

This policy applies to: <input type="checkbox"/> Stanford Hospital and Clinics <input checked="" type="checkbox"/> Lucile Packard Children's Hospital <input type="checkbox"/> Stanford University	Date Written or Last Revision March 2006
Name of the Policy: Low Dose Ketamine Infusion and Oral Ketamine for Intractable Pain	Page 1 of 4
Departments Affected: All Departments (Except Labor and Delivery, F1, F2)	

I. Purpose

To ensure safe administration of ketamine for the management of intractable pain.

II. Policy Statement

Oral administration or continuous intravenous infusion of ketamine can be administered by staff registered nurses's (RN) on the intensive **AND** acute care units for the management of intractable pain; to be ordered by the pain management service **ONLY** for the acute care units and the pediatric intensive care unit (PICU) team for the critical care units.

III. Definitions

A. Ketamine

1. Used for the induction and maintenance of general anesthesia. However, this medication has unique effects which may also be useful in the management of acute and chronic pain and for those patients who are opioid-tolerant.
 - a. Actions
 - (1) Provides analgesia by acting on central and peripheral sites in the body.
 - b. Side Effects
 - (1) **Cardiovascular:** hypertension, tachycardia, increased cardiac output, paradoxical direct myocardial depression, hypotension, bradycardia.
 - (2) **Central Nervous System (CNS):** tremors, tonic-clonic movements, fasciculations, increased intracranial pressure
 - (3) **Gastrointestinal (GI):** Hypersalivation, vomiting
 - (4) **Neuromuscular/skeletal:** Increased skeletal tone
 - (5) **Ocular:** Diplopia, nystagmus, increased intraocular pressure
 - (6) **Respiratory:** Increased airway resistance, depression of cough reflex, respiratory depression or apnea with large doses or rapid infusions, laryngospasm.

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(7) **Endocrine/Metabolic:** increased metabolic rate

IV. Considerations

A. Types of Patients

1. Ketamine is generally used only when other more traditional methods of pain management are ineffective, for instance, in patients who have received high dose opioid therapy and no longer benefit from increasing opioid doses. Additionally, those patients with a large component of neuropathic nerve pain may also benefit. Oral ketamine may be used for patients with a variety of conditions, such as cancer, postoperative pain, and chronic pain.

B. Contraindications

1. Elevated intracranial pressure, hypertension, aneurysms, thyrotoxicosis, congestive heart failure, angina, and psychotic disorders.

C. Physician's Role (Except in the critical care units)

1. Ketamine intravenous infusion used for pain management may only be prescribed by Pain Management Service.
2. To order ketamine, the Pain Management Service physicians/allied health care professional (AHP) will write the order. These orders include upper dosing limits.
3. There should be a discussion between the Pain Management Service, the nursing staff, and the primary service to determine if the patient is a candidate for ketamine.

V. Procedures

- A. When the use of opioids leads to dose-limiting side effects or pain that is judged to be poorly controlled, the following plan should be considered and implemented by the **Pain Management Service ONLY**.

1. **To be administered by the bedside nurse:**

Ketamine Intravenous Bolus: 0.025mg/kg-0.1mg/kg IV over 1-10 minutes. After 10-15 minutes, if no appreciable decrease in pain, repeat the loading dose of ketamine.

Oral Ketamine: 0.5mg/kg-1mg/kg

2. Monitor and assess pain and vital signs (VS); reassure patient that they may experience a dream-like feeling, especially those who cannot adequately communicate due to their medical circumstance. Patient to remain on oxygen

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saturation monitor for duration of intravenous infusion or while on oral ketamine. Continuous monitoring of oxygen saturation may be suspended to permit the patient to ambulate with assistance.

3. Repeat monitoring and dosing steps until satisfactory pain relief or undesirable side effects occur an anti-sialogogue [glycopyrrolate] or small doses of a benzodiazepine or phenothiazine may be used to control excessive secretions and dysphoric feelings.
4. Start infusion at 0.025mg-0.1mg/kg/hr. Cancer patients with opioid tolerance and severe pain may require infusion doses as high as 0.5mg/kg/hr. Oral ketamine should be administered at intervals of every 2-3 hours.
5. Monitor and adjust the infusion or oral dose according to clinical signs and symptoms.
6. After initiating ketamine, decrease opioid dose by 25%-50% and again every 6-12 hours as tolerated; be prepared to re-bolus if abstinence symptoms emerge
7. Re-bolus with ketamine (at 25%-50% of total initial effective dose) and increase infusion or oral dose as needed, limited only by unpleasant psychomimetic effects, excessive secretions, or other symptomatically distressing effects.
8. Pain Management Service to be notified if inadequate pain relief or side effects are experienced.

DOCUMENTATION

- A. Document vital signs, pain score, level of consciousness, signs/symptoms of ketamine toxicity, and related interventions by the RN on the nursing flow-sheet.
- B. Ketamine intravenous infusion will be double checked by two RN's and documented on the medication administration record and the nursing flow-sheet.

VI. Document Information

- A. Legal Authority/References
 1. Clark, J.L. & Kalan, G.E. (1995). Effective treatment of severe cancer pain of the head using low dose ketamine in an opioid-tolerant patient. *Journal of pain and symptom management*, 10(4), 310-314.
 2. Correll, G., Maleki, J., Gracely, E., Muir J., & Harbut, R. (2004). Subanesthetic ketamine infusion therapy: A retrospective analysis of a novel therapeutic approach to complex regional pain syndrome. *Pain management*, 5(3), 263-275.
 3. Fine, P.G. (1999). Low-dose ketamine in the management of opioid nonresponsive terminal cancer pain. *Journal of pain and symptom management*, 17(4), 296-300.

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4. Hocking, G. & Cousins, M. (2003). Ketamine in chronic pain management: An evidence-based review. *Anesthesia analgesia*, 97, 1730-1739.

B. Author/Original Date

Sandy Sentivany-Collins, 12/99

C. Distribution and Training Requirements

1. This policy resides in the Patient Care Manual of Lucile Packard Children's Hospital
2. New documents or any revised documents will be distributed to Patient Care Manual holders. The department/unit/clinic manager will be responsible for communicating this information to the applicable staff.

D. Review and Renewal Requirements

This policy will be reviewed and/or revised every three years or as required by change of law or practice.

E. Review and Revision History

Sarah Ferrari, MSN, CNS; Elliot Krane, MD; 2/06

F. Approvals

Clinical Practice Committee; 3/06

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