Waikato District Health Board	Type: **Drug Guideline**	Document reference: **2928**	Manual Classification: **Waikato DHB Drug Guidelines**
Title: **Hydrocortisone for Neonates**			Effective date: **15 March 2021**
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BRIEF ADMINISTRATION GUIDE

For detailed information refer to the Australasian Neonatal Medicines Formulary **hydrocortisone** monograph

Critical Note: there are minor variations between the ANMF and Waikato DHB best practice within this drug guideline – see shaded text

Indications:
- Prevention of bronchopulmonary dysplasia (<28/40, <24h of age, not receiving indomethacin) with baseline (at birth) cortisol < 500 nmol/L
- Replacement therapy in adrenal insufficiency
- Hypotension, not responding to inotropes
- Intractable hypoglycaemia
- Stress dose / Adrenal crisis

Route:

IV (preferred) or **IM**, supplied as hydrocortisone sodium succinate 100mg act-o-vial with 2mL of diluent (not registered in NZ but available under Section 29)
pH 7-8. Sodium content: 2.066 mmol sodium per 1 g of hydrocortisone.

Oral, supplied as hydrocortisone 1 mg/ml suspension (compounded by pharmacy)

Dose:

Bronchopulmonary dysplasia prophylaxis
0.5 mg/kg/dose every 12 hours for 7 days, then 0.5 mg/kg/dose every 24 hours for 3 days

Replacement therapy in adrenal insufficiency (maintenance dose)
- 8 – 10 mg/m^2 daily in 3-4 divided doses.
- Higher doses may be needed: Consult Paediatric Endocrinologist

To calculate a **childs body surface area (m2)** use one of the below:

= $\sqrt{\text{(length(cm) x weight (kg) ÷ 3600}}$

OR

= (0.05 x kg) + 0.05

Hypotension
≥35 weeks CGA: 1mg/kg/dose 6-8 hourly (range 1-2 mg/kg/dose)
<35 weeks CGA: 1mg/kg/dose 6-12 hourly (range 1-2 mg/kg/dose)
- Reduce dose gradually over at least 48 hours.

Hypoglycaemia
- Oral / IV / IM: 1 – 2.5 mg/kg every 6 hours

Adrenal crisis
- 50–100 mg/m^2 IV or IM,
  then 50–100 mg/m2 every 24 until stable
  Once stable reduce parenteral dose or switch to about 3 times the usual maintenance dose of oral hydrocortisone, then gradually reduce to the maintenance steroid treatment

Stress dose
- 50 mg/m^2 IV or IM,
  then 50–100 mg/m^2 divided 6 hourly if major surgery, otherwise tapering is not usually required.

Preparation and administration

Direct IV Injection

- Reconstitute powder for injection using the Act-O-Vial. Tap vial to ensure powder is at the base away from the central stopper. Place Act-O-Vial on stable surface and press firmly down on plastic activator to force diluent into the lower compartment. Gently mix by turning the vial upside down a number of times. DO NOT SHAKE. This makes a 50 mg/mL solution.
- Usual dilution for administration is 10mg/mL but for very small doses consider diluting to 2.5mg/ml
- For **10mg/mL** dilution: draw up 1 mL (50mg) of reconstituted solution and add 4 mL compatible fluid (sodium chloride 0.9%, glucose 5% or glucose sodium chloride combinations) to make a final volume of 5 mL with a concentration of 10 mg/mL.
- For **2.5mg/mL** dilution: draw up 0.5 mL (25mg) of reconstituted solution and add 9.5 mL compatible fluid to make a final volume of 10 mL with a concentration of 2.5 mg/mL.
- Draw up dose and administer by direct IV injection over at least 1 minute.

IM Injection

- Reconstitute using the Act-O-Vial (as above). Draw up dose and inject deep into gluteal muscle.
- Rotate site to avoid muscle atrophy. Avoid administration into the deltoid muscle due to the high incidence of subcutaneous atrophy.

Oral

- Use 1 mg/ml solution compounded by pharmacy. If not available, solution for injection can be given orally.
- Administer with feeds to decrease gastrointestinal upset.

Monitoring

- Monitor serum electrolytes, renal function, white blood count, blood pressure, blood glucose
- Monitor fluid status (input and output and body weight)
- Monitor for adverse effects and extravasation
- In infants with primary adrenal insufficiency, monitor glucocorticoid replacement by clinical assessment, including growth velocity, body weight, blood pressure and energy levels

Storage and Stability

- Reconstituted IV solution is stable when refrigerated for 24 hours.
- Store oral solution in the fridge or at room temperature < 25oC. Expiry is 30 days from manufacture.

Competency for administration

This procedure is carried out by, or under, the direct supervision of a registered nurse/registered midwife who holds current Waikato DHB Generic Medicine Management and IV certification. For CVAD administration Neonatal specific competency NCV/NAC is also required.

References:

- Royal Prince Alfred Hospital NeoMed Consensus Group. Hydrocortisone Drug Information Sheet. March 2018. Available from: https://www.slhd.nsw.gov.au/rpa/neonatal/NeoMedPaperCopy.html
- Truven Health Analytics Inc. Pediatrics and Neofax®. Hydrocortisone monograph. Accessed 8th January 2020. Available from: http://www.micromedexsolutions.com.
- Auckland DHB Neonatal Services. Hydrocortisone sodium succinate Drug Protocol. August 1996. Available from: http://www.adhb.govt.nz/newborn/DrugProtocols

- New Zealand Hospital Pharmacists Assoc. Inc. Notes on Injectable Drugs 7th ed, 2015.
- New Zealand Formulary for Children (NZFC). Hydrocortisone (systemic). Accessed 8th January 2020. Available from: http://www.nzfchildren.org.nz/nzf_3840
- American Pharmacists Association. Pediatric & Neonatal Dosage Handbook. 20th edition. 2013.
- Pfizer NZ Ltd. SOLU-CORTEF Data sheet New Zealand. 13 June 2019. Available from: http://www.medsafe.govt.nz/profs/Datasheet/s/Solucortefinj.pdf
- The Royal Children's Hospital Melbourne. Paediatric Injectable Guidelines. Accessed 8th January 2020. Available from: https://pig.rch.org.au
- Christchurch DHB Neonatal Services. Hydrocortisone Drug Information Sheet. May 2019. Available from: http://www.cdhb.health.nz/Hospitals-Services/Health-Professionals/Neonatal-Clinical-Resources/Neonatal-Drug-Information-Sheets
- Baud O, Trousson C, Biran V, Leroy E,Mohamed D, Alberti C. Association between early low-dose hydrocortisone therapy in extremely preterm neonates and neurodevelopmental. Lancet 2016 (387):1827-36.
- Shaffer et al, Effect of prophylaxis for early adrenal insufficiency using low-dose hydrocortisone in very preterm infants: An individual patient data meta-analysis, J Peds, April 2019, 207, 136-42
- Renolleau C et al for the PREMILOC Trial study group, Association between Baseline Cortisol Serum Concentrations and the Effect of Prophylactic Hydrocortisone in Extremely Preterm Infants, The Journal of Pediatrics (2021), doi: https://doi.org/10.1016/j.jpeds.2020.12.057.

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