Document Conception	
Document type	Clinical Guidance
Document name	Best Practice Guidance for Procedural Sedation of Children and Young People: A South London and South East of England approach.
Document Audience	All tertiary and secondary centre staff involved in sedating children for procedures; mainly paediatricians, paediatric ward nurses, and anaesthetists.
Summary	Colleagues from the South Thames Paediatric Network originally developed this guideline in 2022 to support safe and standardised sedation practice across the Network. This is a second version of the original document, following feedback that the painless sedation algorithm, especially in older age groups, was not always effective in achieving adequate sedation. The high 'failure rate' has led to children being required to be booked for imaging under general anaesthetic, as an alternative. The document provides a reference for what is considered best practice across the South Thames region.
Reason for development	To ensure standardised and safe procedural sedation practice for painful and painless procedures.
Document Benefits	
Key Improvements / Benefits	Teams are empowered to support safe procedural sedation practise within their services
	Effective procedural sedation can avoid the need for children any young people to undergo a general anaesthetic, and the associated risks
	Waiting lists for scans, such as an MRI, under general anaesthetic are significantly longer than for awake MRIs, or those under sedation. The guidance will aid waiting times for unnecessary general anaesthetic and will support elective recovery
	Theatre time is saved, if a procedure can be conducted under sedation rather than general anaesthetic for painful procedures, such as involved suturing or forearm fracture manipulation.
	Families aren't inconvenienced by additional time in hospital or an overnight stay, where not necessary
Project Evaluation	
Evaluation	A reduction in the number of episodes of failed sedation in the centres adopting the new guidance
	Side effect profile reported
Implementation / Recommendations: Next Steps	
In order for the implementation of the Procedural Sedation Best Practice Guidance to be impactful across the network we need to ensure they are circulated widely across the whole network, to ensure all clinical staff performing these procedures are familiar with the agreed standards to be following.	
Step 1	Each Trust should align local guidelines and policies with the principles set in this document
Step 2	STPN identifies training and workforce needs
Step 3	STPN collects data on implementation and feeds back to the Sedation Task and Finish group
Document Contributors	
Consultation provided by	Sedation Task and Finish Group members- all contributors listed in appendix D Led by Dr Bengisu Bassoy and Dr Darren Ranasinghe
Date published	March, 2025

Version	2.0

BEST PRACTICE GUIDANCE FOR PROCEDURAL SEDATION OF CHILDREN AND YOUNG PEOPLE

A South London and South East of England approach

Introduction:

Colleagues from the South Thames Paediatric Network originally developed this guideline in 2022 to support safe and standardised sedation practice across the Network. This is a second version of the original document, following feedback that the painless sedation algorithm, especially in older age groups, was not always effective in achieving adequate sedation. The high 'failure rate' has led to children being required to be booked for imaging under general anaesthetic, as an alternative.

The changes made to the algorithms have been made by collating all available Sedation guidance in the Network, alongside the latest NICE evidence base. The latest guidance adopts the use of Dexmedetomidine for painless sedation in children, which has a long history of safe use at hospitals within the network. It also highlights non-pharmaceutical measures to lessen the need for deep sedation, or even the need for sedation at all.

Please note that this guidance is for use in all paediatric areas, in conjunction with existing trust guidance on pain management (including, if applicable, use of IV/IM Ketamine, Fentanyl and Diamorphine). It acknowledges existing trust competencies for the administration of Ketamine, Fentanyl and Diamorphine.

