KETAMINE INFUSIONS FOR ADULT PATIENTS WITH ACUTE AND CHRONIC NON MALIGNANT PAIN

This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

1. AIM

To ensure the provision of effective and safe acute and chronic pain management through the use of Ketamine infusion.

2. PATIENT

When commencing ketamine therapy the patient has either;

a) Proven to be resistant to opioids for acceptable analgesia or
b) Has had major surgery with the expectation that the opioid requirements alone could cause significant side effects and complicate patient recovery.
c) Pre-emptive use may minimise patient opiate use in enhanced recovery protocols.

Patients who are on opioids, preoperatively or who have had multiple surgeries for ongoing pathology may find their pain improved while requiring less opioid if ketamine is added to their regimen. Loading doses in the operating theatre while under anaesthesia may be helpful and preferable over frequent boluses in recovery.

3. STAFF

- Anaesthetists
- Medical staff
- Nursing staff

4. EQUIPMENT

- Sapphire Pain Management Pump (Ketamine) with lock box
- Appropriate Sapphire giving set (PCA set for IV or Straight set for SC)
- Ketamine - 200mg in 2mL ampoule/s
- Sodium Chloride 0.9% 100mL bag (Acute Pain)
- Sodium Chloride 0.9% 50mL bag (Chronic Pain)
- Syringe & needle for drawing up Ketamine
- Blue ANTT tray
- Chlorhexidine/alcohol swab
- Appropriate additive label for line and bag (Blue for IV or Brown for SC)

5. CLINICAL PRACTICE

Prescribing

- Prescribe Ketamine infusions on the NSW State Ketamine Infusion (Adult) chart.
- Prescribe recommended dose depending on the specific patient population
  - (Acute Pain - see Appendix 1)
  - (Chronic non-malignant pain - see Appendix 2)

Preparation

- Inform the patient of potential side effects of ketamine such as hallucinations or unpleasant reactions.
- Wash hands and use aseptic technique during preparation.

Acute Pain (Intravenous infusion)

- Refer to dosage schedule (Appendix 1)
- Remove Ketamine 200mg/2mL (1 vial) from S8 cupboard then sign S8 book with a witness (2 RNs).

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- Draw up **100mg** of Ketamine and add to sodium chloride 0.9% **100mL** bag (*to make a 1mg/1mL solution*)
- Witness discard of remaining 100mg Ketamine and sign S8 Book with a witness (2 RNs).
- Complete and attach "blue" additive label to bag and label giving set.
- Ensure the infusion is given via a PCA giving set with back check valve to prevent migration into other lines.
- Set up Ketamine pain management pump & program pump according to prescription.
- Check prescription, patient and pump settings at bedside prior to commencement (2 RNs)
- Sign record of administration on the NSW State Ketamine Chart (2 RNs)
- Connect giving set to patent IV cannula.
- Witness, measure and sign discard of any remaining ketamine on the NSW State Ketamine chart (2 RNs)

Chronic Pain (Sub-cutaneous infusion)

- Refer to dosage schedule (Appendix 2)

Option 1:

- Remove Ketamine 200mg/2mL (2 vials) from S8 cupboard and sign S8 book with a witness (2 RNs)
- Draw up **400mg** of Ketamine and add to sodium chloride 0.9% **50mL** bag (*to make a 8mg/1mL solution*)

Option 2:

- Remove Ketamine 200mg/2mL (1 vial) from S8 cupboard and sign S8 book with a witness (2 RNs)
- Draw up **200mg** of Ketamine and add to sodium chloride 0.9% **50mL** bag (*to make a 4mg/1mL solution*)

Then:

- Complete and attach "brown" additive label to bag and label giving set.
- Ensure the infusion is given via straight giving set for sub-cutaneous infusion.
- Set up Ketamine pain management pump & program pump according to prescription.
- Check prescription, patient and pump settings at bedside prior to commencement (2 RNs)
- Sign record of administration on the NSW State Ketamine Chart (2 RNs)
- Connect giving set to patent SC cannula.
- Witness, measure and sign discard of any remaining ketamine on the NSW State Ketamine chart. (2 RNs)

