Anaesthetics: KETAMINE INFUSION FOR CHRONIC PAIN MANAGEMENT

Rationale:
Medicines can only be administered in accordance with a prescription or a standing order. The use of protocols and standing orders establishes procedures to be followed for the administration of medications which will allow safe, efficient and timely treatment of patients.

Standard:
Registered Health Professionals will administer medications as per the protocol/guideline.

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1. Scope:

Ketamine for analgesia is an unapproved indication, therefore within the NDHB it is to be prescribed under the instruction of one of the following groups;

- Pain team (consultants, MOSSs, registrar)
- Palliative Care team (consultants, MOSSs)
- Anaesthetists.

2. Indications:

Control of pain associated with:

- Trauma or surgery where opioids are ineffective or where the dose of opioids is limited by side effects and/or comorbidities
- Cancer and chronic benign pain conditions
- Neuropathic syndromes
- Drug and Alcohol Services
- Procedures, such as change of dressings, debridement in burned patients
- Induction of anaesthesia
- Sole anaesthetic agent
- As a sedative for diagnostic and therapeutic procedures
- Adjunct to weaning off high use opiates only in collaboration with Drug and Alcohol Services

3. Primary effects:

Ketamine hydrochloride is a rapid-acting non-barbiturate general anaesthetic agent whose mechanism of action is complex. In sub-anaesthetic doses it is also a potent analgesic, blocking conduction of painful stimuli, by binding to the N-Methyl-D-Aspartate (NMDA) receptor implicated in "windup" in spinal dorsal horn neurones and the development of opioid tolerance. It can thus be described as an NMDA antagonist.

4. Contraindications: *(see also Other information: on page 4)*

- Any condition where a significant rise in blood pressure may be hazardous, such as severe cardiovascular disease, heart failure, severe or poorly controlled hypertension, angina, recent myocardial infarction, history of stroke
- Patients who have demonstrated an allergy or previous intolerance to this medicine.

5. Cautions: *(see also Monitoring: on page 4)*

Patients with:

- Head injuries and raised intra-cranial pressures (ICPs)
- Raised intraocular pressure
- History of psychiatric disorder
- Confusion
- History of seizure
- Hyperthyroidism
- Renal or hepatic impairment – dose reduction may need to be considered

6. Dosage:

Ketamine infusion should be charted on the regular side of the medication chart, to be administered as a continuous intravenous infusion via a dedicated Ketamine designated pump.

As the Ketamine designated pumps are preset it is vital that the concentration of ketamine in the infusion syringe is 1mg/ml. Alternative concentrations will cause unintentional under or overdosing of ketamine.

The Ketamine infusion rate will be prescribed on a variable rate determined by side effects experienced by patient. The infusion rate will be dependent on patient's analgesic requirements, **but settings will only allow up to a maximum rate of 10mg/hr.**

NB: In some instances, e.g. chronic pain patients may require a higher infusion rate. This will be determined by the prescribing anaesthetist.

Chart on the REGULAR section of the National Medication Chart.

Date	Medicine: Ketamine 1mg/ml infusion						0600	
	Dose: •	Units: ml/ hour	Route: IV	Frequency: continuous	Dose calculation	Prescribers signature: Blah Blah Blah	0800	
	Dose range if needed: 1 to 10		Pharmacy and special instructions: via ketamine pump		Pharm	Sign, date and time to cancel	1200	
							1400	
							1800	
							2200	

7. Administration:

There should not be any medication piggy backed through the background compatible IV fluids while the Ketamine infusion is in progress due to probable interactions occurring.

Ketamine is administered as a continuous infusion. When administered as an infusion, it is preferable that the medication is given via a separate cannula to avoid peaks and troughs in the serum concentration of the ketamine**. If this is not possible however**, and when a patient is **also on PCA**, the ketamine can be piggy-backed through the IV fluids port of the PCA giving set.

8. Presentation:

A 50ml infusion consisting of 50mg Ketamine (1mg/ml) in a 50ml syringe. Only infusion preparations of ketamine 1mg/ml solution supplied in a 50 ml syringe should be administered via a ketamine designated pump (shown below).

Ketamine designated pump – with **PINK** front panel.

9. Preparation:

Level of competency required

- RN - IV designated & PCA Moodle completed (recommended)

This is a high risk medication requiring a 2 person independent second check Including checking patient ID and pump setup.