The contents for the Guideline are as follows:

Main document: Best Practice guidance for Procedural Sedation of children and young people

Appendix A: Team Screen- An essential safety checklist to work through prior to the administration of sedation

Appendix B: Intranasal Fentanyl, Intranasal Diamorphine and IV/IM Ketamine competencies

Appendix C: National Nursing competencies for Procedural Sedation

Appendix D: References and Team credits

Change History:

Date	Change details, since approval:	Approved by:	Document Version:
June 2022	First version	STPN Sedation Task and Finish Group	1.0
Dec 2024	Dexmedetomidine added to the painless sedation algorithm on the >1 year branch. Midazolam route changed from buccal to oral. Alimemazine recommended in >6 month olds only. Addition of Non-pharmaceutical measures.	STPN Sedation Task and Finish Group Chair – Darren Ranasinghe and Bengisu Bassoy	2.0

Non-Pharmaceutical Measures

All services should consider non-pharmacological techniques as an alternative to sedation, or at the very least in combination to it. Play therapy, VR (virtual reality), guided imagery, hypnosis and relaxation techniques can be excellent alternatives to pharmacological sedation. Utilise anyone in your department (particularly within ED and anaesthesia) who has developed an interest in any of these techniques.

Pre-procedural Patient Assessment

The Nurse in Charge of the patient and the Paediatric Registrar must complete this assessment and discuss with the appropriate Consultant prior to the procedure.

- **Weight**
- **Fasting status**
  Follow national recommendation of 1-4-6 for moderate sedation or above.
- **Current medical condition and any surgical problems**
- **PMH including any history of problems with sedation or anaesthesia, injury to neck**
- **Current and recent medication and allergies**
- **Psychological and developmental status**
- **General physical assessment, adopt a systematic approach**
- **Assessment of the airway:**
  Noisy breathing, snoring, nasal speech, sleep apnoea, mouth breathing and drooling.
  Mandibular hypoplasia, small mouth or limited mouth opening, micrognathia

Contra-indications and specialist support required for sedation

Contra- indications to Sedation – **Conscious Sedation should not be used in the following situations:**	**Cautions 1-** Conscious sedation should only be performed after Consultation with Senior Anaesthetist and with on-site availability of Critical Care support (L1, or 2/HDU as appropriate)	**Cautions 2- ,**As for Cautions 1 with additional consultation with specialist team, anaesthetic team and tertiary centre
• Active respiratory tract infection • SpO_2 <94% in air • Apnoeic episodes • Decreased level of consciousness (e.g. Raised ICP, encephalopathy, head injury) • Bowel obstruction • Allergy to drugs being used • Child too distressed despite adequate preparation • Informed refusal by parent or child • This guidance is not intended to guide sedation to support babies or children to tolerate CPAP. Please see the advice within the STPN 'CPAP under 2 years' guideline.	• <5kg • <12 months post term • ASA ≥ 2 (See ASA classification table) • Congenital abnormalities or dysmorphic features E.g. Pierre Robin, Trisomy 21, Mucopolysaccaridoses • Any airway problems including obstructive sleep apnoea, snoring and stridor • Large tonsils • Any other respiratory problems • Previous failed sedation • Severe gastroesophageal reflux requiring treatment • Previous paradoxical agitation • Previous history of aspiration • Obesity	• Receding Mandible- On-site ENT • ASA ≥ 3 (See ASA classification table) L3 CC support • Severe liver, kidney, cardiac, neuromuscular disease- Consult appropriate specialist Consultant

American Society of Anaesthiologists Classification*

ASA1: No organic, physiological, biochemical or psychiatric disturbance.

ASA2: Mild to moderate systemic disturbance, not disabling e.g. well controlled diabetes, moderate anaemia, well-controlled asthma.

ASA3: Severe systemic disease, which is disabling e.g. poorly managed diabetes with vascular, fluid or electrolyte complications, severe pulmonary or cardiac insufficiency.

ASA4: Severe systemic disorders, which are already life threatening.

ASA5: The moribund patient who has little chance of survival with or without operative intervention

Monitoring & Observations

Monitor patient continuously - document every 5 minutes once sedation given and every 15 minutes post procedure until child has minimal residual sedation.