General Information

- Refer to dosing schedule for acute pain (Appendix 1)
- Refer to dosing schedule for Chronic non-malignant pain (Appendix 2)
- Refer to required observations (Appendix 3)
- Refer to management of adverse events (Appendix 4)

6. DOCUMENTATION

- NSW State Ketamine Chart
- Integrated Clinical Notes
- National In-Patient Medication Chart
- Standard Adult General Observation (SAGO) Chart
- Relevant Clinical Pathways

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7. EDUCATIONAL NOTES

Background

Ketamine is an anaesthetic agent known to have analgesic properties in sub-anaesthetic doses. Ketamine analgesia is mediated by its effect on the N-methyl-D-aspartate (NMDA) receptor where it blocks excitatory nerve activity involved in pain transmission. Ketamine is administered in combination with other analgesics, may improve pain and reduce opioid requirements. Best effects are obtained when given as a continuous infusion either intravenously or subcutaneously.

- Ketamine is a Schedule 8 drug under the Poisons and Therapeutic Goods Act.
- Ketamine is compatible, as a separate infusion via a Y site, with fentanyl, morphine sulphate and hydromorphone.
- Ketamine can produce severe dysphoric and hallucinogenic sensations/reactions. For this reason the use of a benzodiazepine or low dose haloperidol in patients receiving ketamine could be considered.
- Patients receiving a Ketamine infusion will be regularly reviewed at least daily by the Acute Pain Relief Service or the Chronic Pain Team.

Contraindications and Precautions

- Known contraindications to ketamine are hypersensitivity to ketamine and any conditions where a significant elevation of blood pressure is hazardous these include;
- Intracranial hypertension, Cerebral aneurysms, Raised intra ocular pressure
- May exacerbate pulmonary hypertension
- Psychiatric disorders: - psychomimetic effects are more pronounced in the presence of schizophrenia and delirium.
- Ketamine should be used with caution in the presence of ischaemic heart disease because of the risk of increased heart rate and blood pressure.

8. RELATED POLICIES / PROCEDURES / CLINICAL PRACTICE LOP

- RHW LOP - Patient Controlled Analgesia (PCA) – Intravenous or subcutaneous (2015)
- NSW Health PD2013_043 Medication Handling in NSW Public Health Facilitates. http://www0.health.nsw.gov.au/policies/pd/2013/pdf/PD2013_043.pdf
- NSW Health PD2010_058Hand Hygiene http://www0.health.nsw.gov.au/policies/pd/2010/pdf/PD2010_058.pdf
- NSWHealthPD2007_036InfectionControl http://www0.health.nsw.gov.au/policies/pd/2007/pdf/PD2007_036.pdf
- NSWHealthPD2015_029HighRiskMedicationManagement. http://www0.health.nsw.gov.au/policies/pd/2015/pdf/PD2015_029.pdf
- NSW Health PD2013_013. Peripheral Intravenous Cannula Insertion and post Insertion Care; Adults http://www0.health.nsw.gov.au/policies/gl/2013/pdf/GL2013_013.pdf
- National Standard for User-Applied Labelling of Injectable Medicines, Fluids and Lines http://www.safetyandquality.gov.au/wp-content/uploads/2015/09/National-Standard-for-User-Applied-Labelling-August-2015-web-optimised.pdf

9. RISK RATING

- High

10. NATIONAL STANDARD

- MS_Medication Safety

KETAMINE INFUSIONS FOR ADULT PATIENTS WITH ACUTE AND CHRONIC NON MALIGNANT PAIN cont'd

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15. Effects of Fentanyl Patient-Controlled Analgesia After Cervical Spine Surgery Anesth Analg 2008;107:1041–4

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Changed title from : *Ketamine Analgesia – Acute Post Operative Pain Procedure and Guidelines*
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…./Appendices 1, 2, 3, 4

APPENDIX 1 – DOSAGE SHEDULE (ACUTE PAIN - IVI)

