

KK WOMEN'S AND CHILDREN'S HOSPITAL POLICY AND PROCEDURE MANUAL

Clinical Policies and Procedures

Title/Description: Sedation For Diagnostic/Therapeutic Procedures by Non-Anaesthetists

I. PURPOSE AND SCOPE

A. Purpose

The purpose of this Policy and Procedure is to allow clinicians to provide their patients with the benefits of sedation/analgesia while minimizing the associated risks. The administration of drugs to produce sedation can have the unintended effect of compromising a patient's protective reflexes; therefore, these guidelines are intended to ensure the safe use of sedation.

For the purposes of this document, a clear distinction has been made between "conscious" and "deep" sedation, but moving from a state of consciousness to deep sedation and on to general anesthesia is a continuum. This continuum can be extremely variable and depends on individual response, age, health status and drug combinations used.

B. Scope

This Policy and Procedure is applicable to:

- (a) All doctors, nurses and paramedical staff within KK Women's and Children's Hospital.
- (b) All patients in all KKH locations beyond the Operating Room where procedures (diagnostic or therapeutic) are carried out, and where any form of sedation is administered. These locations include, but are not limited to:

Children's Tower

Children's Emergency
Children's Intensive Care Unit
Outpatient Clinics
Children's Day Therapy
General Wards
Diagnostic Imaging

Women's Tower

KK In-Vitro Fertilisation Centre
Gynaecologic Endoscopy Centre
Gynaecologic Cancer Centre
Women's 24H Clinic
Women's Intensive Care Unit
Diagnostic Imaging

II. POLICY STATEMENT

Ensure patient safety is not compromised at all times.

III. DEFINITIONS AND GENERAL PRINCIPLES

1. General Definitions

1.1 Levels Of Sedation (ASA & JCAHO, 2003)

- (a) **Minimal Sedation ("anxiolysis"):** *A drug-induced state during which patients respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected.*
- (b) **Moderate sedation ("conscious sedation"):** *A drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. Reflex withdrawal from a painful stimulus is not considered a purposeful response. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.*
- (c) **Deep sedation/analgesia:** *A drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully following repeated or painful stimulation. The ability to independently maintain ventilatory function maybe impaired. Patients may require assistance in maintaining a patent airway and spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained. Reflex withdrawal from a painful stimulus is not considered a purposeful response.*
- (d) **Anaesthesia :** *A drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.*
- (e) **Continuum of Depth of Sedation**

	Minimal Sedation (anxiolysis)	Moderate Sedation ("conscious sedation")	Deep sedation/analgesia	General Anaesthesia
Responsiveness	Normal response to verbal stimulation	Purposeful* response to verbal or tactile stimulation	Purposeful* response after repeated or painful stimulation	Unarousable, even with painful stimulus
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous Ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular function	Unaffected	Usually maintained	Usually maintained	May be impaired

2. Essential Equipment

The following list of equipment should be made available and in proper working conditions.

- Blood pressure monitoring device
- Pulse oximeter

- Electrocardiogram
- Oxygen Source (wall or cylinder) capable of delivering 100% O₂ continuously for at least 60min, a flow meter and self-inflating bag and mask
- Suction catheters and suction equipment
- Emergency "crash cart" near location including Defibrillator

IV. ROLES AND RESPONSIBILITIES

DOCTOR

The physician responsible for ordering the sedation should:

1. ensure suitability of patient for sedation
2. determine the level of sedation / analgesia required
3. calculate the amount of drug(s) to be used
4. ensure proper monitoring and emergency equipment / drugs are available
5. ensure appropriate assistance available
6. ensure proper monitoring is used
7. ensure proper documentation of sedation and procedure viz
 - a. drugs and dosage given, time and place
 - b. personnel involved
 - c. type of procedure
 - d. outcome of procedure
 - e. adverse events if any and outcome
8. when moderate and deep sedation is used ensure fitness for discharge

The doctor should be competent in Basic Cardiac Life Support (BCLS).

NURSE/PARAMEDICAL STAFF

The staff assisting the doctor is responsible for:

1. helping to prepare drugs
2. helping to prepare and apply monitoring equipment
3. monitoring the patient and documentation
4. assisting the doctor in the procedure
5. assisting in resuscitation if necessary
6. recovering and monitoring the patient in the post sedation/recovery period
7. when minimal sedation is given ensure fitness for discharge
8. adequate post-discharge instructions are given

The staff should be competent in Basic Cardiac Life Support (BCLS).