To prepare a 50ml ketamine intravenous infusion (IV) 1 mg/ml;

- Using a 50ml syringe 'BD Plastipak 50ml' draw up a 0.5ml volume of ketamine 200mg/2ml.
- Make up with 0.9% Sodium Chloride or 5% Dextrose to a total of 50ml to achieve a concentration of 1mg/ml.
- Preparation not used within 24 hours should be discarded.

10. Equipment needed:

- Infusion is via a ketamine designated pump with pink painted front (will allow up to a hard max 10mg/hr)
  - Note: This pump does not require a bolus button or an access code.
- Designated PCAM tubing – Order number: M13499
- Monitoring equipment –SpO2, BP, HR, RR
- Ketamine 200mg/2ml
- 0.9% sodium chloride for injection
- 50ml BD syringe
- Filter needle (if ketamine supplied in glass vials)
- Medication label
- Emergency trolley available on ward
- Functioning oxygen/suction in room

11. Monitoring:

Observations:

- **The Adult EWS chart will be used to record observations.**
- Record baseline observations i.e. BP, HR, resp rate, pain score (at rest and on movement) and level of consciousness
- 30 minute SpO2, BP, HR, RR, Sedation Score, and Pain Score for at least 2 hours on commencement of infusion
- Commence 4 hourly observations (SpO2, BP, HR, RR, Sedation Score, and Pain Score) once stable for 2 hours
- **Any rate increase will require 30 minute observations until stable then revert back to 4 hourly.**
- Post infusion cessation, continue monitoring patient (SpO2, BP, HR, RR, Sedation Score, and Pain Score) half hourly for two hours, or longer if required if the patient's condition is not satisfactory i.e. not easily rouseable, hallucinating, vital signs not within acceptable parameters

Considerations:

- Patient remains awake
- Minimise any excessive stimuli to patient
- Explain the possibility of side effects, e.g. hallucinations, excessive salivation, nausea and vomiting
- Patient may feel drowsy, but sedation is likely to be minimal
- If possible maintain staff continuity while patient is receiving ketamine infusion
- Review with pain team daily for follow up and any other IV/SC analgesia (possible interaction) during ketamine infusion
- Contact the Inpatient Pain Service: ph 021 446 375/ #9402 **Or** On call anaesthetist after hours and weekends if requires more than daily review

12. Other information:

Adverse effects

Neurological
Psychomimetic reactions can include alteration of body image, floating sensations, extracorporeal experiences, vivid dreams, agitation, and frank hallucinations.

Cardiovascular
Ketamine stimulates the sympathetic nervous system, resulting in a noticeable increase in heart rate and blood pressure. This can precipitate angina in at-risk patients.

13. References:

1. *New Zealand Formulary*, release 39 - 01 September 2015, [online] (accessed 10/9/15)
2. Waikato DHB and Auckland DHB provided support with their current protocols to use guidelines

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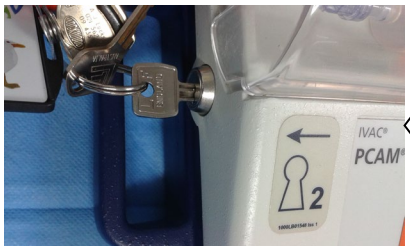
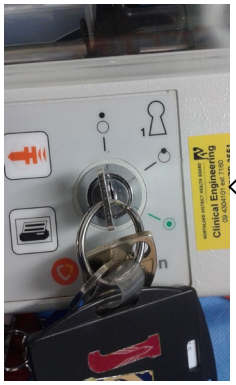
Setting up the ketamine designated pump for ketamine infusion

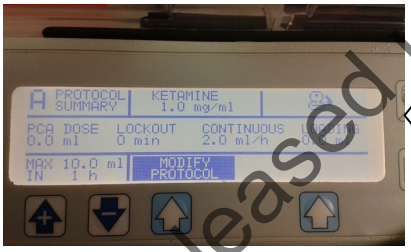


Unlock cover to insert prepared ketamine syringe.

