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Title: **Paracetamol for neonates**			Effective date: **18 January 2019**	
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BRIEF ADMINISTRATION GUIDE

(For more detailed guideline information please see the following pages)

Indications: Relief of mild to moderate pain and reduction of fever[1,2]

Route: Intravenous, oral, or rectal[1-4]

Dose:

Intravenous[2,4-6]

Gestational Age (weeks)	Dose (mg/kg)	Dosing interval (hours)	Max daily dose (mg/kg/day)
28 – 32	7.5	8	22.5
33 – 36	7.5	6	30
≥ 37	10	6	40

Oral[1,4]

Gestational Age (weeks)	Dose (mg/kg)	Dosing interval (hours)	Max daily dose (mg/kg/day)
28 – 32	10-15	8 - 12	30
≥ 32	10-15	6 - 8	60

Rectal[1-4]

Gestational Age (weeks)	Dose (mg/kg)	Dosing interval (hours)	Max daily dose (mg/kg/day)
28 – 32	20	12	40
≥ 32	15	8	60

Note: Round doses to the nearest suppository strength if this remains a safe dose

Maximum of 4 doses each day

Supplied as:

- Paracetamol 500 mg/50 ml (10 mg/ml) vial[1]
- Paracetamol 120 mg/5 ml oral liquid[1]
- Paracetamol 50 mg suppository[1]

Preparation and administration:

Intermittent IV Infusion[3,7,8]

- Administer undiluted, or dilute in compatible fluid (sodium chloride 0.9% or glucose 5%) if required to achieve a final volume of 1.6 ml (to enable administration via a syringe driver)
- Prepare immediately before use. Diluted solution must be used within 1 hour of preparation including the infusion time. Visually inspect solution for precipitation and discolouration; do not use if present
- Administer by intravenous infusion over 15 minutes

Oral[5,9]

- Shake the bottle well before measuring the dose. Draw up the prescribed dose and administer orally

Rectal[4,12,13]

- If suppositories are used, these must not be cut to make part doses. Remove the wrapper and insert suppository well up into the rectum
- If this is not practicable, consider diluting the oral suspension 1:1 with water for rectal doses, or use an alternative route of administration

Monitoring:

- Monitor for injection site reactions before and during infusion[5]
- Observe for signs of hypersensitivity or adverse reactions[10]
- Consider serum creatinine and liver function tests at baseline and if treatment is prolonged[6,10]

1. Purpose and scope

To facilitate the safe and effective use of paracetamol in neonates at Waikato DHB.

2. Drug

Drug	**Paracetamol**
Drug action	Paracetamol is a centrally acting analgesic and antipyretic with minimal anti-inflammatory properties. Although not fully elucidated, the analgesic effects may be due to inhibition of prostaglandin synthesis and an elevation of the pain threshold. The antipyretic effects are produced by inhibition of the hypothalamic thermoregulatory centre[2]. Due to metabolic immaturity, neonatal clearance of paracetamol differs from adults[3,5].
Indications	Relief of mild to moderate pain and reduction of fever[1,2]
Presentation	• Paracetamol 500 mg/50 ml (10 mg/ml) vial[1] • Paracetamol 120 mg/5 ml oral liquid[1] • Paracetamol 50 mg suppository[1]
Route	Intravenous, oral, or rectal[1-4]
Dose	**Intravenous**[2,4-6] **Gestational Age (weeks) / Dose (mg/kg) / Dosing interval (hours) / Max daily dose (mg/kg/day)** 28 – 32 / 7.5 / 8 / 22.5 33 – 36 / 7.5 / 6 / 30 ≥ 37 / 10 / 6 / 40 **Oral**[1,4] **Gestational Age (weeks) / Dose (mg/kg) / Dosing interval (hours) / Max daily dose (mg/kg/day)** 28 – 32 / 10-15 / 8 - 12 / 30 ≥ 32 / 10-15 / 6 - 8 / 60 **Rectal**[1-4] **Gestational Age (weeks) / Dose (mg/kg) / Dosing interval (hours) / Max daily dose (mg/kg/day)** 28 – 32 / 20 / 12 / 40 ≥ 32 / 15 / 8 / 60 Note: Doses must be rounded to the nearest suppository strength if this remains a safe dose **Maximum of 4 doses each day**
Contraindications	• Hypersensitivity to paracetamol or any component of the formulation[2,3,7,11] • Severe hepatocellular insufficiency, hepatic failure or decompensated active liver disease[1,2,7,11] • Intravenous paracetamol should only be used when oral route is not appropriate[11]
Precautions	• Use in the first 24-hours after birth (refer to "Special Considerations") • Use in extremely preterm infants[11] • Hypovolaemia, dehydration[1-3,11] • Severe renal insufficiency[1,3,7,11]