V. PROCEDURE

A. Pre-Procedure

(i) Physician/Staff Responsibility

1. Assess and document patient appropriateness for sedation.
2. Ensure that a current history and physical examination record is done.
3. Note the last food/liquid intake

4. Establish and document a plan for sedation and write orders for sedative and appropriate reversal agents.
5. Establish or order intravenous access for deep sedation.

(ii) Patient Care Provider Checklists

1. Initiate the pre-procedure checklist.
2. If an outpatient, ensure that the patient has transportation home and will be accompanied by a responsible adult.
3. Verify that a completed history and physical examination is done.
4. Document NPO status. If not in compliance with guidelines, notify the physician in charge
5. Interview patient/parent or guardian about the patient's medication history, and record on Sedation Flow-sheet or Record.
 - a. Drug allergies
 - b. Prior reaction to anesthesia/sedation
6. Assess and record pre-sedation condition of the patient. This includes:
 - a. Airway
 - b. Pulse
 - c. Respiratory rate
 - d. Baseline SaO₂
 - e. ECG rhythm if ordered
 - f. Blood pressure, if appropriate

B. Intra- Procedure Monitoring and Care Requirements

1. Ensure that patients undergoing deep sedation have patent IV access. IV should be maintained until recovery criteria are met or discontinued by the physician, nurse or paramedical staff.
2. Continuous observations and monitoring of the patient during the administration of sedation for:
 - a. Airway patency and respiratory rate
 - b. Level of consciousness
 - c. Occurrence of adverse reactions
3. Continuous monitoring of hemoglobin oxygen saturation and pulse rate

4. Continuous monitoring of electrocardiogram in patients with significant cardiovascular disease or when dysrhythmias are anticipated or detected.
5. Documentation of blood pressure for all patients undergoing deep sedation
 - a. Intermittent monitoring of blood pressure at least every 10 minutes during procedures
 - b. Blood pressures should be recorded no less often than every 5 minutes for the following patients:
 - Patients who have significant medical disease
 - Patients with congenital heart disease and a history of congestive heart failure.
 - Any patient in critical care unit.
 - Any patient at risk for hypotension e.g. dehydration or sepsis
6. Documentation of these observations, name, dosage, route, site, and time of all drugs administered, and patient's response to medication should be made.

C. Post-Procedure Monitoring and Care Requirements

1. Using the same protocol as during the procedure, continually assess and monitor the patient until the patient meets postprocedure discharge criteria.
2. Discharge Criteria
 - a. Able to independently maintain an airway
 - b. SpO₂ of 95% or greater in room air, or equivalent to baseline SpO₂ in room air prior to the procedure
 - c. Stable cardiovascular status. A post-procedure blood pressure must be documented in the high-risk group as stated above item C point 5
 - d. Easily aroused, able to talk (if age appropriate), or is at pre-procedure baseline level of consciousness
 - e. Able to move/walk with minimal assistance
 - f. If a reversal agent has been given, monitoring must continue for a minimum of two hours before discharge
 - g. For outpatients:
 - a. The patient's discharge from the hospital must be ordered meet established discharge criteria.

- b. A responsible adult must be present to escort the patient home.
- c. The patient or parent/guardian must be given written post-procedure instructions.

D. Management of Emergency Situations

- i. Any medical personnel monitoring the patient must be competent to institute appropriate emergency care if the patient's airway, breathing or circulation becomes compromised.
- ii. Immediately report all untoward effects (e.g. respiratory or haemodynamic instability, adverse reaction to drugs, altered level of consciousness, prolonged drug effect, etc.) to the responsible physician/nurse and intervene as ordered by the responsible physician/nurse.
- iii. If an outpatient's condition deteriorates, STAT page the responsible physician and/or initiate CODE BLUE.

E. List of References

APPENDICES

- I. NPO Status
- II. Airway assessment checklist
- III. Monitoring requirements
- IV. Equipment list
- V. Drug list
- VI. Adverse effects

Appendices should be made available to all doctors administering sedation.

Distribution: CEO
CMB
Head, Medical Affairs
All Clinical HODs/HODs to communicate to all Doctors, Nurses and Paramedical Staff

APPENDIX I

FASTING GUIDELINES

For minimal to moderate sedation in children: 3h from last full meal.

(The exception is the use of chloral hydrate in infants undergoing non-painful procedures whereby the feeds are continued to ensure effective sedative conditions. No other sedative agents should be added if this technique fails)

For deeper levels of sedation fasting guidelines as for anaesthesia apply. When in doubt or if the last full meal is very close to time of trauma, err on the side of caution to avoid aspiration pneumonitis.

