Drug Guideline Title: Morphine

Summary:
Morphine is an opioid narcotic analgesic agent used for the treatment of pain in adult ICU patients.

Approved by: ICU Director
Publication (Issue) Date: February 2014
Next Review Date: February 2017
Replaces Existing Drug Guideline: Morphine

1. Introduction:
The risk addressed by this policy:

| Patient Safety |

The Aims / Expected Outcome of this policy:

| Morphine will be administered safely and appropriately without any adverse side effects. |

Related Standards or Legislation

- NSQHS Standard 1 Governance
- National Standard 4 Medication Safety

Related Policies
- LH_PD2013_C03.01 Drug Administration
- LH_PD2010_C03.00 Drug Prescribing
- LH_PD2008_C03.12 Administration of IV Medication
- LH_PD2012_C03.05 Accountable Drugs – Schedule 8 (S8) and S4D

2. Policy Statement:
- All care provided within Liverpool Hospital will be in accordance with infection control, manual handling and minimisation and management of aggression guidelines.
- Medications are to be prescribed and signed by a medical officer/authorised nurse practitioner (NP) unless required during an emergency.
• All drugs administered during an emergency (under the direction of a medical officer/authorised nurse practitioner) are to be documented during the event, then prescribed and signed following the event.

• Morphine is a Schedule 8 drug, requiring storage and administration as per the Poisons Act 1994.

• Registered Nurses and medical staff are to be familiar with the following Hospital Policy:

  ⇒ LH_PD2012_C03.05 Accountable Drugs – Schedule 8 (S8) and S4D

• Medications are to be given at the time prescribed (as close to the time as is possible when multiple drugs require ‘same time’ administration and, when the nurse is caring for more than one patient, recognition is given to a possible short delay to administration – antibiotics and other lifesaving drugs are to be prioritised) and are to be signed by the administering nurse.

• Parenteral medication prescriptions and the drug are to be checked with a second registered or endorsed enrolled nurse prior to administration. The “rights of drug administration” must be followed: right: patient, drug, dose, route, administration, time, reason for the drug, documentation, education and evaluation/outcome.

• Adverse drug reactions are to be documented and reported to a medical officer.

• Medication errors are to be reported using the hospital electronic reporting system: IIMS.

• Guidelines are for adult patients unless otherwise stated

3. Principles / Guidelines

Actions 1,2,3

• Morphine is an agonist at all opioid receptors particularly the mu receptor.

• It binds to mu receptors in the brain, spinal cord and other organs containing smooth muscle.

• Morphine produces many effects including analgesia, decreased gastrointestinal motility, respiratory depression, drowsiness, changes in mood and alterations of the endocrine and autonomic nervous systems.

• Nausea and vomiting may occur through direct stimulation of the chemoreceptor trigger zone. Urinary retention may occur due to increased bladder sphincter tone.

• It is distributed throughout the body but most especially to the kidney, lung, liver and spleen.

• When given as an IV bolus, morphine acts within 2 minutes, peaks at 20 minutes and lasts for up to 2 hours.

Indications 2

• Pain relief.

• Relief of respiratory distress and reduction of preload in pulmonary edema.

• For analgesia, as an adjunct to sedation in the intubated patient.

Contraindications 2,4

Absolute contra-indication:

• Patients with known hypersensitivity to morphine or other opioids.

Relative contraindications.

• Hypotension that has not been treated.

• Acute or severe bronchial asthma or other obstructive airways disease, prior to ventilation.

• Severe liver disease or incipient hepatic encephalopathy.

• Biliary colic, biliary tract surgery, GIT obstruction.
• Patients who are taking or who have taken monoamine oxidase inhibitors (MAOIs) within the previous 14 days.

Precautions

• Large doses or rapid administration can cause respiratory depression, bradycardia or even cardiac arrest
• Increased risk of aspiration as it delays gastric emptying.
• Morphine must be administered with caution and in reduced doses to elderly patients.
• It may have a prolonged duration of action and cumulative effect in patients with liver and renal disease.
• Psychological dependence, physical dependence, and tolerance may develop upon repeated administration of morphine. However it should be noted that clinically significant respiratory depression, addiction, rapid tolerance and euphoria rarely develop when doses of morphine are carefully titrated against the pain in patients with terminal disease and severe pain.
• Withdrawal of morphine should be undertaken gradually, as abrupt withdrawal in patients who are physically dependent may precipitate an acute withdrawal syndrome, including convulsions.
• A syndrome of inappropriate antidiuretic hormone secretion characterized by hyponatraemia secondary to decreased free water excretion may occur.
• Morphine stimulates prolactin release and may also cause hyperglycaemia.

