Morphine 10mg/mL (Parenteral) 2019

Newborn use only

<table>
<tr><td>Alert</td><td>S8 - High risk medication- may cause significant patient harm when used in error.</td></tr>
<tr><td>Indication</td><td>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</td></tr>
<tr><td>Action</td><td>mu-opioid analgesic − stimulates brain opioid receptors.</td></tr>
<tr><td>Drug Type</td><td>mu-opioid analgesic.</td></tr>
<tr><td>Trade Name</td><td>DBL Morphine Sulfate (also contains sodium chloride and hydrochloric acid).
Juno Morphine Hydrochloride</td></tr>
<tr><td>Presentation</td><td>10 mg/mL (10,000 microgram/mL) ampoule.
Note: Morphine hydrochloride and sulfate contain approximately equivalent amounts of morphine base per milligram.</td></tr>
<tr><td>Dosage/Interval</td><td>ANALGESIA
CONTINUOUS IV INFUSION
Range: 5–40 microgram/kg/hour:
Ventilated infants or after surgery*[1,2,3]
<table>
<tr><td>Postnatal age#</td><td>Starting dose</td><td>Range</td></tr>
<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>
</table>
*Infants after cardiovascular surgery may need lower starting dose and titrated to clinical response.[2]

IV BOLUS FOR ANALGESIA
50 microgram/kg (maximum recommended 100 microgram/kg) every 4 hours.[4]

PRE-MEDICATION FOR INTUBATION
100 microgram/kg/dose (up to 200 microgram/kg) [5]

NEONATAL ABSTINENCE SYNDROME –INITIAL TREATMENT
10 microgram/kg/hour titrated to Neonatal Abstinence Syndrome scores.</td></tr>
<tr><td>Maximum Daily Dose</td><td>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.</td></tr>
<tr><td>Route</td><td>IV</td></tr>
<tr><td>Preparation/Dilution</td><td>2-STEP DILUTION (consider for weight <2 kg)
IV Infusion: SINGLE STRENGTH
<table>
<tr><th>Prescribed amount</th><th>Infusion rate</th></tr>
<tr><td>1 mg/kg morphine and make up to 50 mL</td><td>1 mL/hour = 20 microgram/kg/hour</td></tr>
</table>
<u>Step 1:</u> Draw up 1 mL (10mg morphine in 1mL) and add 9 mL sodium chloride 0.9% to make a volume of 10 mL with a concentration of 1000 microgram/mL.
<u>Step 2</u>: 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.
IV bolus dose from single strength solution: 2.5 mL =50 microgram/kg.

IV infusion: DOUBLE STRENGTH
<table>
<tr><th>Prescribed amount</th><th>Infusion rate</th></tr>
<tr><td>2 mg/kg morphine and make up to 50 mL</td><td>1 mL/hour = 40 microgram/kg/hour</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td>
<u>Step 1:</u> Draw up 1 mL (10mg morphine in 1mL) and add 9 mL sodium chloride 0.9% to make a volume of 10 mL with a concentration of 1000 microgram/mL.
<u>Step 2</u>: 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.
IV bolus dose from double strength solution: 1.25 mL =50 microgram/kg.

IV BOLUS and PRE-MEDICATION FOR INTUBATION
Draw up 1 mL (10mg morphine in 1mL) and add 9 mL sodium chloride 0.9% to make a final volume of 10mL with a concentration of 1000 microgram/mL.

<h2>1-STEP DILUTION (consider for weight 2 kg and over)</h2>
IV Infusion: SINGLE STRENGTH
<table>
<tr><th>Prescribed amount</th><th>Infusion rate</th></tr>
<tr><td>1 mg/kg morphine and make up to 50 mL</td><td>1 mL/hour = 20 microgram/kg/hour</td></tr>
</table>
Draw up 0.1 mL/kg (10mg 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 1 mL/hour = 20 microgram/kg/hour.
For IV bolus dose from single strength solution: 2.5 mL = 50 microgram/kg.

