# DRUG DOSAGES IN PAEDIATRIC ANAESTHESIA

## PREMEDICATION

| | |
|---|---|
| Atropine | 0.04mg/kg oral, or 0.02mg/kg IM |
| Chloral Hydrate | 50mg/kg oral, given 30-45 minutes before surgery |
| Clonidine | 2mcg/kg oral |
| Hyoscine hydrobromide | 0.01mg/kg IM, given 30 minutes before surgery |
| Ketamine | 5mg/kg oral, or 2-4mg/kg IM |
| Midazolam | 0.5mg/kg oral, given 15 minutes before surgery<br>0.1-0.2mg/kg IV, or 0.2-0.3mg/kg intranasal (causes a burning sensation) |
| Promethazine | 1mg/kg oral, given 30 minutes before surgery |

## INTRAVENOUS INDUCTION AGENTS

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|---|---|
| Etomidate | 0.3mg/kg IV |
| Ketamine | 0.2mg/kg IV or 5-10mg/kg IM |
| Propofol | 2-6mg/kg IV, over 3 months of age |
| Thiopentone | 5mg/kg IV (if premedicated), 5-8mg/kg IV (if unpremedicated) |

## MUSCLE RELAXANTS

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|---|---|
| Atracurium | 0.5mg/kg IV |
| Mivacurium | 0.15mg/kg IV |
| Pancuronium | 0.1mg/kg IV |
| Rocuronium | 0.6-1.2mg/kg IV |
| Suxamethonium | 1-2mg/kg IV |

## REVERSAL AGENTS

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|---|---|
| Atropine | 0.02mg/kg IV |
| Glycopyrrolate | 0.01mg/kg IV |
| Neostigmine | 0.05mg/kg IV |
| Sugammedex | 2mg/kg IV for moderate blockade<br>4mg/kg IV for deep blockade<br>16mg/kg IV for immediate reversal |

## ANALGESICS

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|---|---|
| Paracetamol | 15 mg/kg oral/IV (paediatrics), 7.5-10 mg/kg oral/IV (neonates) |
| Ibuprofen | 5-10mg/kg oral |
| Diclofenac | 1 mg/kg per rectal |
| Oxycodone | 01 - 0.2 mg/kg oral |
| Fentanyl | 0.5 - 3 mcg/kg IV |
| Morphine | 0.05- 0.2 mg/kg IV |
| Remifentanil | 0.01-1 mcg/kg/min, titrate to effect |

## LOCAL ANAESTHETICS (TOXIC DOSE)

| | |
|---|---|
| Bupivacaine | ≥ 2.5mg/kg; ≥ 2mg/kg in neonates |
| Levobupivacaine | ≥ 2.5mg/kg, ≥ 2mg/kg in neonates |
| Lignocaine | ≥ 3mg/kg; ≥ 7mg/kg (with adrenaline) |

** please refer to chapter on Regional Anaesthesia for dosing guidelines for central neuraxial blocks or peripheral nerve blocks*

## DRUGS USED FOR EMERGENCIES/ RESUSCITATION

### CARDIAC RESUSCITATION DRUGS

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|---|---|
| Adrenaline | 0.1ml/kg of 1:10 000 IV/ IO (ie 10mcg/kg) repeated 3-5min as required<br>0.1ml/kg of 1:1000 via ETT<br><br>Anaphylaxis: 0.05ml/kg of 1:10 000 IV, or 0.01ml/kg of 1:1000 IM<br>Severe croup: 0.5ml/kg/dose of 1:1000 nebulised (max 5ml) |
| Adenosine | 0.1-0.2mg/kg IV (max 6-12mg) for SVT, and flushed with 10ml NS |
| Atropine | 0.02mg/kg |
| Amiodarone | 5mg/kg IV over 3-5min, may repeat 5mg/kg/dose up to 3 times (max 15mg/kg)<br>Infusion: 5-15mcg/kg/min |
| Calcium chloride 10% | 0.2ml/kg IV |
| Lignocaine | 1mg/kg IV, infusion 15-50mcg/kg/min |
| Sodium bicarbonate 8.4% | 1-2ml/kg IV |

### DEFIBRILLATION

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| External defibrillation | 4J/kg for pulseless VF/VT |
| Synchronized cardioversion | Initial 0.5-1J/kg then subsequent 2J/kg for unstable SVT |

### LOCAL ANAESTHETIC TOXICITY

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|---|---|
| Lipofundin 20% | Initial bolus 1.5ml/kg IV over 1 minute and start infusion at 15ml/kg/hr<br>Subsequent bolus 1.5ml/kg IV every 5min, up to a maximum of 3 boluses, and increase infusion to 30ml/kg/hr if hemodynamic stability not achieved.<br>**Not to exceed a maximum cumulative dose of 12ml/kg.*<br>*Ref: AAGBI guidelines (2010) Management of local anaesthetic toxicity* |