Acute Pain Infusion Rate (Intravenous)			
Recommended Dose	**Starting Dose**	**Dose Range**	**Solution Concentration**
0.1 - 0.2mg/kg/hr	2-4mg/hour **OR** 2-4mL/hour	2-12 mg/hour **OR** 2-12 mL/hour	100mg in 100mL sodium chloride 0.9% **OR** **1mg/1mL**

APPENDIX 2 – DOSAGE SCHEDULE (CHRONIC PAIN - SCI)

Chronic Pain Infusion Rate (Sub-cutaneous) – Option 1			
Recommended Dose	**Starting Dose**	**Dose Range**	**Solution Concentration**
0.125-0.3mg/kg/hr	4mg/hour **OR** 0.5mL/hour	4 - 24 mg/hour **OR** 0.5 – 3.0 mL/hour	400mg in 50mL sodium chloride 0.9% **OR** **8mg/1mL**

Chronic Pain Infusion Rate (Sub-cutaneous) – Option 2			
Recommended Dose	**Starting Dose**	**Dose Range**	**Solution Concentration**
0.125-0.3mg/kg/hr	2mg/hour **OR** 0.5mL/hour	2 - 12 mg/hour **OR** 0.5 – 3.0 mL/hour	200mg in 50mL sodium chloride 0.9% **OR** **4mg/1mL**

APPENDIX 3 – OBSERVATIONS

All patients	• General observations need to be performed and recorded on the Standard Adult General Observation chart (SAGO) as per patient's condition. • Ketamine specific observations to be recorded on NSW State Ketamine chart. • The delivery device settings to be checked at the commencement of each shift, on patient transfer and when the bag is being changed. • The cannula site (subcutaneous or intravenous) must be checked each shift for signs of redness, swelling or tenderness.
Acute Pain	• If the patient is on Patient Controlled Analgesia (PCA) concurrently with ketamine infusion, the pain scores may be recorded on the PCA chart only in order to avoid duplication • Frequency of pain score at rest (R) and with movement (M) and dysphoric adverse effects present every 2 hours
Chronic non-malignant pain	• Frequency of pain score at rest (R) and with movement (M) every 4 hours and dysphoric adverse effects present every 4 hours

APPENDIX 4 – MANAGEMENT OF ADVERSE EVENTS

Dysphoria- vivid / bad dreams / disassociation / hallucinations

- Reduce infusion by half
- Check drug and prescription and ensure pump programme and infusion rate is correct
- Contact the APRS or anaesthetic fellow/registrar.
- Have diazepam 2 to 5mg available.

Hypertension (i.e. Systolic greater than 40mmHg above patients usual OR Diastolic greater than 95mmHg).

- If blood pressure greater than180/95mmHg and/or heart rate greater than 110 beats per minute reduce ketamine infusion rate by 25% per hr and contact the Acute Pain Relief Service or Anaesthetic Registrar/Fellow.
- If blood pressure or heart rate remains elevated despite rate reduction inform anaesthetic registrar/fellow.

Where patient has concurrent use of Opioid PCA they should be observe closely for increased sedation or respiratory depression:

Increased Sedation

- If drowsy but rousable administer oxygen via nasal prongs at 2 litres per minute, check infusion rate, check respiratory rate more frequently and if concerned contact PACE Team or Anaesthetic registrar.
- If difficult to rouse, cease the infusion, administer oxygen via Hudson mask at 6 litres per minute and contact the Acute Pain Team or Anaesthetic Registrar/Anaesthetist.
- If opioids are administered in conjunction with the ketamine infusion a review of opioid prescription is required.

Respiratory depression / apnoea (usually caused by rapid infusion)

- Check the infusion rate.
- If respiratory rate is 8 to 10 breaths per minutes, continue to observe closely and administer oxygen via nasal prongs at 2 litres per minute.
- If respiratory rate is less than 8 breaths per minute, cease the infusion, administer oxygen via Hudson mask at 6 litres per minute and initiate PACE Tier 1 call and contact Anaesthetic Registrar/Anaesthetist.
- If apnoea is present, cease the infusion, initiate PACE Tier 2 call, provide basic life support and contact Anaesthetic registrar/Anaesthetist.
- If opioids are administered in conjunction with the ketamine infusion a review of opioid prescription is required.