	• Impaired hepatic function[1,2,7,11] • Unconjugated hyperbilirubinaemia (clearance is reduced)[1,5,6,11] • G6PD deficiency (may lead to haemolytic anaemia)[1-3,11] • Chronic malnutrition[1-3,11] • Paracetamol injection contains benzyl alcohol, which in large quantities has led to gasping syndrome, a potentially fatal toxicity in neonates[2]
Incompatibilities	• Compatible with sodium chloride 0.9% and glucose 5%[3,7,8,10] • Do NOT mix with other drugs, blood or blood products[11]
Adverse effects	• Pain at injection site[2,11] • Hypotonia[11] • Nausea and vomiting[2,3,11] • Fever[2,3,11] • Rare: rash, neutropenia, leucopenia, thrombocytopenia[1-3] • May cause liver toxicity with excessive doses or after prolonged administration[1,3]

3. Administration

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 as well as Neonatal specific competency NCV/NAC.
Preparation & Administration	**Intermittent IV Infusion**[3,7,8] • Administer undiluted, or dilute in compatible fluid (sodium chloride 0.9% or glucose 5%) if required to achieve a final volume of 1.6 ml (to enable administration via a syringe driver) • Prepare immediately before use. Diluted solution must be used within 1 hour of preparation including the infusion time • Visually inspect solution for precipitation and discolouration; do not use if present • Administer by intravenous infusion over 15 minutes • Discard any unused vial contents **Oral**[5,9] • Shake the bottle well before measuring the dose • Draw up the prescribed dose and administer orally with or without feeds **Rectal**[4,12,13] • If suppositories are used, these must not be cut to make part doses. Remove the wrapper and insert suppository well up into the rectum • If this is not practicable, consider diluting the oral suspension 1:1 with water for rectal doses, or use an alternative route of administration
Observations and management	• Monitor for injection site reactions before and during infusionl[5] • Observe for signs of hypersensitivity or adverse reactions[10] • Consider serum creatinine and liver function tests at baseline and if treatment is prolonged[6,10]
Special considerations	• Clinical experience in neonates, especially those preterm, is limited. • Caution in the first 24 hours for treatment of "pain" related to birth Infants who are unsettled should be assessed clinically and not assumed to be in pain secondary to birth[5] • Store vials at room temperature (below 30°C). Diluted solution must

	be used within 1 hour of preparation including the infusion time[10] • Store oral suspension at room temperature (below 25°C)[9]
Rescue medication	Discontinue immediately and seek urgent medical assistance if anaphylaxis or severe adverse reactions occur. In the case of accidental overdose, measure serum paracetamol concentration, consider treatment with N-acetyl cysteine (antidote) and monitor hepatic transaminases. Refer to TOXINZ for further guidance[11].

4. Guardrails Information

Paracetamol is Guardrail profiled on the CC pump for NICU. Following are the guardrail limits[14]:

Guardrails Drug Name	**Paracetamol***			
Pump	**CC**			
	0.4 – 1 kg	**1 – 2 kg**	**2 – 3 kg**	**3 – 5 kg**
Concentration (mg/ml)				
Minimum	1.87	4.68	9.3	9.9
Maximum	10	10	10	10
Dose rate (mg/kg/hr)				
Default	30	30	30	30
Soft minimum	28	28	28	28
Soft maximum	40	40	40	40
Hard max	60	60	60	60

5. References

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