IV Infusion: DOUBLE STRENGTH
<table>
<tr><th>Prescribed amount</th><th>Infusion rate</th></tr>
<tr><td>2 mg/kg morphine and make up to 50 mL</td><td>1 mL/hour = 40 microgram/kg/hour</td></tr>
</table>
Draw up 0.2 mL/kg (10mg 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 1 mL/hour = 40 microgram/kg/hour.
For IV bolus dose from double strength solution: 1.25 mL = 50 microgram/kg.

IV BOLUS and PRE-MEDICATION FOR INTUBATION
Draw up 1 mL (10 mg morphine in 1 mL) and add 9 mL sodium chloride 0.9% to make a final volume of 10 mL with a concentration of 1000 microgram/mL.
</td></tr>
<tr><td>Administration</td><td>
CONTINUOUS IV INFUSION: Via syringe driver.

IV BOLUS: Administer over 5 minutes. Flush with 1 mL sodium chloride 0.9% before and after injection. Rapid IV administration may increase adverse effects.

PRE-MEDICATION FOR INTUBATION: 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.
</td></tr>
<tr><td>Monitoring</td><td>
All patients should have cardiorespiratory monitoring and be carefully observed, particularly if they are breathing spontaneously. Respiratory depression/apnoea can be reversed with naloxone.
Naloxone is contraindicated in opioid dependent infants.
Observe for urinary retention, abdominal distension or delay in passage of stool.
Withdraw slowly following prolonged use.
</td></tr>
<tr><td>Contraindications</td><td>Hypersensitivity to morphine or any excipients.</td></tr>
<tr><td>Precautions</td><td>Potentially toxic serum concentrations of morphine may occur in infants with hypoxic ischaemic encephalopathy with moderate hypothermia and infusion rates >10 microgram/kg per hour. [3] Use with caution in patients with hypersensitivity reactions to other opioids.</td></tr>
</table>

	Hypotension and bradycardia. Respiratory depression. Transient hypertonia. Convulsions. Ileus and delayed gastric emptying time. Urinary retention. Renal or hepatic impairment. Tolerance may develop after prolonged use − wean slowly.
Drug Interactions	Concomitant use with other CNS depressants potentiates effects of opioids, increasing risk of respiratory depression, profound sedation or coma.
Adverse Reactions	Morphine has been associated with respiratory depression (levels above 20 ng/mL); decreased gastrointestinal motility, hypotension at higher doses, and urinary retention [4].
Compatibility	Compatibility is likely to be similar for morphine hydrochloride and sulfate. **Fluids : Morphine hydrochloride** – glucose 5%, sodium chloride 0.9% **Morphine sulfate** – glucose 2.5%, 5% and 10%, glucose in sodium chloride solutions, Hartmann's, sodium chloride 0.45% and 0.9% **Y-site : Morphine hydrochloride** –Consult the pharmacist for more advice. **Morphine sulfate** – 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, remifentanil, sodium nitroprusside, tacrolimus, tigecycline, tirofiban, tobramycin, trimethoprim-sulfamethoxazole, vancomycin, vecuronium, zidovudine.
Incompatibility	**Fluids:** Morphine may precipitate out of solution when the final pH is greater than 6.4. **Drugs : Morphine hydrochloride** – esomeprazole **Morphine sulfate** – Aminophylline, azathioprine, azithromycin, flucloxacillin, folic acid, ganciclovir, indometacin, pentamidine, pethidine, promethazine, sodium nitrite, thiopental sodium.
Stability	Diluted solution for continuous IV infusion is stable for 48 hours.
Storage	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.
Special Comments	Prolonged use (> 5–7 days) may be associated with dependence.
Evidence summary	Refer to full version.
References	Refer to full version.

Original version Date: 8/08/2015	**Author: Neonatal Medicines Formulary Consensus Group**
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Approval by: JHCH CQPCC	**Approval Date: 26/03/2019**

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