### MALIGNANT HYPERTHERMIA

| | |
|---|---|
| Dantrolene | 2.5mg/kg immediate IV bolus<br>Repeat 1mg/kg boluses as required to max 10mg/kg<br>**Dilution: mix 20mg dantrolene with 60ml sterile water to make a solution of 1mg in 3ml. Initial bolus of 7.5ml/lg (=2.5mg/kg) then further doses of 3ml/kg (=1mg/kg) to a max 30ml/kg (10mg/kg)*<br>*Ref: AAGBI safety guidelines (2011) Malignant Hyperthermia Crisis* |

### HYPOGLYCEMIA

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|---|---|
| 50% Dextrose | 0.5ml/kg slow IV, or |
| 10% Dextrose | 2.5ml/kg slow IV |

### HYPERKALEMIA

| | |
|---|---|
| Insulin | 0.1unit/kg/dose IV (max 10units/dose), to be given with IV dextrose |
| 50% Dextrose | 1ml/kg/dose IV, given with IV insulin as above |
| 10% Dextrose | 5ml/kg/dose IV, given with IV insulin as above |
| Calcium chloride 10% | 0.2ml/kg IV |

### SEVERE ASTHMA

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|---|---|
| Aminophylline | Loading dose 5mg/kg IV over 30min, then infusion 15-20mg/kg over 24h<br>*avoid loading dose in patients on theophylline therapy |
| Hydrocortisone | 4-5mg/kg IV 4-6 hourly (max 100mg) |
| Magnesium sulphate | Loading dose 50mg/kg (0.2mmol/kg) IV over 30min (max 2g/dose)<br>Maintenance dose: 20-40mg/kg/hr (max dose 40g/day, max rate 40mg/kg/hr) |
| Salbutamol | Loading dose 5mcg/kg IV, diluted in 10mls NS given over 10min<br>Maintenance dose: 1-5mcg/kg/min (max rate 10mcg/kg/min) |

## VASOACTIVE DRUG INFUSIONS

| Drug | Paediatric dilution | Concentration* | Dose Range |
|---|---|---|---|
| Adrenaline | (weight x 0.3)mg in 50ml | 1ml/hr = 0.1mcg/kg/min | 0.01 to 0.5mcg/kg/min |
| Dobutamine | (weight x 30)mg in 50ml | 1ml/hr = 10mcg/kg/min | 2 to 15mcg/kg/min |
| Dopamine | (weight x 30)mg in 50ml | 1ml/hr = 10mcg/kg/min | 2 to 15mcg/kg/min |
| Isoprenaline | (weight x 0.3)mg in 50ml | 1ml/hr = 0.1mcg/kg/min | 0.05 to 2mcg/kg/min |
| Milrinone | (weight x 3)mg in 50ml | 1ml/hr = 1mcg/kg/min | 0.3 to 0.7mcg/kg/min |
| Noradrenaline | (weight x 0.3)mg in 50ml | 1ml/hr = 0.1mcg/kg/min | 0.01 to 0.5mcg/kg/min |
| Nitroglycerin | (weight x 3)mg in 50ml | 1ml/hr = 1mcg/kg/min | 0.5 to 10mcg/kg/min |
| Nitroprusside | (weight x 1.5)mg in 25ml | 1ml/hr = 1mcg/kg/min | 0.5 to 8mcg/kg/min |
| Phenylephrine | | | 2-10mcg/kg IV bolus<br>Infusion 1-5mcg/kg/min |

