Morphine 10mg/mL (Parenteral)
Newborn use only

Alert
S8 - High risk medication - may cause significant patient harm when used in error.

Indication
Analgesia / sedation:
1. Pre-medications prior to intubation or other procedure
2. During assisted ventilation
3. Procedures and post-surgery
4. Neonatal abstinence syndrome secondary to opioid withdrawal

Action
mu-opioid analgesic – stimulates brain opioid receptors.

Drug Type
mu-opioid analgesic.

Trade Name
DBL Morphine Sulfate (also contains sodium chloride and hydrochloric acid).
Juno Morphine Hydrochloride

Presentation
10 mg/mL (10,000 microgram/mL) ampoule.
Note: Morphine hydrochloride and sulfate contain approximately equivalent amounts of morphine base per milligram.

Dosage/Interval
ANALGESIA
CONTINUOUS IV INFUSION
Range: 5–40 microgram/kg/hour:
Ventilated infants or after surgery*:1,2,3

<table>
<thead>
<tr>
<th>Postnatal age</th>
<th>Starting dose</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>0-7 days</td>
<td>10 microgram/kg/hour</td>
<td>5-40 microgram/kg/hour</td>
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<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>
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</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.

Maximum Daily Dose
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.

Route
IV

Preparation/Dilution
2-STEP DILUTION (consider for weight <2 kg)

IV Infusion: SINGLE STRENGTH

<table>
<thead>
<tr>
<th>Prescribed amount</th>
<th>Infusion rate</th>
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<tbody>
<tr>
<td>1 mg/kg morphine and make up to 50 mL</td>
<td>1 mL/hour = 20 microgram/kg/hour</td>
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</table>

Step 1: 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.

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

This is a printed copy. Refer to HNE PPG Intranet site for the most up to date version.
**Step 1:** 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.

**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.

**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 10 mL with a concentration of 1000 microgram/mL.

**1-STEP DILUTION (consider for weight 2 kg and over)**

**IV Infusion: SINGLE STRENGTH**

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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**

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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.

**Administration**

**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.

**Monitoring**

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.

**Contraindications**

Hypersensitivity to morphine or any excipients.

**Precautions**

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.
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**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.

**Incompatibility**
Fluids: Morphine may precipitate out of solution when the final pH is greater than 6.4.

**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.
<table>
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<tr>
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<th>Srinivas Bolisetty</th>
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Facilitator | Srinivas Bolisetty