should there be an emergency, or you require any immediate medical treatment, it will let teams know that you are on steroid replacement.

Many companies produce steroid alert bracelets and necklaces. These are not compulsory, but are a quick and effective way of alerting others in an emergency that you are on steroids. The websites provide more information on these companies, you can also purchase these items online:

www.medicalert.org.uk

www.sostalisman-retailer.co.uk

Where can I find out more information?

The Diabetes and Endocrine Day centre is at Stobhill Hospital (Clinic D). All the team will be happy to assist with any questions you may have relating to your steroid treatment.

- Endocrine Secretary – **0141 355 1089**
- Diabetes and Endocrine Day Centre (Clinic D) – **0141 355 1078**
- GP or Practice Nurse
- The Addison's Disease Group provide useful further information for patients **www.addisons.org.uk**
- The Pituitary Foundation **www.pituitary.org.uk**

Notes: