

Procedural Sedation - Adult Emergency Department - Full Clinical Guideline - Derby Only

Reference No: CG-EMD/2024/019

Aim

To enable Emergency Department clinicians to deliver safe procedural sedation within the Adult Emergency Department environment.

Scope

This guideline is intended for use in adult patients (aged 16 & over) in the Adult Emergency Department by appropriately trained personnel.

Definition

Sedation is a continuum, starting with minimal sedation and ending with general anaesthesia. The American Society of Anaesthesiologists defines sedation as:

- Minimal sedation/anxiolysis
A typical agent would be Entonox.
The patient responds normally to verbal commands.
Cognitive and physical coordination may be impaired.
Ventilation and cardiovascular function is unaffected.
- Moderate (conscious) sedation
A typical agent would be a benzodiazepine.
Purposeful response to commands or light tactile stimulation is maintained.
The airway is normally unaffected and spontaneous ventilation adequate. Cardiovascular function is usually unaffected.
- Deep sedation
Typical agent would be propofol.
The patient cannot easily be roused but responds purposefully to repeated or painful stimulation.
The patient may require assistance in maintaining a patent airway. Positive pressure ventilation may be required to support potential clinically significant ventilatory depression. Cardiovascular function is usually unaffected.
- General anaesthesia
The patient is unrousable. Patients most often require assistance in maintaining a patent airway and ventilatory assistance because of depressed respiration.
Cardiovascular function may be impaired.
- Dissociative sedation
Agent used is Ketamine
The patient enters a trance like cataleptic state.
Airway reflexes are usually maintained and ventilation unaffected.
Cardiovascular function is usually unaffected.

Indications for procedural sedation & analgesia in the ED

- Joint reduction (with the exception of prosthetic joints which should be managed by the orthopaedic surgeons in theatre usually under general anaesthesia)
- Manipulation of joints/limbs with fractures for anatomical alignment
- Cardioversion

Contraindications to procedural sedation by ED clinicians

Patient related:

- Patients ASA III or above (unless they require emergent life or limb saving interventions – then discuss with the ED consultant)

<u>ASA status</u>	
The patient's ASA status should be determined:	
I	A normal healthy patient
II	A patient with mild systemic disease e.g. asthma or COPD well controlled on inhalers, angina with occasional use of GTN
III	A patient with severe systemic disease e.g. asthma or COPD poorly controlled or limiting exercise tolerance, angina requiring regular use of GTN
IV	A patient with severe systemic disease that is a constant threat to life
V	A moribund patient who is not expected to survive without the operation

- Patients who have proven allergy to the sedative agents or analgesics (Note propofol contains egg and soya derivatives)
- Patients who are at high risk of aspiration e.g. those who are acutely intoxicated, those with delayed gastric emptying (e.g. previous upper GI surgery) and the morbidly obese
- Patients who have a co-existent head injury associated with loss of consciousness, GCS<15 or vomiting
- Patients with porphyria, sickle cell disease or untreated thyroid disease
- Pregnancy
- Patients with prior problems relating to their airway or previous anaesthesia

Department/personnel related:

- Where departmental workload is such that a nurse, or other appropriately trained personnel, would not be available to stay with the patient until recovery from sedation
- Where there is no appropriately trained personnel to provide the sedation episode

- Where monitoring and resuscitation equipment is not available or in good working order

Patient assessment

AMPLE history

An AMPLE history should be taken, and the patient examined. This should be documented in the patient's notes. An ECG should be recorded in those with a history of collapse or pre-existing heart disease.

Allergies
Medication
Past medical history
Last ate
Events leading to episode

Fasting

Recent College of Emergency Medicine recommendation¹ suggests that fasting is not required for minimal sedation or moderate sedation where verbal contact is maintained.

For all other sedation techniques patients should be fasted as per guidelines for general anaesthesia: **two hours for clear fluids and six hours for solids.**

For life or limb threatening procedures where deferment until a patient is fasted is not possible, risk-benefit assessment should be made and the choice of sedation technique should be carefully considered.