**not to exceed the concentration of the original preparation*

## MISCELLANEOUS DRUGS

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|---|---|
| Dexamethasone | 0.25mg/kg IV, then 0.1mg/kg q6h |
| Dexmedetomidine | 1mcg/kg IV over 15min, then 0.2-0.7mcg/kg/hr (prepared as either neonatal concentration of 1mcg/ml or adult concentration of 4mcg/ml) |
| Esmolol | 0.5mg/kg IV, repeated as needed |
| Flumazenil | 5mcg/kg IV every 60seconds to a max 40mcg/kg total dose.<br>Infusion 2-10mcg/kg/hour |
| Frusemide | 0.5-1mg/kg IV (max 20-40mg)<br>Infusion 0.1-1mg/kg/hour |
| Hydrocortisone | 1-2mg/kg IV q6h |
| Hyoscine Nbutylbromide (Buscopan) | 0.6mg/kg/dose IV 6-8hourly<br>>12 years old: 10-20mg 3-4 times daily |
| Levitiracetam (Keppra) | Loading dose 50mg/kg/dose IV (max 2.5g)<br>Maintenance: 30-60mg/kg/day divided twice daily |
| Lorazepam | 0.1mg/kg IV, up to 4mg. May repeat in 5min, for status epilepticus |
| Mannitol 20% | 0.25-0.5g/kg IV (1.25-2.5ml/kg of 20% Mannitol) |
| Metoclopromide | 0.15mg/kg/dose IV q6h |
| Naloxone | |
| Omeprazole | 0.7-3.3mg/kg/day IV/oral once daily to 8hourly (max 40mg/dose) |
| Ondansetron | 0.15-0.2mg/kg/dose 8hourly (max 8mg/dose) |
| Phenobarbitone | Loading dose 20mg/kg IV over 30min, may repeat up to 60-80mg/kg |
| Phenytoin | Loading dose 20mg/kg IV over 20min (max rate 1mg/kg/min, max dose 1.5g)<br>May repeat 5mg/kg x 2 in status epilepticus |
| Promethazine | ≥ 2 years: 0.125-0.2mg/kg oral (max 10mg/dose) TDS |
| Propranolol | 0.1mg/kg IV |
| Ranitidine | 1mg/kg IV 6-12hourly |
| Tranexamic acid | Loading 10mg/kg IV over 1 hour, then infusion at 1mg/kg/hour.<br>Loading 25mg/kg IV over 1 hour, then infusion at 2.5mg/kg/hour for cardiac surgical cases |

# ANTIBIOTICS

*Note:*
Neonatal dosing to be used till post menstrual age (PMA) of 44 weeks.
PMA is equivalent to gestational age + postnatal age. For example, for a baby born at 28 weeks gestation and is now 21 days old, the PMA would be 31 weeks.
For PMA above 45 weeks, please refer to the dosing indicated for child.

All routes are intravenous (IV) unless otherwise specified.

| Drug | Dosing | Remarks |
|---|---|---|
| Amikacin | **Neonates**<br>PMA ≤ 29 wk:<br>≤ 7 days: 18mg/kg q48h<br>8-28 days: 15mg/kg q36h<br>≥ 29 days: 15mg/kg q24h<br>PMA 30-34 wk:<br>≤ 7 days: 18mg/kg q36h<br>≥ 8 days: 15mg/kg q24h<br>PMA 35-44wk: 15mg/kg q24h<br><br>**Child**: 15-22.5mg/kg/day q8-12h<br><br>**Adult**: 15mg/kg/day q8-12h (max 1.5g/day) | Infuse over 30-60min.<br><br><u>Therapeutic levels:</u><br>Target peak: 30-40 μg/ml<br>Target trough: <10μg/ml<br>(*ideal trough: 4-5μg/ml, especially if existing nephrotoxic drugs or poor renal function) |
| Ampicillin | Neonates: 50mg/kg/dose, interval depends on PMA<br>PMA ≤ 29 wk: (≤ 28 days: q12h, >28 days: q8h)<br>PMA 30-36wk: (≤ 14 days: q12h, >14 days: q8h)<br>PMA 37-44wk: (≤ 7 days: q12h, >7 days: q8h) | |

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|---|---|---|---|
| | Child: | 25-37.5mg/kg/dose q6h<br>50mg/kg for single dose cardiac prophylaxis | |
| Augmentin | Neonates: | <7 days: 30mg/kg q12h (based on Co-amoxiclav)<br>≥7 days: 30mg/kg q8h (based on Co-amoxiclav) | |
| | Child: | 30mg/kg/dose q8h (up to 40mg/kg/dose q8h) | |
| Cefazolin | Neonates: | 25mg/kg/dose<br>< 2kg: (≤7 days q12h; >7 days q12h)<br>> 2kg: (≤7 days q12h; >7 days q8h) | |
| | Child: | 25-30mg/kg/dose q6-8h | |
| Ceftazidime | Neonates: | 50mg/kg/dose, interval depends on PMA<br>PMA ≤ 29 wk: (≤ 28 days: q12h, >28 days: q8h)<br>PMA 30-36wk: (≤ 14 days: q12h, >14 days: q8h)<br>PMA 37-44wk: (≤ 7 days: q12h, >7 days: q8h) | |

