

# Morphine 5mg/mL (Parenteral)

## Newborn use only

2019

<b>Alert</b>	S8 - High risk medication- may cause significant patient harm when used in error.												
<b>Indication</b>	Analgesia / sedation: 1. Pre-medication prior to intubation or other procedure 2. During assisted ventilation 3. Procedures and post-surgery 4. Neonatal abstinence syndrome secondary to opioid withdrawal												
<b>Action</b>	mu-opioid analgesic – stimulates brain opioid receptors.												
<b>Drug Type</b>	mu-opioid analgesic.												
<b>Trade Name</b>	DBL Morphine Sulfate (also contains sodium chloride and hydrochloric acid).												
<b>Presentation</b>	5 mg/mL (5,000 microgram/mL) ampoule												
<b>Dosage/Interval</b>	<p><b>ANALGESIA</b></p> <p><b>CONTINUOUS IV INFUSION</b>  Range: 5–40 microgram/kg/hour:  <b>Ventilated infants or after surgery*[1,2,3]</b></p> <table border="1"> <thead> <tr> <th>Postnatal age<sup>#</sup></th> <th>Starting dose</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>0-7 days</td> <td>10 microgram/kg/hour</td> <td>5-40 microgram/kg/hour</td> </tr> <tr> <td>8-30 days</td> <td>15 microgram/kg/hour</td> <td>5-40 microgram/kg/hour</td> </tr> <tr> <td>31-90 days</td> <td>20 microgram/kg/hour</td> <td>5-40 microgram/kg/hour</td> </tr> </tbody> </table> <p>*Infants after cardiovascular surgery may need lower starting dose and titrated to clinical response.[2]</p> <p><b>IV BOLUS FOR ANALGESIA</b>  50 microgram/kg (maximum recommended 100 microgram/kg) every 4 hours.[4]</p> <p><b>PRE-MEDICATION FOR INTUBATION</b>  100 microgram/kg/dose (up to 200 microgram/kg) [5]</p> <p><b>NEONATAL ABSTINENCE SYNDROME –INITIAL TREATMENT</b>  10 microgram/kg/hour titrated to Neonatal Abstinence Syndrome scores.</p>	Postnatal age <sup>#</sup>	Starting dose	Range	0-7 days	10 microgram/kg/hour	5-40 microgram/kg/hour	8-30 days	15 microgram/kg/hour	5-40 microgram/kg/hour	31-90 days	20 microgram/kg/hour	5-40 microgram/kg/hour
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<b>Maximum Daily Dose</b>	Doses up to 100 microgram/kg/hour have been used in newborns; however this was associated with an increase in the duration of mechanical ventilation.												
<b>Route</b>	IV												
<b>Preparation/Dilution</b>	<p><b>2-STEP DILUTION (consider for weight &lt;2 kg)</b></p> <p><b>IV Infusion: SINGLE STRENGTH</b></p> <table border="1"> <thead> <tr> <th>Prescribed amount</th> <th>Infusion rate</th> </tr> </thead> <tbody> <tr> <td>1 mg/kg morphine and make up to 50 mL</td> <td>1 mL/hour = 20 microgram/kg/hour</td> </tr> </tbody> </table> <p><b>Step 1:</b> Draw up 1 mL (5mg morphine in 1mL) and add 4 mL sodium chloride 0.9% to make a volume of 5 mL with a concentration of 1000 microgram/mL.  <b>Step 2:</b> From the above solution, draw up 1 mL/kg (1000 microgram/kg) and further dilute with glucose 5% or glucose 10% or sodium chloride 0.9% to make a final volume of 50 mL with a concentration of 1 mL/hour = 20 microgram/kg/hour.  <b>IV bolus dose from single strength solution: 2.5 mL =50 microgram/kg.</b></p> <p><b>IV infusion: DOUBLE STRENGTH</b></p> <table border="1"> <thead> <tr> <th>Prescribed amount</th> <th>Infusion rate</th> </tr> </thead> <tbody> <tr> <td>2 mg/kg morphine and make up to 50 mL</td> <td>1 mL/hour = 40 microgram/kg/hour</td> </tr> </tbody> </table> <p><b>Step 1:</b> Draw up 1 mL (5mg morphine in 1mL) and add 4 mL sodium chloride 0.9% to make a volume of 5 mL with a concentration of 1000 microgram/mL.</p>	Prescribed amount	Infusion rate	1 mg/kg morphine and make up to 50 mL	1 mL/hour = 20 microgram/kg/hour	Prescribed amount	Infusion rate	2 mg/kg morphine and make up to 50 mL	1 mL/hour = 40 microgram/kg/hour				