Significant Interactions

• Simultaneously giving tricyclics antidepressant, beta blockers or any CNS depressants can increase the CNS depressant effects of morphine.
• Morphine may enhance the neuromuscular blocking effects of skeletal muscle relaxants.
• Morphine when given with cimetidine can cause apnoea, significant reduced in respiratory rate and grand mal seizure.
• Diuretics are less effective because morphine stimulates the release of ADH, causing spasm of the bladder sphincter, and may lead to acute retention of urine.
• It potentiate the anticoagulant activity of Coumarin anticoagulant e.g. Warfarin.

Adverse Effects

• Depression of the level of consciousness (LOC).
• Respiratory depression
• Hypotension.
• Nausea and vomiting.
• Allergic reactions.
• Constipation.
• Spasm of the sphincter of Oddi, which may exacerbate pancreatitis or biliary colic.

Presentation
Morphine 10mg in 1mL ampoule.
Morphine 30mg in 1mL ampoule.
Administration Guidelines

**Pain Relief:**

**Bolus dose IV**

- Dilute 10mg morphine to 10mL sterile 0.9% sodium chloride (final concentration = 1mg/mL).
- Give 1-2 mg morphine as a slow IV bolus every 5 minutes until pain is relieved. Continually observe the patient’s LOC, blood pressure and respiratory rate.
- If after the delivery of 5mg IV, there is no acceptable decrease in pain, contact the Medical Officer for review of the patient.
- It may be necessary to commence an infusion if pain persists.
- A pain score is to be documented on the ICU flowchart at least 4th hourly and after purges, using either the behavioural pain score or the Critical-Care Pain Observation Tool (CPOT). In awake and responsive patients use the “Faces Pain Scale”.

**Infusion**

- Obtain a pre-loaded syringe of morphine 50mg/50mL of sterile 0.9% sodium chloride (or dilute 50mg morphine with sterile 0.9% sodium chloride to total 50mL), final concentration = 1mg/mL.
- Use a syringe driver for accurate delivery.
- A loading dose will be required in patients who have not received one prior to commencement of the infusion. Commence at 1 to 5mg/hour and titrate to achieve pain relief. Closely monitor the patient’s LOC, BP and respiratory rate. Morphine may have a “cumulative effect” in the elderly, or in patients with liver or renal impairment.
- Boluses of 1 to 2mg morphine (use lower doses in elderly patients and in patients with renal impairment) as prescribed on the prn section of the medication chart may be given prior to procedures or nursing care associated with pain (eg: turning the patient). Document boluses on the prn section of the medication chart and the Infusion section of the ICU flowchart.
- A pain score is to be documented on the ICU flowchart at least 4th hourly and after boluses, using either the behavioral pain score or the Critical-Care Pain Observation Tool (CPOT). In awake and responsive patients use the “Faces Pain Scale”.

**‘Sedation’ and pain management for the intubated patient:**

- **Infusion:**
  - Obtain a pre-loaded syringe of 50mg morphine in sterile 0.9% sodium chloride to total 50mL, final concentration of 1mg/mL.
  - Use a syringe driver for accurate delivery.
  - Commence at 1 to 5 mg/hr and titrate to achieve a pain-free, comfortable/non-agitated patient.
  - Boluses of 1 to 2 mg prn may be given prior to potentially painful procedures or nursing/medical care. Document boluses on the prn section of the medication chart and the Infusion section of the ICU flowchart.
  - Ensure that ventilator settings are appropriate if the patient’s spontaneous rate is altered.
  - Morphine may have a “cumulative effect” in the elderly, or patients with liver or renal impairment.

- **The dying patient:**
  - Comfort care with absolute relief of pain and suffering underpins the care of the dying patient.
  - Achieving this may require large doses of morphine.
  - Appropriate pain relief is to be discussed and documented with the ICU medical team, the palliative care team and the attending medical team. Guidelines for analgesia are available in the ICU End of life care document.
• **Subcutaneous Infusion administration:**
  - SCI administration of morphine is often used for palliative care purposes.
  - Use a range of 2 to 5 mg morphine, depending on the cause of pain and the patient response. Doses may be repeated every four to six hours.
  - If there is inadequate relief of pain, then review of the patient is required to ensure timely, effective pain-relief.