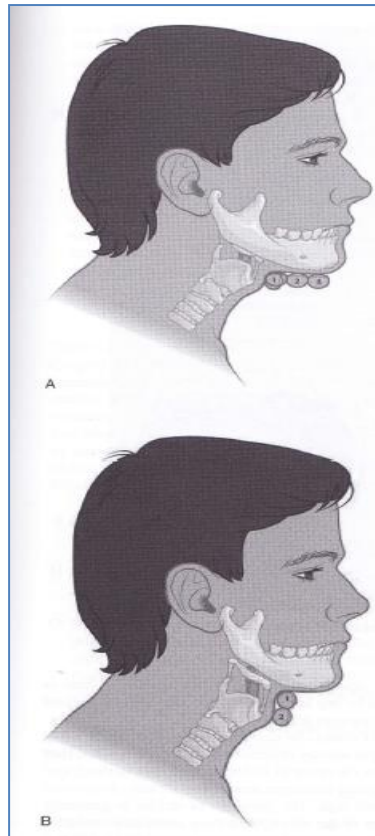
Airway

The patient's airway should be evaluated to identify a potentially difficult airway. The mnemonic **LEMON**² is a useful aide-memoire.

LEMON assessment:

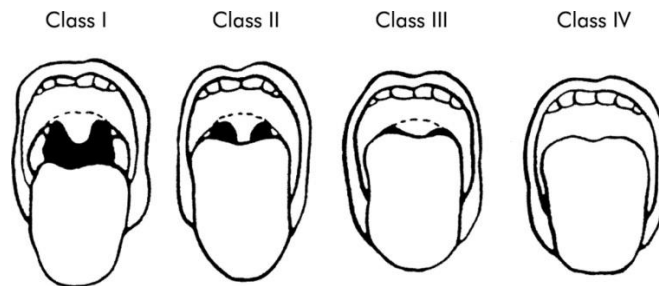
Look externally; Consider lower facial disruption, patients with beards, small mandibles, large tongues, large teeth, and short necks. If an airway looks difficult, it probably is.

Evaluate 3-3-2; 3: Mouth opening (3 fingers)
 3: Distance between tip of mental process & hyoid bone (3 fingers – fig. A)
 2: Distance between hyoid bone and thyroid notch (2 fingers – fig B)



(Illustration taken from Manual of Emergency Airway Management (2nd Edition) Ron M Walls et al.)

Mallampati score – this equates with view at laryngoscopy



Obstruction; Are there any signs of upper airway obstruction? E.g. difficulty swallowing, stridor, change in voice

Neck mobility Does the patient have a full range of movement of the neck?

Patients who are ASA III or above, or who have been identified as having a potentially difficult airway should be discussed with the ED consultant initially or the anaesthetic registrar if the ED consultant is unavailable. If procedural sedation is to proceed within the ED then the ED consultant or an anaesthetist should be immediately available in the department before commencing the sedation episode.

Preparation

Identify appropriate personnel

1) "Sedationist".

The sedationist should fulfil the below criteria:

- Those administering minimal or moderate sedation should have ILS or ALS certification and have local sign off for **level one sedation training**.

Level one sedation training¹ (conscious sedation) – knowledge of:
ASA grading
Pre-procedural assessment including prediction of difficult airway
Pre-procedural fasting and risk benefit assessment
Consent & documentation
Drug selection & preparation
Monitoring, complications & rescue strategies
Governance & audit

- Those administering deep or dissociative sedation should have achieved the Royal College of Anaesthetists initial assessment of competence and local sign off for **level two sedation training and ED RSI training**.

Level two sedation training¹ (deep sedation/general anaesthesia)
As per level 1
Drug selection, potential alternative strategies &/or lighter sedation
Safe use of propofol
Safe use of Ketamine
Monitoring, complications & rescue strategies
Governance & audit

- Those undertaking general anaesthesia and RSI should have as above plus local sign off for ED RSI training

More information on training and local sign off (including descriptions of level one and level two sedation training) can be found in the RCoA and CEM report on Safe Sedation in the Emergency Department, published November 2012¹.

