Drug Guideline

Guideline Title: Dexmedetomidine hydrochloride (Precedex)

**Summary:**
Dexmedetomidine is a selective alpha-2 receptor agonist with sedative, analgesic and anaesthetic properties when given as a slow infusion. It has a half life of 6 minutes and undergoes rapid distribution.

The clinical trials on dexmedetomidine to date have only been conducted on post operative patients limited to a 24 hour period. Further trials are required to establish its suitability and safety in non-surgical patients for long term use >24hours.

**Approved by:** ICU Director

**Publication (Issue) Date:** April 2015

**Next Review Date:** April 2018

**Replaces Existing Guideline:** dexmedetomidine hydrochloride (Precedex) _2009

**Previous Review Dates:** 2009, 2011

**Background Information:** dexmedetomidine hydrochloride

1. **Introduction contains:**
   The risk addressed by this policy:

   Patient Safety

**The Aims / Expected Outcome of this policy:**

Dexmedetomidine should be administered safely and 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_PD2013_C03.03 Drug Calculation Formulas
- LH_PD2013_C03.00 Drug Prescribing
2. Policy Statement:

- All care provided within Liverpool Hospital will be in accordance with infection prevention/control, manual handling and minimisation and management of aggression guidelines.
- Medications are to be prescribed and signed by a medical officer unless required during an emergency.
- Medications are to be given at the time prescribed and are to be signed by the administering registered nurse.
- Parenteral medication prescriptions and the drug are to be checked with a second registered nurse prior to administration.
- Infection Control guidelines are to be followed.
- All drugs administered during an emergency (under the direction of a medical officer) are to be documented during the event, then prescribed and signed following the event.
- Adverse drug reactions are to be documented and reported to a medical officer.
- Medication errors are to be reported using the hospital electronic IIMS reporting system.
- Guidelines are for adult patients unless otherwise stated.

3. Principles / Guidelines

Actions

Dexmedetomidine is a selective alpha-2 receptor agonist.
- The sedative action of dexmedetomidine appears to be mediated by the activation of postsynaptic alpha-2 adrenoreceptors in the locus coeruleus in the brainstem.
- The analgesic action appears to be mediated by activation of alpha-2 adrenoreceptors in the spinal cord.

Indications

- It is indicated for short term sedation < 24 hours in intubated and ventilated ICU patients. It has no respiratory depression effect and so can be used for those patients who require a short period of sedation without respiratory depression.

Contraindications

- Known hypersensitivity to dexmedetomidine

Precautions

- Use with caution in patients with advanced heart block, bradycardia, ventricular dysfunction, congestive cardiac failure and in whom sympathetic tone is critical for maintaining hemodynamic balance.
- Patients with desensitised autonomic nervous system control eg: the elderly, diabetics, patients with chronic hypertension may experience decreased blood pressure and/or heart rate with dexmedetomidine.
- Clinical evidence of bradycardia or hypotension may be potentiated when dexmedetomidine is used with midazolam or propofol and the dose of these agents may need to be reduced.
- Hypovolemic patients will need fluid supplementation prior to use of dexmedetomidine

Interactions

- Co-administration of dexmedetomidine could lead to enhancement of effects of anaesthetics, sedatives, hypnotics and opioids. Reduction of the dose may be required.

Adverse Effects

- Hypotension, bradycardia
- Hypertension during the loading dose
Nausea, dry mouth, somnolence

Presentation
- Each vial contains dexmedetomidine 200mcg / 2ml. Store below 25°C.

Administration Guidelines
- Add the dexmedetomidine 200mcg / 2ml (one vial) to 48ml 0.9% sodium chloride = total volume 50ml (200mcg/50ml = 4mcg/ml)
- Administer the infusion via the intravenous route using a syringe driver.

Maintenance Dose
- Recommended maintenance dose is 0.2-0.7microgram/kg/hr.
- The rate of the maintenance infusion is titrated to achieve the desired clinical effect. The maintenance dose should be prescribed by the medical team. The dose will be titrated to the desired / prescribed sedation score as per the RASS (Richmond Agitation Sedation Scale).
- As a guide use the 0.4mcg/kg/hr dose as the initial maintenance infusion rate. If after 5-10minutes sedation is inadequate then the maintenance infusion dose can be increased. If the patient is oversedated, the maintenance dose can be decreased.