Sedation depth	Sedation score	Conscious State	Monitoring and Observations - Immediate access to resus equipment required		Training required	
					Basic Life-support	Advanced life support
Awake	0	Awake, normal conscious level			**ALL team members**	**Not required, BUT inform senior nurse or Doctor BEFORE Procedure.**
Minimal sedation	1	Patient awake, calm and responds normally to verbal commands. Cognitive function and coordination impaired Ventilation and cardiovascular functions unaffected.	Access to monitoring, so available if sedation deepens			
Moderate sedation	2	Patient sleepy but responds purposefully to verbal commands or light tactile stimulation. Airway patent and spontaneous ventilation. Cardiovascular function maintained.	☐ Respiratory Rate ☐ Oxygen Saturations – maintain above 94% ☐ HEART RATE ☐ Depth of Sedation ☐ Face mask capnography available if at risk of progression to deep sedation		**ALL team members**	**At least ONE team member***
Deep sedation	3	Patient asleep and cannot be easily roused but responds purposefully to repeated or painful stimulation. May require assistance to maintain a patent airway. Spontaneous ventilation may be inadequate. Cardiovascular function maintained.	☐ Respiratory Rate ☐ Oxygen Saturations – maintain above 94% ☐ Face mask Capnography	☐ Heart Rate ☐ BP ☐ Depth of Sedation ☐ 3-Lead ECG	**ALL team members**	**At least ONE team member AND Anaesthetic support.**
	4	**Unrousable**	**To be avoided but if this occurs monitor as above and call anaesthetic support.**		**Call Anaesthetic support**	

*The patient may be looked after by a PILS (Paediatric Immediate Life Support) trained team member, providing they have an APLS (Advanced Paediatric Life Support), or equivalent, trained colleague to call upon. If they are leaving the department, then individual teams should consider how far they are going, whether there are airway skilled professionals there, and how quickly those skills can be called upon.

Discharge Criteria

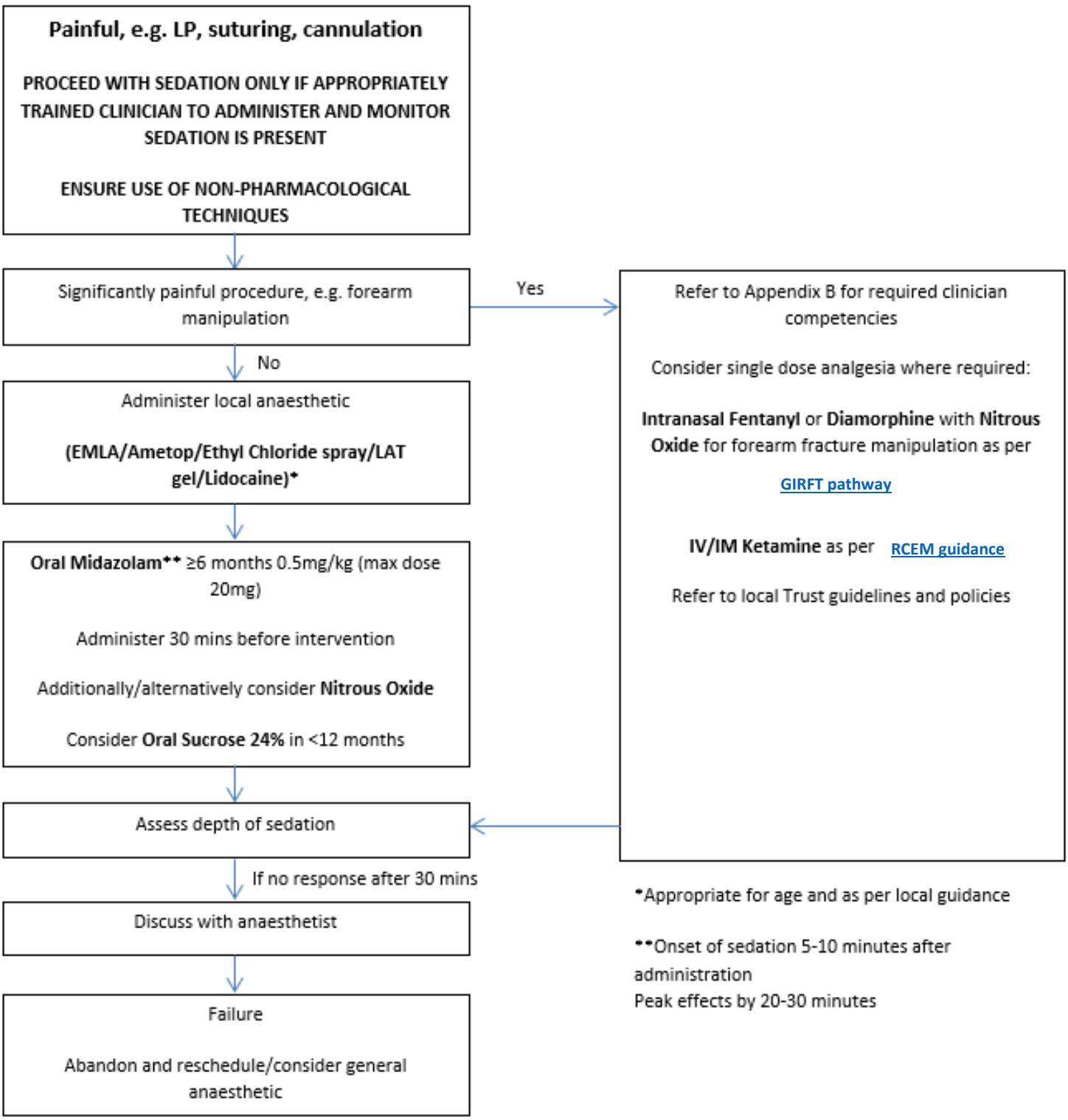
Ensure all the criteria are met before the patient is discharged