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	<p><b>Step 2: From the above solution, draw up 2 mL/kg (2000 microgram/kg) and further dilute with glucose 5% or glucose 10% or sodium chloride 0.9% to make a final volume of 50 mL with a concentration of 1 mL/hour = 40 microgram/kg/hour.</b>  <b>IV bolus dose from double strength solution: 1.25 mL =50 microgram/kg.</b></p> <p><b>IV BOLUS and PRE-MEDICATION FOR INTUBATION</b>          Draw up 1 mL (5mg morphine in 1mL) and add 4 mL sodium chloride 0.9% to make a final volume of 5 mL with a concentration of 1000 microgram/mL.</p> <p><b>1-STEP DILUTION (consider for weight 2 kg and over)</b></p> <p><b>IV Infusion: SINGLE STRENGTH</b></p> <table border="1" data-bbox="475 667 1469 745"> <thead> <tr> <th>Prescribed amount</th> <th>Infusion rate</th> </tr> </thead> <tbody> <tr> <td>1 mg/kg morphine and make up to 50 mL</td> <td>1 mL/hour = 20 microgram/kg/hour</td> </tr> </tbody> </table> <p>Draw up 0.2 mL/kg (5mg morphine in 1mL) and add glucose 5% or glucose 10% or sodium chloride 0.9% to make a final volume of 50 mL with a concentration of <b>1 mL/hour = 20 microgram/kg/hour.</b>  <b>For IV bolus dose from single strength solution: 2.5 mL = 50 microgram/kg.</b></p> <p><b>IV Infusion: DOUBLE STRENGTH</b></p> <table border="1" data-bbox="475 1010 1469 1088"> <thead> <tr> <th>Prescribed amount</th> <th>Infusion rate</th> </tr> </thead> <tbody> <tr> <td>2 mg/kg morphine and make up to 50 mL</td> <td>1 mL/hour = 40 microgram/kg/hour</td> </tr> </tbody> </table> <p>Draw up 0.4 mL/kg (5 mg morphine in 1mL) and add glucose 5% or glucose 10% or sodium chloride 0.9% to make a final volume of 50 mL with a concentration of <b>1 mL/hour = 40 microgram/kg/hour.</b>  <b>For IV bolus dose from double strength solution: 1.25 mL = 50 microgram/kg.</b></p> <p><b>IV BOLUS and PRE-MEDICATION FOR INTUBATION</b>          Draw up 1 mL (5 mg morphine in 1 mL) and add 4 mL sodium chloride 0.9% to make a final volume of 5 mL with a concentration of 1000 microgram/mL.</p>	Prescribed amount	Infusion rate	1 mg/kg morphine and make up to 50 mL	1 mL/hour = 20 microgram/kg/hour	Prescribed amount	Infusion rate	2 mg/kg morphine and make up to 50 mL	1 mL/hour = 40 microgram/kg/hour
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<b>Administration</b>	<p><b>CONTINUOUS IV INFUSION:</b> Via syringe driver.</p> <p><b>IV BOLUS:</b> Administer over 5 minutes. Flush with 1 mL sodium chloride 0.9% before and after injection. Rapid IV administration may increase adverse effects.</p> <p><b>PRE-MEDICATION FOR INTUBATION:</b> As above for IV bolus. Wait a minimum of 5 minutes for onset of action; however for maximum effect wait 15 minutes after giving the dose.</p>								
<b>Monitoring</b>	<p>All patients should have cardiorespiratory monitoring and be carefully observed, particularly if they are breathing spontaneously. Respiratory depression/apnoea can be reversed with naloxone.</p> <p>Naloxone is contraindicated in opioid dependent infants.</p> <p>Observe for urinary retention, abdominal distension or delay in passage of stool.</p> <p>Withdraw slowly following prolonged use.</p>								
<b>Contraindications</b>	<p>Hypersensitivity to morphine or any excipients.</p>								
<b>Precautions</b>	<p>Potentially toxic serum concentrations of morphine may occur in infants with hypoxic ischaemic encephalopathy with moderate hypothermia and infusion rates &gt;10 microgram/kg per hour. [3] Use with caution in patients with hypersensitivity reactions to other opioids.</p> <p>Hypotension and bradycardia. Respiratory depression.</p> <p>Transient hypertonia. Convulsions.</p>								

