Scottish Paediatric & Adolescent Rheumatology Network

Guideline for Methylprednisolone use

Methylprednisolone is a synthetic glucocorticoid drug used for its anti-inflammatory and immunosuppressive effect. It can be given to suppress inflammation in a variety of conditions including:

- Polyarticular or Systemic onset Juvenile Idiopathic Arthritis
- Juvenile Systemic Lupus Erythematosus
- Systemic Vasculitis
- Juvenile Dermatomyositis
- Localised Scleroderma
- Juvenile Systemic Sclerosis
- Behcet's Disease
- Uveitis
- Macrophage Activation Syndrome
- Kawasaki Disease

Contra-indications:

- Pregnancy
- Active peptic ulceration
- Acute severe infection
- Hypersensitivity to active ingredient or excipients
- Live vaccines: avoid concomitant use

Cautions:

- Diabetes: Insulin requirements will rise and can be unpredictable. Monitor blood glucose and provide appropriate insulin cover if required.
- Benign intracranial hypertension
- Previous peptic ulcer disease
- Hepatic impairment
- Ciclosporin: increased risk of convulsions if used together
- History of steroid-induced psychosis
- Systemic Sclerosis: Consider reducing dose and giving infusion at slower rate due to theoretical risk of renal crisis reported in adult patients
- May enhance or reduce the anticoagulant effect of coumarins
- Metabolism of corticosteroids accelerated by phenobarbital, phenytoin and carbamazepine

Pre-assessment considerations:

- Baseline observations (temperature, pulse, respiratory rate, blood pressure)
- Baseline blood tests (fbc, esr, crp, ue, lfts, blood glucose)
- Varicella zoster status prior to first infusion
- Further baseline blood tests as per unit protocol and disease indication
- Baseline urinalysis checking for glycosuria
- Vaccine status

Dosage and administration:

- Stop oral steroids on day of infusion and recommence after if required.
- Gastric protection should be considered with local formulary choice proton pump inhibitor at BNF for children dose.
- Methylprednisolone is administered intravenously at a dose of **30mg/kg (max 1gram)** once daily for **3 consecutive days** to achieve rapid control of inflammation. If required, this can be repeated after 1 week.
- Other regimes may be used depending on condition /clinical situation in discussion with a Paediatric Rheumatologist e.g. weekly pulses (30mg/kg, max 1g) for 4-6weeks or monthly (30mg/kg, max 1g).
- 800 micrograms of IV methylprednisolone is equivalent to 1mg of oral prednisolone as an anti-inflammatory agent
- Preparation and administration monograph available at Medusa Injectable Medicines Guide: http://www.injguide.nhs.uk
- Reconstitute methylprednisolone powder with water for injection taking account of the displacement value, then add to an appropriate intravenous fluid (eg. sodium chloride 0.9% or 5% glucose. Also compatible with Sodium chloride 0.9% and 5% glucose mixture)
- For example: Add reconstituted solution to 100ml 0.9% sodium chloride for infusion
- Intravenous infusion given over 30-60 mins
- Consider a lower dose in patients with **Juvenile Systemic Sclerosis** (10-15mg/kg) and a slower (e.g. 4 hours) infusion rate in view of theoretical risk of renal crisis.
- Consider longer infusion rate (e.g. 4 hours) in patients with **nephritis, renal impairment or hypertension**
- Consider sliding insulin scale if patient has **diabetes** and monitor blood glucose regularly

Formulations:

- IV injection (methylprednisolone sodium succinate) 40mg, 125mg, 500mg, 1g and 2g (diluent in box)

Monitoring

- Check temperature, respiratory rate, pulse and BP at 30min intervals. If patient feels unwell, check observations and blood glucose -> consider slowing the rate of infusion. See side effect profile below and expected actions.
- Observe for 30-45mins after infusion
- Most patients are managed as day cases, however, some Paediatric Rheumatology centres may admit a patient for the first dose.

Side effects:

Mild common side effects requiring **no intervention**

- Facial flushing
- Metallic taste in the mouth
- Hyperactivity
- Mood changes
- Headache
- Blurred vision
- Increased appetite
- Stinging during infusion: slow rate / dilute more

Rare Side effects **requiring intervention**

- Hypertension: may need reduced rate of infusion and occasionally anti-hypertensive prescribed
- Hypotension
- Severe tachycardia

Extremely Rare Side effects requiring **infusion to be stopped and subsequent intervention**

- Altered conscious state or psychosis
- Seizures
- Allergic reaction

Other considerations:

- Consider the need for prevention and treatment of steroid induced osteoporosis with repeat infusions
- Give steroid card (if on long-term steroids) and advice re chicken pox exposure (follow SPARN guidelines)
- Avoid live vaccines for 3 months after administration

References:

1. BNF for children
2. Department of Health Green book: Contra-indications and special circumstances, Chapter 6; Page 43
3. BSPAR: Methyl-prednisolone use in Paediatric Rheumatology Oct 2010
4. Eleftheriou et al, Management of Kawasaki Disease, Arch Dis Child 2014 Jan;99(1):74-83
5. SPARN varicella exposure guideline available at https://www.sparn.scot.nhs.uk/wp-content/uploads/2021/05/chickenpox-guideline.pdf

Authors:

Sarveshni Naidoo, Paediatric Registrar, Royal Hospital for Children, Glasgow
Neil Martin, Paediatric Rheumatologist, Royal Hospital for Children, Glasgow