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| | Child: | 30-50mg/kg/dose q8h for mild-moderate infections<br>60-100mg/kg/dose q8h for severe infections/ meningitis | |
| Ceftriaxone | Neonates: | <2kg: 50mg/kg/dose q24h<br>≥2kg: (≤7 days) 50mg/kg/dose q24h<br>(>7 days) 75mg/kg/dose q24h | |
| | Child: | 25-50mg/kg q12-24h<br>100mg/kg/day q12-24h for meningitis (max 2g q12h) | |
| Ciprofloxacin | Child: | 10-15mg/kg/dose q12h | |
| Clindamycin | Neonates: | 5mg/kg/dose, interval depends on PMA<br>PMA ≤ 29 wk: (≤ 28 days: q12h, >28 days: q8h)<br>PMA 30-36wk: (≤ 14 days: q12h, >14 days: q8h)<br>PMA 37-44wk: (≤ 7 days: q12h, >7 days: q8h) | |
| | Child: | 5mg/kg/dose q6-8h | |

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|---|---|---|---|
| | Adult: | 600mg-1.2g/day | |
| Cloxacillin | Neonates: | < 2kg: (≤7 days) 50mg/kg q12h<br>(>7 days) 50mg/kg q8h<br>> 2kg: (≤7 days) 50mg/kg q8h<br>(>7 days) 50mg/kg q6h | |
| | Child: | 25mg/kg/dose q6h<br>50mg/kg/dose q6h in meningitis | |
| Erythromycin | Neonates: | 10mg/kg/dose<br>< 1kg: (≤14 days q12h; 15-28 days q8h)<br>≥ 1kg: (≤7 days q12h; 8-28 days q8h) | IV infusion over 30-60min. |
| | Child: | 10-12.5mg/kg/day q6h | |
| Gentamicin | **Neonates**<br>PMA ≤ 29 wk: | | Infuse over 30-60min.<br>Do not mix with ampicillin. |

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| | | ≤ 7 days: 5mg/kg q48h<br>8-28 days: 4mg/kg q36h<br>≥ 29 days: 4mg/kg q24h<br>PMA 30-34 wk:<br>≤ 7 days: 4.5mg/kg q36h<br>≥ 8 days: 4mg/kg q24h<br>PMA 35-44wk: 4mg/kg q24h<br><br>Child: 2-2.5mg/kg q8h<br>5mg/kg q24h for uncomplicated UTI over 1month old | <u>Therapeutic levels:</u><br>Target peak: 8-10 μg/ml<br>Target trough: <2 μg/ml<br>(ideal trough: <1 μg/ml, especially if nephrotoxic drugs or poor renal function) |
| Imipenem | Child: | 15-25mg/kg q6h (max 4g/day) | May cause convulsions, adjust dose in renal dysfunction |
| Meropenem | Neonate: | 20mg/kg/dose, interval depends on PMA<br>PMA < 32wk: (≤ 14 days: q12h, >14 days: q8h)<br>PMA ≥ 32wk: (≤ 7 days: q12h, >7 days: q8h) | |

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|---|---|---|---|
| | Child: | 20mg/kg q8h<br>40mg/kg q8h for meningitis | |
| Metronidazole | Neonate: | Loading dose 15mg/kg<br>Maintenance dose 7.5mg/kg/dose, dosing interval depending on PMA<br>PMA ≤ 29 wk: (≤ 28 days: q48h, >28 days: q24h)<br>PMA 30-36wk: (≤14 days: q24h, >14 days: q12h)<br>PMA 37-44wk: (≤7 days: q24h, >7 days: q12h) | |
| | Child: | 7.5-10mg/kg q6-8h | |
| Piperacillin/ Tazobactam (Tazocin) | Neonates: | 50-100mg (piperacillin) /kg/dose<br>PMA ≤ 29 wk: (≤ 28 days: q12h, >28 days: q8h)<br>PMA 30-36wk: (≤14 days: q12h, >14 days: q8h)<br>PMA 37-44wk: (≤7 days: q12h, >7 days: q8h) | |
| | Child: | <2 months: 80mg Piperacillin /kg/dose q8h<br>≥2 months: 80mg Piperaciliin /kg/dose q6h | |

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|---|---|---|---|
| Vancomycin | Neonates: | 15mg/kg/dose<br>PMA ≤ 29 wk: (≤ 14 days: q18h, >14 days: q12h)<br>PMA 30-36wk: (≤14 days: q12h, >14 days: q8h)<br>PMA 37-44wk: (≤7 days: q12h, >7 days: q8h) | Each dose to be infused over 60min.<br><br><u>Therapeutic levels:</u><br>Peak: 30-40 μg/ml<br>Trough: 15-20 μg/ml (complicated infections);<br>10-15 μg/ml (others) |
| | Child: | 15mg/kg/dose q6h | |
| | Adult: | 2-4g/day q6-12h | |

References:


1. KKH Neonatal Drug Dosing Booklet, 3rd edition (2014), available on KKH intranet
2. KKH Paediatric Medicine Clinical Guidelines, Appendix - Drugs – Infections (March 2015), available on KKH intranet