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	Ileus and delayed gastric emptying time. Urinary retention. Renal or hepatic impairment. Tolerance may develop after prolonged use – wean slowly.
<b>Drug Interactions</b>	Concomitant use with other CNS depressants potentiates effects of opioids, increasing risk of respiratory depression, profound sedation or coma.
<b>Adverse Reactions</b>	Morphine has been associated with respiratory depression (levels above 20 ng/mL); decreased gastrointestinal motility, hypotension at higher doses, and urinary retention [4].
<b>Compatibility</b>	<b>Fluids</b> : glucose 2.5%, 5% and 10%, glucose in sodium chloride solutions, Hartmann’s, sodium chloride 0.45% and 0.9%  <b>Y-site</b> : adrenaline hydrochloride, amifostine, amikacin, amiodarone, ampicillin, anidulafungin, atracurium, atropine, aztreonam, bivalirudin, caspofungin, cefazolin, cefotaxime, cefoxitin, ceftazidime, ceftriaxone, cisatracurium, clindamycin, dexamethasone, digoxin, dopamine, eptifibatide, erythromycin, esmolol, filgrastim, fluconazole, foscarnet, gentamicin, granisetron, haloperidol lactate (in glucose), heparin sodium, hyoscine hydrobromide, insulin (short-acting), ketorolac, labetalol, lignocaine, linezolid, magnesium sulfate, methylprednisolone sodium succinate, metoclopramide, metoprolol, metronidazole, midazolam, milrinone, noradrenaline, palonosetron, paracetamol, piperacillin-tazobactam (EDTA-free), posaconazole, potassium chloride, remifentanyl, sodium nitroprusside, tacrolimus, tigecycline, tirofiban, tobramycin, trimethoprim-sulfamethoxazole, vancomycin, vecuronium, zidovudine.
<b>Incompatibility</b>	<b>Fluids</b> : Morphine may precipitate out of solution when the final pH is greater than 6.4.  <b>Drugs</b> : Aminophylline, azathioprine, azithromycin, flucloxacillin, folic acid, ganciclovir, indometacin, pentamidine, pethidine, promethazine, sodium nitrite, thiopental sodium.
<b>Stability</b>	Diluted solution for continuous IV infusion is stable for 48 hours.
<b>Storage</b>	Ampoule: Store below 25°C. Protect from light. Discard remainder after use (in line with schedule 8 drug legislation). Store in Dangerous Drug (DD) safe and record use in DD register.
<b>Special Comments</b>	Prolonged use (> 5–7 days) may be associated with dependence.
<b>Evidence summary</b>	Refer to full version.
<b>References</b>	Refer to full version.

<b>Original version Date: 8/08/2015</b>	<b>Author: Neonatal Medicines Formulary Consensus Group</b>
<b>Current Version number: 2.1</b>	<b>Current Version Date: 18/09/2018</b>
<b>Risk Rating: Medium</b>	<b>Due for Review: 18/09/2021</b>
<b>Approval by: As per Local policy</b>	<b>Approval Date:</b>

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