# What is the equivalent dose of oral prednisolone to intravenous (IV) hydrocortisone?

Prepared by UK Medicines Information ([UKMi](http://www.ukmi.nhs.uk/ukmi/about/default.asp?pageRef=1)) pharmacists for NHS healthcare professionals

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## Background

Pharmacological doses of glucocorticoids are used mainly for their potent anti-inflammatory and immunosuppressive effects (1). For both hydrocortisone and prednisolone, glucocorticoid activity is more pronounced than mineralocorticoid activity, but the mineralocorticoid activity of hydrocortisone is high relative to that of prednisolone and may result in fluid retention (2). Hydrocortisone is therefore unsuitable for long-term disease suppression, but can be used to compensate for a diminished adrenocortical response in patients who have been receiving long-term corticosteroid treatment, in whom oral administration is not possible, for example, in patients undergoing surgical procedures (1).

## Answer

The British National Formulary (BNF) includes a table on equivalent anti-inflammatory doses of glucocorticoids (2). It does not take account of mineralocorticoid effects nor does it take account of variations in the duration of action (2).

From the literature, prednisolone 5mg is approximately equivalent to hydrocortisone 20mg in terms of equivalent anti-inflammatory dose (1-7).

As hydrocortisone tablets have a high bioavailability (6-9), the oral and intravenous (IV) doses of hydrocortisone tend to be the same. Therefore for every 5mg of oral prednisolone, 20mg of IV hydrocortisone, can be given.

The biological half-life of prednisolone is 12 to 36 hours (4,6), which allows once-daily dosing. Hydrocortisone has a shorter biological half-life ranging from 8 to 12 hours (4,6). Consequently the dose of hydrocortisone is usually repeated three to four times in 24 hours (7). If the equivalent anti-inflammatory dose reported for these steroids is based on the total daily dose, as interpreted by one reference found in the literature (10), then the daily dose of prednisolone should be converted to the daily dose of hydrocortisone and either be divided over three to four doses per day or be given as a continuous 24-hour infusion. Patients should be monitored accordingly and further dosage adjustments made as necessary.

 It is currently recommended that patients with adrenal suppression receive corticosteroid supplementation during surgery (2).Peri-operative glucocorticoid administration in these patients should aim to treat the underlying condition and to imitate the normal response to surgery (10,11). Therefore the peri-operative dose of hydrocortisone required may be higher than the equivalent prednisolone dose usually taken by the patient.

The BNF contains advice on corticosteroid cover for operations (2). Patients who have taken more than 10mg oral prednisolone daily within 3 months of surgery may require cover with parenteral hydrocortisone (2). Further details are provided in the BNF (2).

Readers may also be interested in the UKMi Q&A ‘What steroid supplementation is required for a patient with primary adrenal insufficiency undergoing a dental procedure?’ and The Addison’s Disease Self-Help Group’s recommendations for steroid dose adjustments during surgery (12).

## Summary

* Prednisolone 5mg orally is equivalent to hydrocortisone 20mg intravenously (equivalent anti-inflammatory dose).
* The peri-operative dose of hydrocortisone required may be higher than the equivalent prednisolone dose usually taken by the patient.

Limitations

The equivalent doses given in the Q&A are approximations and may not apply to all disease states and to all patients. This information should not be used in emergency situations such as in the management of acute severe asthma.

### References

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## Quality Assurance

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### Search strategy

Embase (\*prednisolone AND \*hydrocortisone. Limit to ‘human’)

Medline (prednisolone.exp AND hydrocortisone.exp. Limit to ‘human’)

In-house database (MiDatabank)

Micromedex (DrugDex, Martindale)

NHS Evidence (prednisolone AND hydrocortisone)

Cochrane (prednisolone AND hydrocortisone)