Table 2: Maintenance Dose

<table>
<thead>
<tr>
<th>Maintenance Dose mcg/kg/hr</th>
<th>Patient body weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40</td>
</tr>
<tr>
<td>0.20</td>
<td>2ml/hr</td>
</tr>
<tr>
<td>0.30</td>
<td>3ml/hr</td>
</tr>
<tr>
<td>0.40</td>
<td>4ml/hr</td>
</tr>
<tr>
<td>0.50</td>
<td>5ml/hr</td>
</tr>
<tr>
<td>0.60</td>
<td>6ml/hr</td>
</tr>
<tr>
<td>0.70</td>
<td>7ml/hr</td>
</tr>
</tbody>
</table>

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

Clinical Considerations
- Continuous monitoring of ECG, blood pressure and SaO₂ is necessary during infusion of dexmedetomidine.
- The rate of the infusion should be titrated to achieve the desired / prescribed sedation score as per the RASS (Richmond Agitation Sedation Scale). This should be assessed and documented every 2-4th hourly. See Below Appendix 1
- Hypovolemic patients should be fluid resuscitated prior to and during dexmedetomidine infusion.
- Treatment for bradycardia and hypotension may include decreasing or stopping the infusion and increasing the rate of fluid administration and vasopressor agents.
- Transient hypertension has been observed during the loading dose infusion of predecex. Reduction of loading dose in this case may be considered.
- Dexmedetomidine may cause reduced lacrimation and lubrication of the patients eyes should be considered to avoid corneal dryness.
6. References / Links

1. MIMS Online, CIAP: NSW Health Department, Copyright MIMS Australia Pty Ltd 2015.  
2. The Society of Hospital Pharmacists of Australia 2015, The Australian Injectable Drugs  

Author:          S. Shunker (CNC ICU)  
Reviewers:      ICU – CNC, CNE, NM, NUM, Staff Specialists, CNS ‘s, Medical Director, Pharmacist  
Endorsed by:    A/ Proff M. Parr, Director ICU.
Appendix 1

Sedation score

Background
Previously, the ICU has used a modified Riker sedation-agitation scale,\textsuperscript{15} which ranged from (0) : alert to (4) : deeply sedated. It did not, however, easily measure agitation in the patient. Consequently, the ICU will use the Richmond agitation-sedation scale (RASS)\textsuperscript{16}. Both scores use a ‘+’ and ‘-’ symbol but for different reasons. Please read the instructions and the procedure below carefully to ensure appropriate use of the ‘+’ and ‘-’ signs using the Richmond score (RASS).

Instructions
• Obtain a sedation score goal at handover/ward round; document this in the health care record (either in the clinical notes or on the ICU flowchart CR145).
• Assess a sedation score and a Glasgow Coma Score (GCS) at least every 4 hours and as clinically indicated. Note that if a stable patient is prescribed a sedative to assist with sleeping (e.g. temazepam), it is reasonable to omit one episode of assessment.
• Conduct a sedation score even if there is no apparent drug in use that would contribute to sedation; if sedation is present and not a goal of therapy – report this to the M.O. and document findings, action plan and outcome in the health care record.
• 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)\textsuperscript{16}

<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 \textit{voice} (≥ 10 seconds)</td>
<td>Verbal</td>
</tr>
<tr>
<td>- 2</td>
<td>Light sedation</td>
<td>Briefly awakens with eye contact to \textit{voice} (&lt; 10 seconds)</td>
<td>Verbal</td>
</tr>
<tr>
<td>- 3</td>
<td>Moderate sedation</td>
<td>Movement or eye opening to \textit{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 \textit{physical} stimulation</td>
<td>Physical</td>
</tr>
<tr>
<td>- 5</td>
<td>Unrousable</td>
<td>No response to \textit{voice} or \textit{physical} stimulation</td>
<td>Physical</td>
</tr>
</tbody>
</table>

Procedure
• Observe patient
  → Patient is alert, restless or agitated (score \textbf{0} to \textbf{+ 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 \textbf{- 1})
  → Patient awakens with eye opening and eye contact, but not sustained (score \textbf{- 2})
  → Patient has any movement in response to voice but no eye contact (score \textbf{- 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 \textbf{- 4})
  → Patient has no response to any stimulation (score \textbf{- 5})