The sedationist is responsible for patient assessment, safety and post sedation care.

2) Assistant.

This should usually be the ED nurse. This person is responsible, along with the sedationist, for patient safety and recovery from sedation. They should be ILS trained as a minimum and have received local training in assistance of procedural sedation.

3) "Operator".

This should be a person competent to undertake the planned procedure. If supervision is required, this should be from other suitably trained personnel *other than* the sedationist and their assistant.

Ensure appropriate environment & that essential equipment is available and in working order

Procedural sedation, other than minimal sedation, should either be undertaken in the resuscitation room, or procedure rooms one or two in minors. Under no circumstances should procedural sedation be undertaken anywhere else within the department. There are no exceptions.

The patient should have the minimum required monitoring for sedation as per AAGBI guidelines;

- Pulse oximetry
- Non-invasive blood pressure (set to cycle every 2.5 minutes)
- Electrocardiography
- Capnography

The use of capnography is **strongly recommended** for moderate sedation and is **mandatory** for deep sedation, dissociative sedation, general anaesthesia & RSI. Oxygen masks with the ability to monitor CO₂ are available in each of the areas where sedation can be undertaken. They require a gas sampling line to extend the capnography outlet to allow attachment to the capnography module.

The patient's respiratory rate and GCS should also be observed and documented

Equipment required (which should be checked by the sedationist) should include

- Monitoring as described above
- A piped oxygen supply
- Working high pressure suction, yankauer sucker and a selection of soft suction catheters
- A tipping trolley
- A defibrillator with ALS drugs available
- A variety of appropriate intravenous cannula
- An appropriate range of intravenous fluids and infusion devices
- A bag valve mask and Mapleson C (Waters) circuit with appropriately sized mask
- A selection of appropriately sized oropharyngeal & nasopharyngeal airways
- Two working laryngoscopes, with size 3 & 4 blades
- Endotracheal tubes, size 6,7,8,9
- LMA, size 3,4 & 5
- Bougie
- Tube tie & 20ml syringe
- Immediate access to difficult airway trolley if required

Consent

The procedure and need for sedation should be explained to the patient along with associated risks. A consent form for both sedation AND the procedure should be signed and a record of this made in the patient's notes.

Patient preparation

The patient should have a working IV cannula attached to a slowly running IV infusion of preferred crystalloid.

Drugs

These should be prepared by the sedationist. This task should not be delegated to other personnel.

The drugs should be in separate syringes labelled with the appropriate drug label and concentration of drug.

If a reversal agent is available for the chosen drug e.g. naloxone for opiates or flumazenil for midazolam, this should be available at the bedside but not drawn up.

Drug choice is dependent on the sedationist & their level of experience, the patient and the intended procedure.

A brief descriptions of the available drugs and their doses are included (see appendix 1³), but personnel should **NOT** be using drugs they are unfamiliar with.

Procedure

1. Sedation checklist and STOP moment should be completed (see appendix 2)
2. The patient should receive 5-7L/min oxygen via a capnography enabled oxygen mask unless contraindicated. Patients in whom this is contraindicated should be discussed with a consultant (the min-max flow rate for the CO₂ sampling oxygen mask is 5-7L/min).
3. The patient should receive an analgesic, if required, and time allowed for it to have its maximal effect according to the pharmaco-kinetics of the chosen analgesic
4. Sedation should be delivered until an adequate level of sedation is safely reached. The drugs given should be documented on the ED front sheet
5. Help from the ED consultant or ICU/anaesthesia registrar should be sought immediately if the patient becomes unstable or other complications occur
6. Observations (RR, BP, HR, O₂ sats, end-tidal CO₂ & GCS) should be recorded every 5 mins. Either the sedationist or assistant must remain with the patient until they have completely returned to pre-procedure baseline observations
7. Discharge can be considered once the patient has returned to his or her pre-procedure state and the discharge criteria are met.