In adults undergoing moderate to deep sedation the following fasting guidelines as for anaesthesia also apply.

NPO Guidelines for deep sedation:

- > 6 hours for milk, solids, and citrus juices.
- > 4 hours for breast milk.
- > 2 hours for clear non-carbonated liquids.

APPENDIX II

AIRWAY ASSESSMENT

- History
 - Previous problems with anesthesia or sedation
 - Stridor, snoring, or sleep apnea
 - Dysmorphic facial features (e.g., Pierre-Robin syndrome, trisomy (21))
 - Advanced rheumatoid arthritis
- Physical examination
 - Habitus
 - Significant obesity (especially involving the neck and facial structures)
 - Head and neck
 - Short neck, limited neck extension, decreased hyoid-mental distance (<3 cm in an adult), neck mass, cervical spine disease or trauma, tracheal deviation
 - Mouth
 - Small opening (<3 cm in an adult); edentulous; protruding incisors; loose or capped teeth; high arched palate; macroglossia; tonsillar hypertrophy; nonvisible uvula
 - Jaw
 - Micrognathia, retrognathia, trismus, significant malocclusion

APPENDIX III

INTRAPROCEDURE MONITORING REQUIREMENTS

	MINIMAL	MODERATE	DEEP
Continuous observation	✓	✓	✓
Sedation level	✓	✓	✓
Respiratory rate	✓	✓	✓
Airway	✓	✓	✓
Pulse oximetry		✓	✓
Heart rate q 5min		✓	✓
Blood pressure q 10			✓
Continuous ECG			✓

APPENDIX IV

EQUIPMENT LIST

- Trolley capable of Trendelenberg tilt (head down)
- Emergency Airway equipment:
 - Face masks
 - Oral airways
 - Endotracheal tubes
 - Laryngoscopes (with batteries)
- Self inflating bag (e.g. AMBU or Laerdal)
- Oxygen source (wall or cylinder) with flowmeter capable of minimum 10L/min flow for 1 h
- Suction device and suction catheters
- Emergency "crash" cart with resuscitation drugs and reversal agents
- ECG machine / defibrillator

APPENDIX V

DRUG LIST

SUGGESTED REGIMENS FOR SEDATION

The agents listed below are available in this hospital. The Sedation P&P recommends that these agents or combinations be used and that intravenous titration be used whenever possible to the desired endpoint.

It is important to know that adverse sedation events are frequently associated with drug overdoses and drug interactions when 3 or more drugs are used.

If you have an inadequate sedative response, please consult the Anaesthesia department.

In general, agents should be used for their primary effects as listed below (e.g. sedation, analgesia, anxiolysis, etc.), combining agents to achieve the desired endpoints (e.g. using midazolam for anxiolysis/sedation and fentanyl for analgesia).

I. CHLORAL HYDRATE (Sedative)

A. Recommended initial dose

PO or PR	<6 months	6 months - 3 years	> 3 years
Initial dose	50 mg/kg	50-75 mg/kg	50-75 mg/kg
Maximum		1000 mg	2000 mg

B. Achieve therapeutic levels after 30-60 min.

C. Recommended repeat dose: 25 mg/kg. The total of the initial and repeat doses should not exceed the maximum recommended dose.

D. Expected duration of action: 4-8 hours.

E. Special recommendations:

1. Should be given with 1 ounce (30 ml) of water to reduce GI irritation.
2. Ninety-five percent success rate in children < 2 yrs for non-painful procedures.
3. If ineffective, do not follow with other sedatives because of risk of respiratory depression.

F. Common adverse effects: Nausea, vomiting, diarrhea.

G. Antidote: NONE

II. DIAZEPAM (Valium) Sedative-hypnotic, anxiolytic, anticonvulsant

A. Recommended initial dose

PO or IV	1-6 months	> 6 months	Maximum
Oral	0	0.4 mg/kg	20 mg
Intravenous	0.05-0.1 mg/kg	0.1-0.2 mg/kg	10 mg