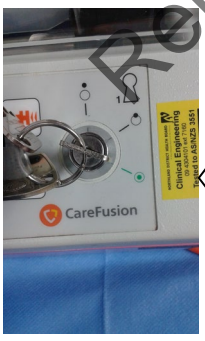


Close cover, insert key into key space 1

Turn key to mid setting. If new patient, select "Yes" to clear previous patient info

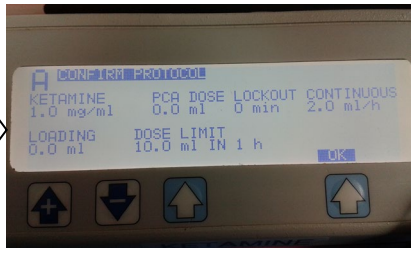


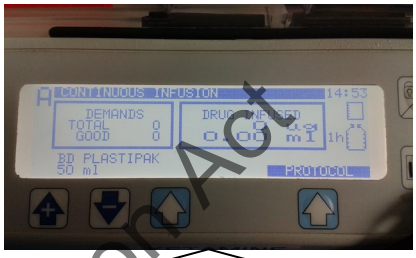
Confirm protocol as per prescription chart



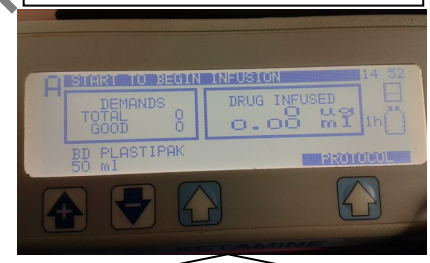
Turn key to green

Press "OK" to confirm protocol

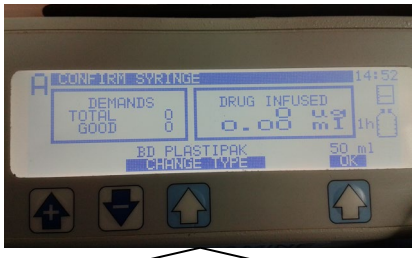




"Continuous Infusion" should be flashing



Press the green button to start infusion



Press "OK" to confirm 50ml BD Plastipak syringe

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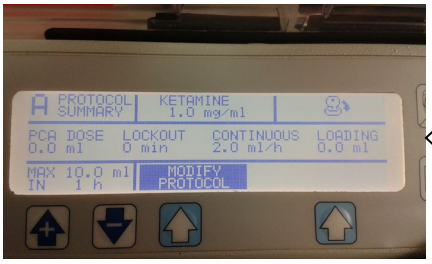
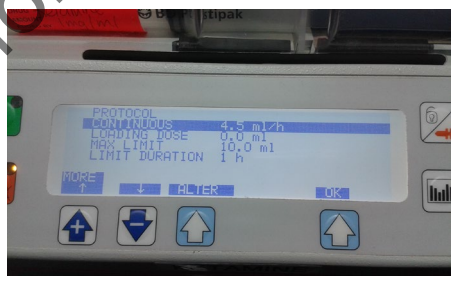
Instructions on how to change ketamine infusion rate

Turn key to mid setting to change infusion rate. Enter "NO" to keep current patient information

Follow instructions as per flow chart above:
-Turn key to green
-Confirm protocol is correct against prescription
-Press OK
-Then press green button to start infusion
-Remove key



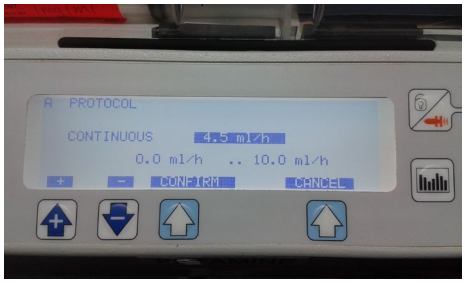
Press arrow below "modify protocol"

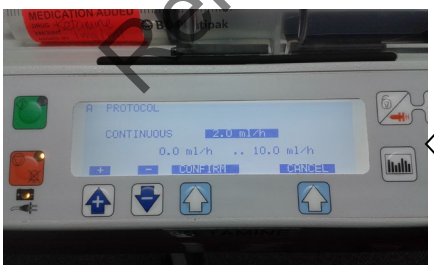


Press arrow below "More ↓" to get to "Continuous"

Press the arrow below "OK"

Press arrow below "Alter"





Use the "+" or "–" arrows to change the rate

Once desired rate has been entered, press the arrow below "Confirm"