N.B:
- Antidote for opioid sensitivity or overdose induced respiratory depression is Naloxone.
- Dilute 400 micrograms in 10ml 0.9% sodium chloride to give a concentration of 40 micrograms/ml. Administer 40-80 microgram naloxone hydrochloride IV bolus every 2-3 minutes up to a maximum of 10 mg, until the patient’s breathing and the level of consciousness has improved (if in extremis can use a higher starting bolus such as 200 micrograms). If IV route is not available, naloxone may be administered as IM injection. Dose is always titrated to individual patients condition and rate of reversal.

**Clinical Considerations**
- Assess and document pain scores using “Behavioural pain scale” (BPS) or the Critical-Care Pain Observation Tool (CPOT) at least 4 hrly. In awake and responsive patients use the “Faces Pain Scale” (See Appendix 2). Self-reporting of pain should be used whenever appropriate.
- Patient relatives may also be involved in the assessment of pain.
- Patient is in significant pain if BPS > 5; CPOT > 3
- Use the “Richmond Agitation-Sedation Score” (RASS) and assess and document the patients sedation score 2nd hourly on the ICU flow chart (See Appendix 1).
- The desired RASS sedation score should be documented on the flow chart.
- Daily sedation vacations or interruption of analgesia / sedation should occur to allow for neurological assessment.
- For patients experiencing on-going pain, a pain management plan is to be developed, documented and reviewed to ensure adequate pain relief with minimal side effects for the patient.
- Constipation will occur in patients receiving opioid analgesia. Impaction may occur in the elderly, debilitated or bedridden patient. Commence a laxative, stool softener and other appropriate treatments at the beginning of opioid therapy.
- Nausea and vomiting are common after both single doses and regular morphine therapy. Anti-emetics may need to be prescribed on the prn section of the medication chart.
- Ensure airway protection occurs in ventilated/tracheotomised patients. Patients with a decreased level of consciousness should be assessed for adequate airway protection.
- Morphine is metabolized in the kidneys as well as the liver. This can cause prolonged decrease in LOC in ICU patients and lower doses are indicated in patients with renal insufficiency and Acute kidney injury requiring CRRT.

4. **Performance Measures**
   All incidents are documented using the hospital electronic reporting system: IIMS and managed appropriately by the NUM and staff as directed.
5. References / Links


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Reviewers: ICU – CNC, CNE, NM, NUM, Staff Specialists, CNS ‘s, Medical Director, Pharmacist  
Endorsed by: A/ Proff M. Parr, Director ICU.
APPENDIX 1: Richmond Agitation-Sedation Score

Instructions
- Obtain a sedation score goal at handover/ward round; document this in the health care record.
- Assess a sedation score every 2-4 hours and as clinically indicated. Conduct a sedation score even if there is no apparent drug in use that would contribute to sedation.
- A ‘sedation – vacation’ from sedative drugs must be prescribed when the sedation score is deemed ‘moderate sedation: ‘- 3’, and this degree of sedation is not the goal of therapy.

Assessment
The use of a sedative aims to:
- Enable the patient to cooperate with ventilation and treatments, and
- Produce a desired amnesia to the Intensive Care environment.
- Document which drugs the patient is taking to produce a sedative effect

Richmond Agitation-Sedation Score (RASS) ⁹

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
<th>Stimulus</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 4</td>
<td>Combative</td>
<td>Overtly combative, violent, immediate danger to self, staff, others</td>
<td>-</td>
</tr>
<tr>
<td>+ 3</td>
<td>Very agitated</td>
<td>Pulls or removes tube(s) or catheter(s); aggressive</td>
<td>-</td>
</tr>
<tr>
<td>+ 2</td>
<td>Agitated</td>
<td>Frequent non-purposeful movement, fights ventilator</td>
<td>-</td>
</tr>
<tr>
<td>+ 1</td>
<td>Restless</td>
<td>Anxious but movements are not aggressive/vigorous</td>
<td>-</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>- 1</td>
<td>Drowsy</td>
<td>Not fully alert, has sustained awakening (eye-opening/eye contact) to voice (≥ 10 seconds)</td>
<td>Verbal</td>
</tr>
<tr>
<td>- 2</td>
<td>Light sedation</td>
<td>Briefly awakens with eye contact to voice (&lt; 10 seconds)</td>
<td>Verbal</td>
</tr>
<tr>
<td>- 3</td>
<td>Moderate sedation</td>
<td>Movement or eye opening to voice (but no eye contact)</td>
<td>Verbal</td>
</tr>
<tr>
<td>- 4</td>
<td>Deep sedation</td>
<td>No response to voice but movement or eye opening to physical stimulation</td>
<td>Physical</td>
</tr>
<tr>
<td>- 5</td>
<td>Unrousable</td>
<td>No response to voice or physical stimulation</td>
<td>Physical</td>
</tr>
</tbody>
</table>