Discharge Criteria

The patient should have returned to their pre-procedure state, they should:

- Have observations within normal limits for that patient (HR, BP, RR, Sats & GCS)
- Be ambulant, appropriate to their pre-procedure state
- Not feel nauseous, dizzy or light headed
- Tolerate oral fluids in the department
- Be pain free and have a pain management plan in place for discharge
- Have a responsible adult to accompany them home and remain with them for 12 hours
- Be in receipt of and understand the contents of the “post sedation advice” sheet (see appendix 3)

Audit & Governance

A record of the patient should be kept in the logbook found in the sedation file (kept in resus). A copy of the Sedation Checklist should also be scanned into ICM with the patients notes. Any adverse events should be clearly documented and an IR1 completed.

References

1. Safe Sedation of Adults in the Emergency Department. Report and Recommendations by the RCoA & CEM. November 2012
2. Ron M. Walls et al. Manual of Emergency Airway Management (2nd edition)
3. Pharmacological Agents for Procedural Sedation & Analgesia in the Emergency Department . RCEM. March 2019

Appendixes

Appendix one: Sedation drugs & their doses

Appendix two: Sedation checklist

Appendix three: Post sedation advice checklist

Documentation Control

Development of Guideline:	Dr Allie Klein, ED Consultant
Consultation with:	
Approved By:	Reviewed with minor change – Dr R. Hurry, approved by ACD. – Feb 2024 Medicine Division - 29/02/2024
Review Date:	February 2027
Key Contact:	Dr Rupert Hurry, ED Consultant

Appendix 1: Sedative agents

Midazolam (level one sedation training required)

Preparation: comes in a 5ml vial of 1mg/ml
Should be drawn up in 10ml syringe adding 5ml of 0.9% NaCl to achieve a concentration of 0.5mg/ml

Dose:

Adult: 1mg-2mg boluses delivered over 1-2 minutes
Can be repeated after 2-5 mins
Usual total dose 3.5-5mg, maximum 7.5mg

Elderly: 0.5mg bolus over 1-2 minutes
Can be repeated after 2-5 mins
Maximum 3.5mg

Pharmaco-kinetics: onset 2-5 minutes, duration of action 3-120 minutes

Pro's: Familiar to most ED staff
Excellent Amnesic
Has the availability of flumazenil as a reversal agent

Con's: Respiratory depression
Hypotension (particularly in those that are hypovolaemic)
Unpredictable action
Long period of post procedural sedation
Can have an enhanced and prolonged sedative effect in hepatic failure and precipitate coma
Can cause enhanced and prolonged sedative effects from interactions with opioids, antidepressants, antihistamines, α -blockers and anti-psychotics

Propofol (level two sedation training/ED RSI training required)

- Preparation: Come in a 20ml vial of 1% solution (10mg/ml)
This does not require dilution & should be drawn up neat in 2 x 10ml syringes
- Dose:
- Adult: 0.5-1mg/kg bolus delivered over 1- 5 minutes titrated to effect
Additional boluses of 0.25-0.5mg/kg as required every 3 – 5 minutes
- Elderly: 10-20mg delivered over 1-5 minutes titrated to effect
Additional boluses of 10-20mg as required every 3-5 minutes
- Pharmaco-kinetics: Rapid onset over approximately 40 seconds with one arm-brain circulation time
Duration of action 5-10 minutes (longer if an opioid has also been used)
- Pro's: Rapid onset/offset
Excellent sedative & amnesic
- Con's: Can cause apnoea and respiratory depression
Hypotension - particularly in the hypovolaemic patient, elderly or debilitated patient

Ketamine (level two sedation training/ED RSI training required)

Preparation: Comes in a 5ml vial of 10mg/ml
This should be drawn up in a 10ml syringe adding 5mls of 0.9% NaCl to achieve a concentration of 5mg/ml

Dose:

Adult: 0.5-1.0mg/kg given as a bolus over 1 minute
Additional boluses of 0.25-0.5mg/kg may be required every 5-10 minutes

Pharmaco-kinetics: Onset of action 10-30 seconds with duration of action up to 30 mins