B. Achieve therapeutic levels after:

oral: 30-60 min

intravenous: 1-3 min

C. Recommended repeat dose:

oral: 1/2 the initial dose

intravenous: 1/2 the initial dose to maximum of 0.6 mg/kg in any 8 hours

D. Expected duration of action:

oral: 6-8 hours

intravenous: 2-4 hours

- E. Special recommendations
1. Intramuscular injections are painful and often ineffective. Intravenous injections usually result in pain on injection and may cause phlebitis. When used intravenously, the following procedures should be undertaken to reduce the possibility of venous thrombosis, phlebitis, local irritation, swelling, and, rarely, vascular impairment: the solution should be injected slowly, taking at least 1 minute for each 5 mg (1 ml) given; do not use small veins, such as those on the dorsum of the hand or wrist; extreme care should be taken to avoid intra-arterial administration or extravasation
 2. Do not give diazepam beyond the appearance of ptosis or inability to respond to verbal command.
- F. Common adverse effects
May cause amnesia, confusion and respiratory depression. .
- G. Antidote: Flumazenil (Mazicon) Incremental doses of 0.01 mg/kg can be administered intravenously over 15 sec. Flurnazenil should be titrated to effect to prevent withdrawal symptoms. Doses may be repeated every 60 sec as needed to a maximum of four additional doses (0.05 mg/kg and no more than 1 mg). Patients who receive flumazenil should be observed for at least one hour to detect re-sedation.

III. MIDAZOLAM (Versed) (Sedative-hypnotic, anxiolytic, anticonvulsant)

- A. Recommended initial dose

	<6 months	> 6 months	Maximum
IV or IM	0.02-0.05 mg/kg	0.02-0.1 mg/kg	5 mg
PO or SL		0.2-0.5 mg/kg	15 mg

- B. Achieve therapeutic levels after:
oral: 10-20 min
Intramuscular: 15 - 30 min
Intravenous: 1 - 5 min
- C. Recommended repeat dose: 1/2 the initial dose
- D. Expected duration of action:
oral, intramuscular about 2 hr
intravenous usually < 2 hr
plasma half-life 3-6 hr
- E. Special recommendations
1. Administer IV over 2 - 3 min
 2. Do not give beyond the appearance of ptosis or inability to respond to verbal command.
 3. Drugs known to inhibit CYP3A4 increase the serum levels of midazolam including the following:
Erythromycin, Cimetidine, Diltiazem, Fluconazole, Grapefruit Juice, Itraconazole, Ketoconazole, Ranitidine, Roxithromycin, Verapamil.
Drugs that stimulate CYP3A4 decrease the serum levels of midazolam including the following: Carbamazepine, Phenytoin, Rifampin
- F. Common adverse effects
1. May cause amnesia, confusion, respiratory depression or hypotension.
 2. An occasional child may become agitated after midazolam.
 3. Episodes of oxygen desaturation, respiratory depression, apnea, and airway obstruction have been reported in <1 % of pediatric patients following premedication, the potential for such adverse events are markedly increased when oral midazolam is combined with other central nervous system depressing agents and in patients with abnormal airway anatomy, patients with cyanotic congenital heart disease, or patients with

sepsis or severe pulmonary disease. Concomitant use of barbiturates or other central nervous system depressants may increase the risk of hypoventilation, airway obstruction, desaturation or apnea, and may contribute to profound and/or prolonged drug effect. In one study of pediatric patients undergoing elective repair of congenital cardiac defects, premedication regimens (oral dose of 0.75 mg/kg midazolam or IM morphine plus scopolamine) increased transcutaneous carbon dioxide (PtcCO₂), decreased SpO₂ (as measured by pulse oximetry), and decreased respiratory rates preferentially in patients with pulmonary hypertension. This suggests that hypercarbia or hypoxia following premedication might pose a risk to children with congenital heart disease and pulmonary hypertension.

- G. Antidote: Flumazenil (Mazicon) Incremental doses of 0.01 mg/kg can be administered intravenously over 15 sec. Flumazenil should be titrated to effect to prevent withdrawal symptoms. Doses may be repeated every 60 sec as needed to a maximum of four additional doses (0.05 mg/kg and no more than 1 mg). Patients who receive flumazenil should be observed for at least one hour to detect re-sedation.

IV. PETHIDINE (Analgesic)

- A. Recommended initial dose

IV or IM	<6 months	6 months - 3 years	> 3 years
Initial doses	0	1.0 mg/kg	1.0-1.5 mg/kg

- B. Achieve therapeutic levels after:
 intravenous: 10 min
 intramuscular: 30 - 50 min

- C. Recommended repeat dose:

1/2 the initial dose to a maximum of 2 mg/kg or 100 mg, whichever is the less.