Procedure
Observe patient
- Patient is alert, restless or agitated (score ⁰ to + ⁴)

If not alert, state patient's name and say to open eyes and look at speaker
- Patient awakens with sustained eye opening and eye contact (score - ¹)
- Patient awakens with eye opening and eye contact, but not sustained (score - ²)
- Patient has any movement in response to voice but no eye contact (score - ³)

When no response to verbal stimulation, physically stimulate the patient by shaking shoulder and / or using the trapezius pinch or applying supra-orbital pressure, as appropriate
- Patient has any movement to physical stimulation (score - ⁴)
- Patient has no response to any stimulation (score - ⁵)
APPENDIX 2: Pain Assessment

**Awake and responsive:**
Use "Faces Pain Scale - Revised" adapted for ICU - get the patient to point to the face that matches their pain level or ask the patient: 0 = none, 5 = worst pain.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No pain</td>
</tr>
<tr>
<td>2</td>
<td>Mild pain, discomfort only with moving</td>
</tr>
<tr>
<td>4</td>
<td>Continuous mild pain</td>
</tr>
<tr>
<td>6</td>
<td>Continuous moderate pain</td>
</tr>
<tr>
<td>8</td>
<td>Continuous severe pain</td>
</tr>
<tr>
<td>10</td>
<td>Excruciating pain</td>
</tr>
</tbody>
</table>

Assess for pain at least every 4 hours:
- If pain score < 4, consider analgesia effective, reassess frequently as ongoing analgesia may need to continue.
- If pain score ≥ 4, increase analgesia to relieve pain
- Maintain prescribed sedation score, report any issues to the M.O. and document.
- Document score on the flowchart.
- If the patient has no pain and they are able to cough easily, deep breathe and move easily, the ongoing need for analgesia is assessed.

**Patients who are sedated, mechanically ventilated and unresponsive**
Use the “Behavioural Pain Scale” or the Critical-Care Pain Observation Tool (CPOT).

**Behavioural Pain Scale**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial Expression</td>
<td>Relaxed</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Partially tightened (eg, brow lowering)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fully tightened (eg, eyelid closing)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Grimacing</td>
<td>4</td>
</tr>
<tr>
<td>Upper Limb Movements</td>
<td>No movement</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Partially bent</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fully bent with finger flexion</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Permanently retracted</td>
<td>4</td>
</tr>
<tr>
<td>Compliance with</td>
<td>Tolerating movement</td>
<td>1</td>
</tr>
<tr>
<td>mechanical ventilation</td>
<td>Coughing but tolerating ventilation for</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>most of the time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fighting ventilator</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Unable to control ventilation</td>
<td>4</td>
</tr>
</tbody>
</table>

**TOTAL SCORE** 3 TO 12

Score ranges from 3 (no pain) to 12 (maximum pain).
The Critical-Care Pain Observation Tool (CPOT)\textsuperscript{11}.

Directives of use of the CPOT

1. The patient must be observed at rest for one minute to obtain a baseline value of the CPOT.
2. Then, the patient should be observed during nociceptive procedures (e.g. turning, wound care) to detect any changes in the patient’s behaviours to pain.
3. The patient should be evaluated before and at the peak effect of an analgesic agent to assess whether the treatment was effective or not in relieving pain.
4. For the rating of the CPOT, the patient should be attributed the highest score observed during the observation period.
5. The patient should be attributed a score for each behaviour included in the CPOT and muscle tension should be evaluated last, especially when the patient is at rest because the stimulation of touch alone (when performing passive flexion and extension of the arm) may lead to behavioural reactions.

Observation of patient at rest (baseline).
The nurse looks at the patient’s face and body to note any visible reactions for an observation period of one minute. She gives a score for all items except for muscle tension. At the end of the one-minute period, the nurse holds the patient’s arm in both hands – one at the elbow, and uses the other one to hold the patient’s hand. Then, she performs a passive flexion and extension of the upper limb, and feels any resistance the patient may exhibit. If the movements are performed easily, the patient is found to be relaxed with no resistance (score 0). If the movements can still be performed but with more strength, then it is concluded that the patient is showing resistance to movements (score 1). Finally, if the nurse cannot complete the movements, strong resistance is felt (score 2). This can be observed in patients who are spastic.