Pros: Has excellent analgesic properties
Cardiovascularly stable

Con's: Should be avoided in patients with severe cardiovascular disease or severe hypertension
May elicit increased secretions and laryngospasm
Can cause an emergence phenomenon (post sedation confusion particularly in the elderly)

Analgesic Agents

Morphine

Preparation: Pre-prepared 10ml syringe with contains a total of 10mg to achieve a concentration of 1mg/ml

Dose: 0.1-0.2mg/kg IV

Pharmaco-kinetics: Peak effect after IV bolus is 15 mins, duration of action 2-3 hrs

Pros: Most people are familiar with morphine
Excellent analgesic

Cons: Can cause respiratory depression and apnoea
Nausea and vomiting
Can have an enhanced and prolonged effect in patients with renal failure, the elderly, and where hypovolaemia or hypothermia exists. Can precipitate coma in hepatic failure
Can cause enhanced sedative and respiratory depression from interactions with benzodiazepines, anti-psychotics and anti-depressants

Fentanyl:

Preparation: Comes in a 2ml vial of 50mcg/ml.
This should be drawn up in a 10ml syringe adding 8mls of 0.9% NaCl to achieve a concentration of 10mcg/ml

Dose: 0.25-0.5mcg/kg

Pharmaco-kinetics: Onset of action is within 1-2 minutes after IV injection with peak effect within 4-5 minutes. Duration of action after a single bolus is approximately 20 minutes

Pros: Quick onset of action and short duration of action
Excellent analgesic

Cons: short duration of action
Can cause respiratory depression and apnoea
Can cause bradycardia and hypotension
Nausea and vomiting
Can enhance the sedation and respiratory depression from interaction with benzodiazepines, antidepressants, anti-psychotics
Has an enhance and prolonged sedative effect with hepatic failure

Affix patient label

Appendix 2:

Pre-Sedation Checklist

(to be used in conjunction with procedural sedation SOP)

STOP – this checklist should be completed by the Sedation Team (Sedationist, Operator, Assistant) as a means of aiding communication around the forthcoming

- Identification of personnel (name/specialty/grade)
Sedationist: _____
Operator: _____
Assistant: _____

- Equipment checked, available, and in working order
- AMPLE history & Examination recorded in patient notes. ECG if required
- Fasting status & aspiration risk assessed
- ASA status determined (*ASA III or above should be discussed with ED consultant or Anaesthetic registrar*)
- Airway assessment (LEMON) performed (*if a difficult airway or difficulty maintaining oxygenation is predicted, this should be discussed with the ED consultant or Anaesthetic registrar*)
- No contraindications to procedural sedation exist
- Consent form signed for sedation & procedure
- IV cannula in situ, flushed, working and attached to a slowly running IV infusion
- Patient receiving oxygen via oxygen mask with gas sampling line and capnography in situ
- Pre-sedation observations documented (weight, BM, Temp, GCS, HR, BP, RR) and recorded on the ED front sheet & patient track
- Relevant drugs prepared and appropriate doses calculated
- Antagonist drugs immediately available

Appendix 3:**Post sedation checklist**

- Drug doses given documented on ED front sheet
- Intra-procedure observations recorded on patient track
- Cannula flushed to ensure there are no remaining sedative drugs within the giving set or cannula
- Discharge criteria are met:
 1. Observations within normal limits for that patient (HR, BP, RR, Sats & GCS)
 2. Patient is ambulant, appropriate to their pre-procedure state
 3. Patient does not feel nauseous, dizzy or light headed
 4. Patient has tolerated oral fluids in the department
 5. Patient is pain free and has a pain management plan in place for discharge
- Post sedation advice sheet given
<http://www.uhdb.nhs.uk/download.cfm?doc=docm93jjm4n1514.pdf&ver=4724>
- Advice explained to patient and the patient's responsible third party, who needs to stay with them for the next 12 hours
- IR1 filled in if occurrence on an adverse event. Adverse events could include:
 - Failed sedation episode
 - Episodes of apnoea, desaturation or airway obstruction
 - Episodes of hypo or hypertension
 - Aspiration, wretching or vomiting
 - Use of antagonist drugs
 - Equipment Failure