- ✓ Vital signs (usually body temperature, heart rate, blood pressure and respiratory rate) have returned to baseline levels
- ✓ The child or young person is awake (or returned to baseline level of consciousness) and there is no risk of further reduced level of consciousness
- ✓ Nausea, vomiting and pain have been adequately managed

Painful Procedures:

Venepuncture, Venous cannulation, Chest drain, Suturing, Fracture manipulation, Dislocation reduction, Eye irrigation, Burns management, Skeletal survey, Wound dressing, Removal of foreign body, Reducing paraphimosis, Incision and drainage, Lumbar puncture, Insertion of nasogastric tube, Short long lines (midlines), PICC lines.

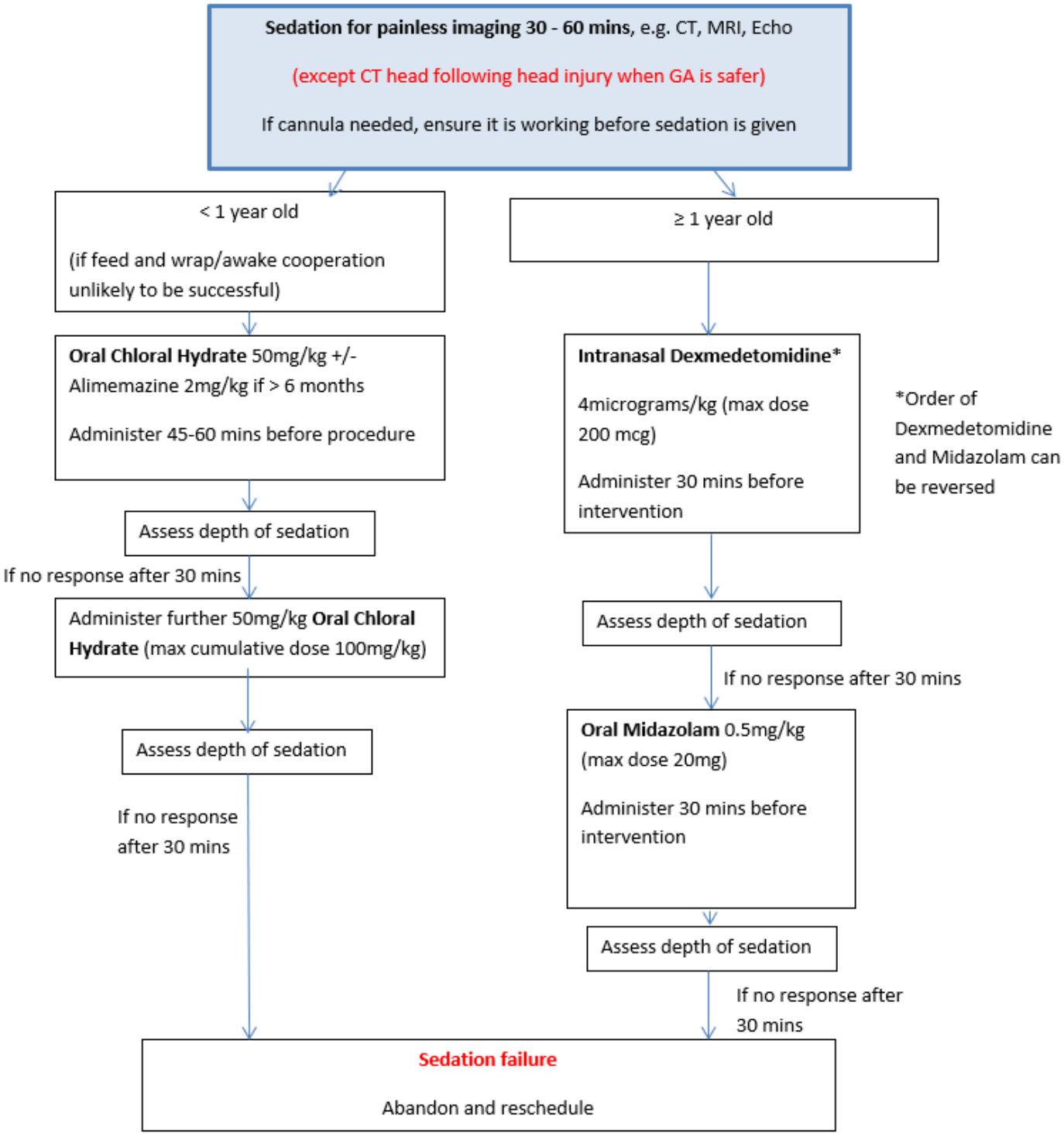
Choice of Medication



Choice of Medication

Painless Procedures:

Imaging: CT, MRI, Ultrasound, Echocardiogram



Reversal Agents:

Flumazenil: *Rapid reversal of sedative effects of Midazolam*

- IV: 10 micrograms/kg (max 200 micrograms per dose) at 1-minute intervals. Administer dose over 15 seconds. Max 5 DOSES per course (i.e. 50 micrograms/kg per course or 1mg per course).
- If drowsiness recurs after IV, consider IV infusion 2-10 micrograms/kg/hour (max 400 micrograms/hour relative to weight)
- **Do not give to epileptic child on long terms benzodiazepines; may precipitate withdrawal seizure**

Drug doses:

Please refer to the latest edition of BNFC https://bnfc.nice.org.uk/ and the Evelina Paediatric Formulary on Clinibee - requires registration

Alimemazine

Action	*Antihistamine with sedative effects, with no analgesic properties.*
Preparations	30mg/5ml oral syrup
Indications	Sedation of painless imaging in ≥6 months to < 1 years of age
Dose	**Oral:** From 1month: 2mg/kg
Timing	45–60 minutes before procedure
Second Dose	Not required
Recovery time	1-4 hours
Contraindications	Epilepsy, hepatic and renal impairment, myasthenia gravis
Cautions	Caution use in children under 6 months due to the possible association with cot deaths, volume depleted patients susceptible to orthostatic hypotension, cardiac disease, and hypokalaemia.,
Side Effects	Respiratory depression
Other	Can cause ECG changes including prolonged QT interval. Pre-existing cardiac disease and hypokalaemia can predispose this. Not licensed for use in < 2 years old