- D. Expected duration of action: 2 to 3 hr (plasma half life is 3 - 4 hr)

- E. Special recommendations

1. Administer IV dose slowly over 3 - 5 min.
2. This agent is primarily an analgesic, and has poor sedative properties; however, it is useful in supplementing sedation during painful procedures.
3. Use with caution in patients with asthma.

- F. Common adverse effects

1. Nausea, vomiting, respiratory depression, hypotension, sedation and itching are commonly observed.

- G. Antidote: Naloxone (Narcan): Incremental doses of 0.01 mg/kg can be administered intravenously, titrated to effect to prevent withdrawal symptoms. Doses may be repeated every 2 to 3 min as needed. Patients who receive naloxone should be observed at least one hour to detect re-sedation.

V. MORPHINE SULFATE (Analgesic)

- A. Recommended initial dose

IV or IM	1 - 6 months	> 6 months
Initial dose	0.025-0.1 mg/kg	0.05 - 0.15 mg/kg

- B. Achieves therapeutic levels after:
 intravenous: 5 - 10 min

- intramuscular: 30 - 50 min
- C. Recommended repeat dose: 1/2 the initial dose to a maximum of 0.15 mg/kg
- D. Expected duration of action: 2 to 4 hr (plasma half life is 1.5 - 2 hr)
- E. Special recommendations
1. Administer IV dose slowly over 3 - 5 minutes.
 2. This agent is primarily an analgesic, and has poor sedative properties; however, it is useful in supplementing sedation during painful procedures.
 3. Use with caution in patients with asthma.
- F. Common adverse effects
1. Nausea, vomiting, respiratory depression, hypotension, sedation and itching are commonly observed.
- G. Antidote: Naloxone (Narcan): Incremental doses of 0.01 mg/kg can be administered intravenously, titrated to effect to prevent withdrawal symptoms. Doses may be repeated every 2 to 3 min as needed. Patients who receive naloxone should be observed at least one hour to detect re-sedation.

VI. FENTANYL CITRATE (Analgesic)

- A. Recommended initial dose

IV or IM	< 6 months	> 6 months
Initial dose	0.5 µg/kg	1 µg/kg
Maximum	1.5 µg/kg	3 µg/kg

- B. Achieves therapeutic levels after:
- intravenous: 1 - 5 min
- intramuscular: 7 - 15 min
- C. Recommended repeat dose: 1/2 the initial dose to the maximum listed above
- D. Expected duration of action:
- intravenous: 30 - 60 min
- Plasma half life: 2 - 4 hr
- E. Special recommendations
1. Onset time is more rapid than pethidine or morphine
 2. May result in chest wall rigidity and inability to ventilate, especially in higher (>3 micro g/kg) doses.
- F. Common adverse effects
1. Respiratory depression, bradycardia, nausea, vomiting.
- G. Antidote: Naloxone (Narcan): Incremental doses of 0.01 mg/kg can be administered intravenously, titrated to effect to prevent withdrawal symptoms. Doses may be repeated every 2 to 3 min as needed. Patients who receive naloxone should be observed for at least one hour to detect re-sedation.

VII. KETAMINE (Sedative and analgesia)

It is a dissociative agent allowing potent sedation, analgesia and amnesia during painful procedures. Onset is rapid by either intravenous or intramuscular administration. It should be used together with an anticholinergic, atropine 0.01 to 0.02 mg/kg as it increases secretions

	Initial dose	Top-up dose	Maximum dose
*IV Ketamine	1 mg/kg	0.25mg/kg every 2 minutes	5 mg/kg
IM Ketamine	2-4 mg/kg	IV top-up 0.25mg/kg every 2 minutes	5-10 mg/kg

- * IV Ketamine: 1 mg/kg diluted to 10 ml in NIS or H₂O for injection and to be titrated slowly.

Contraindications

1. Active upper or lower airway disease and for posterior pharynx procedure as airway reflexes are intact and laryngospasm can occur.
2. Head injury
3. Poorly controlled epilepsy
4. Acute eye globe injury
5. Known hypersensitivity

Recovery

The child should be allowed to wake up by himself/herself to reduce the incidence of emergence delirium.

