Ketamine is a dissociative drug which has anxiolytic, analgesic, amnesic and dissociative properties with a wide safety margin. It can be used to induce analgesic sedation in children who need a painful or frightening procedure during the course of their emergency care. It can be used instead of general anaesthesia for minor and moderate procedures in combination with local anaesthetic techniques. It is most commonly used to facilitate short painful procedures, such as suturing under local anaesthetic, removal of a foreign body or brief orthopaedic manipulations.

Before ketamine is used all other options should be fully considered, including analgesia, reassurance, distraction, involving play therapist, entonox, intranasal diamorphine, etc. There is a significant risk of a failure of sedation if the procedure is prolonged, and it is important to recognise that the option of general anaesthesia may be preferred in these circumstances.

Ketamine should be only used by clinicians experienced in its use and capable of managing any complications, particularly airway obstruction, apnoea and laryngospasm. The risks associated with ketamine use in children are: mild agitation (20%), moderate/severe agitation (1.5%), rash (10%), vomiting (7%), transient clonic movements (5%), airway problems (1%). Nystagmus, purposeless movements and some degree of dissociation are normal during ketamine sedation and the parent/carer should be made aware of this.

Con	traindications:
Absolute Contraindications: Age < 3 months Known or suspected schizophrenia	Relative Contraindications: Age less than 12 months Active pulmonary disease or infection Known or suspected cardiovascular disease Intracranial masses, abnormalities or hydrocephalus

### **Complications:**

Noisy breathing:	Usually due to airway mal-position. Normally corrected by routine airway position management.	
Excess secretions: Gentle suction; may need treatment with atropine 20 mcg / kg iv		
Laryngospasm:	Apply BVM with peep, if unable to ventilate will need paralysis and intubation. Incidence 0.3% (intubation required in 0.02%)	
Stridor:	Nebulised adrenaline 0.5 mL/kg 1:1000 (max 5 mL)	
Apnoea:	Support airway, may require BVM	
Hypoxia:	Supplemental $O_2$ , assess airway and breathing	
Bradycardia:	If compromised, treat with atropine 20 mcg / kg iv (minimum 100 mcg, maximum dose 600 mcg)	

## Pre-sedation assessment

### Document on cerner and Sedation Checklist

ASA and airway assessment, PMHx, allergies, previous anaesthetics, consent for procedure and sedation

### **Situational Awareness**

• Senior informed? (inform consultant if on site)

• Enough staff available to perform procedural sedation and manage rest of department?

Patient Preparation
 Fasting is not required in children undergoing procedural sedation (NBM while awaiting procedure)
 Topical anaesthesia should be used to reduce the pain of intravenous cannulation or intramuscular injection.

- Topical anaesthesia eg LATgel can also be used to prepare any wound requiring suturing etc.
   Cannula should be inserted in an area separate to which the procedural sedation will be performed.
- Advice leaflet given to parents and ensure consent documented. Encourage the child and parents to talk about happy topics whilst preparing.
- Ensure have ready any analgesia / anaesthesia for during the procedure and post procedure

# **Check Emergency Equipment:**

- RSI box available & doses calculated
- Intubation / airway kit checked
- Oxygen / suction Ventilator available

- Monitorina:
- High dependency or resuscitation cubicle,
- · Monitor vital signs, ECG and sats
- 3 clinicians: sedationist (signed off), operator, nurse
- Procedure
- Oxygen available (may be given after ketamine administered to avoid agitation)
  Ketamine 1-2 mg/kg by slow iv injection (peak effect within 1-2 minutes) or 4 mg/kg im (peak effect within 5-8 minutes)
  Repeat dose of 0.5-1mg/kg iv (or 2 mg/kg im) may be needed after 5-10 minutes
  If using im dose due to access, consider inserting cannula after first dose in case further dose required

- Adequate sedation is usually indicated by loss of response to verbal stimuli and nystagmus: heart rate, blood pressure and respiration rate may all increase slightly. Lacrimation or salivation may be observed. Procedure can be performed once patient is adequately sedated
- If patient has had opiates or is >12 years then consider ondansetron (100 mcg/kg max 4mg)

## Recovery May need admission to PCDU

Recover in a quiet, observed and monitored area under the continuous observation of a trained member of staff. Recovery should be complete between 60 and 120 minutes, depending on the dose and route used.

### Discharge criteria (by Doctor or Nurse)

- Patient can ambulate at pre-procedure level
- Patient has minimal pain and no nausea & vomiting
- · Patient has a responsible adult to escort them and stay with them at home
- Parent advised that simple analgesics (paracetamol, ibuprofen) are fine to give
- Parent advised not to give any other sedative (eg. Phenergan)
- Parents are advised to contact ED if they have any concerns
- Post sedation advice sheet given to parents



Lead Author

PEM Consultant Paediatric Consultant

Co-Authors / Collaborators

**Reference Documents** 

Pharmacological Agents for Procedural Sedation and Analgesia in the Emergency Department; RCEM Best Practice Guideline; March 2019.

RCEM Guideline for Ketamine Sedation of Children in Emergency Departments; October 2016.