Observation of patient during turning.
Even during the turning procedure, the nurse can still assess the patient’s pain. While she is turning the patient on one side, she looks at the patient’s face to note any reactions such as frowning or grimacing. These reactions may be brief or can last longer. The nurse also looks out for body movements. For instance, she looks for protective movements like the patient trying to reach or touching the pain site (e.g. surgical incision, injury site). In the mechanically ventilated patient, she pays attention to alarms and if they stop spontaneously or require that she intervenes (e.g. reassurance, administering medication). According to muscle tension, the nurse can feel if the patient is resisting to the movement or not. A score 2 is given when the patient is resisting against the movement and attempts to get on his/her back.
The Critical-Care Pain Observation Tool (CPOT)  
(Gelinas et al., 2006)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facial expression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relaxed, natural</td>
<td>0</td>
<td>No muscle tension observed</td>
</tr>
<tr>
<td>Tense</td>
<td>1</td>
<td>Presence of frowning, brow lowering, orbit tightening and levator contraction</td>
</tr>
<tr>
<td>Grimacing</td>
<td>2</td>
<td>All previous facial movements plus eyelid tightly closed (the patient may present with mouth open or biting the endotracheal tube)</td>
</tr>
<tr>
<td><strong>Body movement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absence of movements or normal position</td>
<td>0</td>
<td>Does not move at all (doesn't necessarily mean absence of pain) or normal position (movements not aimed toward the pain site or not made for the purpose of protection)</td>
</tr>
<tr>
<td>Protection</td>
<td>1</td>
<td>Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements</td>
</tr>
<tr>
<td>Restlessness/Agitation</td>
<td>2</td>
<td>Pulling tube, attempting to sit up, moving limbs/thrashing, not following commands, striking at staff, trying to climb out of bed</td>
</tr>
<tr>
<td><strong>Compliance with the ventilator (intubated patients)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tolerating ventilator or movement</td>
<td>0</td>
<td>Always not activated, easy ventilation</td>
</tr>
<tr>
<td>Coughing but tolerating</td>
<td>1</td>
<td>Coughing, asthma may be activated but stop spontaneously</td>
</tr>
<tr>
<td>Fighting ventilator</td>
<td>2</td>
<td>Asynchrony: blocking ventilation, asthma frequently activated</td>
</tr>
<tr>
<td>Talking in normal tone or no sound</td>
<td>0</td>
<td>Talking in normal tone or no sound</td>
</tr>
<tr>
<td>Sighing, moaning</td>
<td>1</td>
<td>Sighing, moaning</td>
</tr>
<tr>
<td>Crying out, sobbing</td>
<td>2</td>
<td>Crying out, sobbing</td>
</tr>
<tr>
<td><strong>Muscle tension</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relaxed</td>
<td>0</td>
<td>No resistance to passive movements</td>
</tr>
<tr>
<td>Tense, rigid</td>
<td>1</td>
<td>Resistance to passive movements</td>
</tr>
<tr>
<td>Very tense or rigid</td>
<td>2</td>
<td>Strong resistance to passive movements or incapacity to complete them</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

Assess Pain Scale every 4 hours. Self-reporting of pain should be used whenever appropriate.

Patient is in significant pain if BPS > 5; CPOT > 3
APPENDIX 3:

1. Assess Analgesia

- In pain → Yes → Fentanyl 10-50 micrograms/hr OR Morphine 1-5 mg/hr
- No
- Reassess often (2-4 hourly)

2. Assess Sedation

- RASS at Target? (usual is -1 to 0)
  - No → Under-Sedated
    - 1. Propofol 5-10 ml/hr (50 to 100 mg/hr).
    - 2. Dexmedetomidine 0.2 to 0.7 mcg/kg/hr (if weaning off sedation or ventilation).
    - 3. Midazolam 1-3 mg/hr (only use if patient is in alcohol withdrawal or has propofol intolerance, this is because use of benzodiazepines has been associated with an increased incidence of delirium)
  - Yes → Over-Sedated
    - Hold sedative/analgesic to achieve RASS target. Restart at 50% of the rate it was running at.

- Reassess and document 2nd hourly
  - Consider daily sedation vacation
  - Spontaneous breathing trial

3. Assess Delirium

- If RASS ≥ 3 perform CAM-ICU Delirium Assessment
  - Negative – Reassess in 12 hrs
  - Positive
    - Non-pharmacological management
    - Pharmacological management (as per delirium guideline)