Chloral hydrate

Action	*Hypnotic drug with no analgesic properties*
Preparation	500mg/5ml Oral Solution
Indication	Sedation of painless imaging in < 1 years of age
Dose	Oral: 50 mg/kg
Timing	45 – 60 minutes before procedure, max effect 1-2 hrs
Second Dose	50 mg/kg if adequate sedation not achieved at 30 minutes (max CUMULATIVE dose is 100mg/kg,)
Recovery time	1-6 hrs minimum
Contraindications	Acute porphyria, gastritis, severe cardiac disease
Side Effects	Agitation, allergic dermatitis, confusion, ataxia, GI disorders, Ketonuria, kidney injury
Cautions	Children with obstructive sleep apnoea could be at risk from life-threatening respiratory obstruction during sedation, severe hepatic and renal impairment
Other	Can mix with squash/sugar water to disguise taste

Dexmedetomidine

Action	*Alpha-2 agonist. Sedation with limited analgesic effect.*
Preparation	100 micrograms/ml concentrate solution (2ml vial)
Indication	Painless Procedure ≥ 1 year old
Dose	Intranasal: 4 micrograms/kg (maximum: 200 micrograms)
Timing	30 mins before intervention
Second Dose	Not required
Recovery time	45-100 minutes
Contraindications	Patients on digoxin, patients with 2nd or 3rd degree heart block, patients with uncontrolled hypertension or hypotension, acute cerebrovascular conditions, upper airway disease
Cautions	-
Side Effects	Can cause bradycardia and hypotension (rarely clinically significant. Accept 30% reduction from baseline)
Other	The solution does not require dilution. For doses greater than 100 micrograms (1ml), split the dose in half and administer in each nostril. Withdraw the dose of dexmedetomidine into a syringe using a filter needle and instil half the volume into each nostril if greater than 1ml. Use a mucosal atomisation device (MAD), if available. Use immediately after preparation.

Inhaled nitrous oxide

Action	*Analgesic and sedative properties.* *Only suitable in >5 years for co-operation*
Preparation	Entonox (50% O_2 + 50% nitrous oxide)
Indication	Painful Procedures
Dose	As required with monitoring
Timing	Rapid onset, peak 3-5 minutes
Recovery time	Wears off rapidly
Contraindications	Patients with closed air spaces (pneumothorax, GI obstruction, middle ear infection, head injury), patients at risk of bone marrow suppression, raised homocysteine, acute asthma.
Side Effects	Vomiting, nausea, dizziness
Other	Avoid in first trimester of pregnancy

Midazolam – Oral

Action	*Sedative drug with anxiolytic and amnesic properties, with no analgesic properties.*
Preparations	Licensed oral solution (5mg/ml, single use only) preferred Injection can be given orally (is extremely bitter, can mix with blackcurrant juice)
Indications	Painful procedures in children ≥ 6 months of age Painless procedures in children ≥ 1 year old
Dose	Oral: 500 microgram/kg (max per dose 20mg)
Timing	30 minutes before procedure
Second Dose	Not applicable
Recovery time	1-2 hours
Contraindications	CNS depression, compromised airway, severe respiratory depression
Side Effects	Can cause severe cardio/respiratory depression
Reversal Agent	**Flumazenil**
Other	Miprosed® 5mg/ml oral solution licensed for procedural sedation from 6 months to 14 years. Injection used via oral route is off-label.

Sucrose 24%

Action	*Analgesic agent via orally mediated increase in endogenous opioid.*
Preparations	24% sucrose solution in single dose units.
Indications	For reducing minor procedural pain in neonates or infants e.g. heel prick, LP, venepuncture, PICC insertion, IM injection, NG tube insertion
Dose	Oral preterm neonate (CGA up to 36 weeks): 0.2ml per dose Oral term neonates (CGA from 37 weeks) & infants up to 12 months: 0.5ml per dose Each dip of pacifier is estimated to be 0.2ml. Can be administered using a pacifier or directly dripped (one drop at a time) onto the tongue using an oral syringe. Effect of sucrose is enhanced when combined with a concomitant breast feed or non-nutritive sucking using a dummy.
Timing	1-2 minutes before procedure
Second Dose	Repeat dose every 2 minutes if required to maximum doses below: Neonate CGA 32-36 weeks: 1ml maximum per procedure Neonate >37 weeks & infants up to 12 months: 2ml maximum per procedure
Recovery time	5-10 minutes
Contraindications	Fructose or sucrose intolerance, glucose-galactose malabsorption, suspected necrotising enterocolitis, altered swallow (risk of aspiration), paralysed and sedated, hyperglycaemia, born to opioid dependent mothers.
Side Effects	Coughing, choking, gagging, transient oxygen desaturations – administer carefully.
Reversal Agent	N/A
Other	No analgesic effect if administered directly into the stomach e.g. via NG tube. Discard remaining solution after each procedure. Sucrose 24% solution is not licensed as a medicinal product.