VIII. NITROUS OXIDE (N₂O) (Sedative and analgesic)

- A. Recommended initial dose: < 50% inspired concentration.
- B. Achieves therapeutic levels after 3 minutes of inhalation.
- C. Recommended repeat dose: NA
Expected duration of action: During administration.
- E. Special recommendations
 1. Pulse oximetry is required
 2. Use in infants (less than 1 year of age) is restricted to anesthesiologists.
 3. Delivery apparatus must be equipped with a calibrated, functioning oxygen analyzer.
 4. Contraindicated in the following clinical situations:
 - a. Pneumothorax
 - b. Small bowel obstruction
 - c. Recent neurosurgery within 7 days
 - d. Recent inner ear surgery within 7 days
 - e. Acute or chronic otitis media
 - f. Pulmonary hypertension
- F. Common adverse effects: Excitement/agitation may occur.
- G. Antidote: None: discontinue inhalation and administer 100% oxygen for 3-5 minutes to prevent diffusion hypoxia.

Emergency Resuscitation And Reversal Drugs

Drug	Dose	Indications & Comment
Adenosine	0.1 mg/kg rapid IV push	Supraventricular tachycardia
Amiodarone	Loading infusion 5mg/kg over 15-30 minutes and infusion 5-15mcg/kg/min	Supraventricular or Ventricular arrhythmias Long half life affects warfarin and digoxin dosage.
Atropine	0.02 mg/kg IV push	Bradycardia, heart block
Adrenaline 1:10,000 (0.1 mg/ml)	0.01 mg/kg, repeat at 0.1 mg/kg	Cardiac arrest; may be administered via endotracheal tube
Sodium Bicarbonate	1 mEq/kg	AHA guidelines recommend dosing based on documented metabolic

		acidosis
Calcium Chloride 10%	20 mg/kg (0.2 ml/kg)	AHA guidelines recommend dosing based on documented hypocalcemia. Extravasation causes tissue necrosis; preferred dosing via CVP
Calcium Gluconate 10%	60 mg/kg (0.6 ml/kg)	AHA guidelines recommend dosing based on documented hypocalcemia.
Dextrose 50%	0.5 mg/kg (1 ml/kg)	Dilute unless administering via CVP
Dobutamine	5-20 µg/kg/min	Hypotension
Dopamine	5-20 µg/kg/min	Hypotension
Flumazenil	0.01 mg/kg, repeat every 10 min to max 0.05 mg/kg	The prescriber should be aware of a risk of seizure in association with flumazenil treatment, particularly in long-term benzodiazepine users and in cyclic antidepressant overdose
Lignocaine	1 mg/kg	Ventricular tachycardia
Magnesium sulphate 50%	25-50mg/kg rapid infusion over 10-20 minutes	Hypomagnesemia, torsades de pointes VT Hypotension is a potential problem
Naloxone	0.001 – 0.01 mg/kg	Opioid overdose; titrate to effect while supporting ventilation and oxygenation. Excessive doses associated with hypertension and pulmonary edema & cardiac arrest.

APPENDIX VI

ADVERSE EFFECTS

1. Airway Obstruction:
 - Common
 - May occur in levels > moderate sedation
 - Use airway maneuvers; head tilt, chin lift, jaw thrust (unless trauma patients with suspect C-spine, in which case avoid head tilt)
 - Use airway adjuncts: oropharyngeal or nasopharyngeal airways as appropriate
2. Respiratory depression
 - common if combination of opiates / benzodiazepines used
 - oxygen : flow by, nasal prongs, face mask
 - bag and mask assist ventilation
 - reversal agents: flumazenil and /or naloxone
3. Laryngospasm
 - especially if child has secretions ++ from crying or pathology
 - ketamine, midazolam, fentanyl plus secretions → laryngospasm
 - consider antisialogogue (atropine, glycopyrolate) *before* sedation
 - consider suction *before* sedation
 - Apply Positive Pressure Ventilation with Bag & Mask. 100% O₂
 - If IPPV/CPAP unsuccessful, paralysis and intubation may be needed
4. Chest Wall Rigidity
 - can occur with rapid bolus of fentanyl 3-5ug/kg
 - reversal with naloxone
 - paralysis and intubation if naloxone unsuccessful
5. Hypotension
 - at risk : dehydrated, hypovolemic patients, those with poor cardiac reserve, sepsis
 - fluid challenge with Normal Saline / Hartman's 10ml/kg rapid bolus
6. Allergic Reactions
 - flushing, tachycardia, urticaria¹ rash, hypotension
 - Adrenaline (SC/IV 10ug/kg) – 1st choice
 - Followed by diphenhydramine (IV/IM 1mg/kg), hydrocortisone (IV 5mg/kg)
 - Anaphylaxis protocol in severe reactions
7. Emesis & Aspiration
 - patients at risk: recent food 1 drink, crying children (aerophagia), bowel obstruction if nasoloro-gastric tube present, aspirate stomach before procedure