Appendix A:

Team Screen- Checklist

An essential safety checklist to work through prior to the administration of sedation

Appendix B:

Intranasal fentanyl, intranasal diamorphine and IV/IM Ketamine competencies:

Healthcare professionals delivering sedation should have documented up to date evidence of competency including:

- Satisfactory completion of a theoretical training course covering the principles of sedation practice
- A comprehensive record of practical experience of sedation techniques, including details of
  - Sedation in CYP performed under supervision
  - Successful completion of work-based assessments

Each healthcare professional delivering sedation should ensure they update their knowledge and skills through programmes designed for continuing professional development

Name: _____
Grade/ Post: _____

Competency	Y/N	Date Achieved	Cons. Initials
A minimum of 3 months clinical experience in anaesthetics with evidence of successful completion of the Royal College of Anaesthetists' Initial Assessment of Competencies (IAC) or equivalent. **OR** A minimum of 6 months clinical experience as an advanced practitioner or middle grade doctor in PICU.			
Current APLS provider or instructor			
Evidence of successful completion of the Royal College of Emergency Medicine's e-learning module and short answer questions on ketamine sedation in children: https://www.rcemlearning.co.uk/?s=sedation			
Demonstrates working knowledge of ketamine (pharmacology, dosage, contraindications and side effects) to a PEM consultant.			
Demonstrates familiarity with the departmental paediatric sedation guideline (including checklists, observation chart and advice sheets).			
Teaching from PEM consultant on consenting parents for ketamine sedation.			
Demonstrates working knowledge of basic and advanced airway equipment.			
Demonstrates ability to set up and use suction.			
Demonstrates ability to set up and use a Waters circuit.			
Observes 2 paediatric ketamine, fentanyl or diamorphine procedural sedations: 1 2			
Performs 3 supervised paediatric ketamine, fentanyl or diamorphine procedural sedations: 1st: no WPBA required 2nd: **FORMATIVE** SLE (DOPS) required 3rd: **SUMMATIVE** SLE (DOPS) required			

Final sign off by PEM Consultant:
Signature: _____
Name: _____
Date: _____

Appendix C:

National Nursing Competencies, Procedural Sedation [Paediatric Critical Care Nursing Competencies]

Procedural sedation

PCCS Paediatric Critical Care Society

Code	Competency	Formative			Summative		
		Self-report	Assessor level	Sign & Date	Self-report	Assessor level	Sign & Date
	Clinical Skills						
PR1	Ensures a patient receiving procedural sedation is appropriately prepared (including consent, fasting, IV access, medical review)						
PR2	Can complete the appropriate risk assessment/checklist						
PR3	Can safely administer enteral procedural sedation						
	Can safely administer IV procedural sedation						
PR4	Can safely monitor HR, BP, RR and 02 saturations during and post receiving procedural sedation						
PR5	Ensures correct emergency equipment is present						
	Knowledge						
PR6	Understands when procedural sedation is required/appropriate						
PR7	Understands the risks and contraindications of procedural sedation						
	Knowledge application						
PR8	Can recognise and respond appropriately to under and over sedation						
PR9	Can respond appropriately to an emergency situation						

35

Appendix D:

References and Team credits

With Special thanks to the South Thames Paediatric Network Sedation Task and Finish Group who wrote the first version of this guideline, as well as the following people who worked collaboratively over several months to produce the new Procedural Sedation Guidance for South London and South East England.

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