

Procedural Sedation Protocol

(Updated 31-08-2018)

Intro

The purpose of this protocol is to provide guidelines for the use of intravenous or intramuscular medications to achieve a combination of analgesia, amnesia, and anxiolysis in order to facilitate specific interventions, procedures, or other specified casualty management by the Special Operations Med Techs when working alone or in conjunction with HMA/SMA.

Indication

When it has been determined by the SMA that a specific medical procedure must be performed urgently/emergently AND that the **successful performance** of this procedure requires sedation. Examples of procedures that may require procedural sedation include:

1. **Airway Management** - for placement of supraglottic device or performance of open surgical cricothyrotomy to secure airway or aid in oxygenation/ventilation.
2. **Orthopedic Management** - for reduction of long bone fractures or joint dislocations where operational circumstances do not permit prompt evacuation or there is neurovascular compromise as a direct result of the injury.
3. **Wound Management** - for management of large, complex wounds requiring packing or dressing changes in situations where there is no option of quick patient evacuation.
4. **Any situation requiring medical management, even monitoring and observation, where the patient is combative and risks harm to himself/herself by interfering with delivery of medical care**

Contraindications

Unfamiliarity with required medications, equipment and/or procedures

Allergy to an indicated medication

Lack of necessary equipment detailed in Figs 1.1 and 1.2

Equipment and Support Requirements

1. Detailed knowledge of medications used in protocol
2. Pulse oximetry with continuous monitoring
3. NIBP measuring ability
4. Advanced airway management skills and equipment
5. BVM or equivalent
6. Good IV or IO access (IM if unable to obtain IV/IO). Note that IV/IO is the preferred route of medication administration for procedural sedation (Fig 1.1).
7. Assistant to continuously monitor airway, respirations, oxygen saturations and hemodynamic status
8. End-tidal CO₂ detector (if available)
9. Suction device (if available)
10. Supplemental oxygen (if available)

Procedure

1. Continuous oxygen saturation monitoring and other vital sign (RR, HR, BP) monitoring at q 1 min intervals at minimum while delivering medications – more frequent as deemed necessary. In recovery phase monitoring may be q 5 min intervals.
2. Administer supplemental oxygen by mask or nasal prongs if available.
3. Prepare ketamine and midazolam for administration at appropriate concentrations as per desired route of administration (refer to Figs 1.1 and 1.2)
4. Prepare airway equipment and BVM bag and mask in event that airway management is required.
5. Secure intravenous access if possible.
6. Administer ketamine and midazolam as per Figs 1.1 and 1.2
7. Assess patient's response to medications, onset of action will take 1 min for IV preparations and 2-3 mins for IM preparations – if sedation deemed adequate, proceed with medical interventions.
8. If sedation is not adequate, then provide additional ketamine as per Figs 1.1 and 1.2.
9. After the procedure has been performed, continue to administer supplemental oxygen and monitor vital signs q 5 mins for 30 mins and then q 15 mins for a total of 60 mins from last administration of sedative medication.

Disposition

Consider evacuation.

Figure 1.1 – Procedural Sedation Protocol (IV/IO Administration)

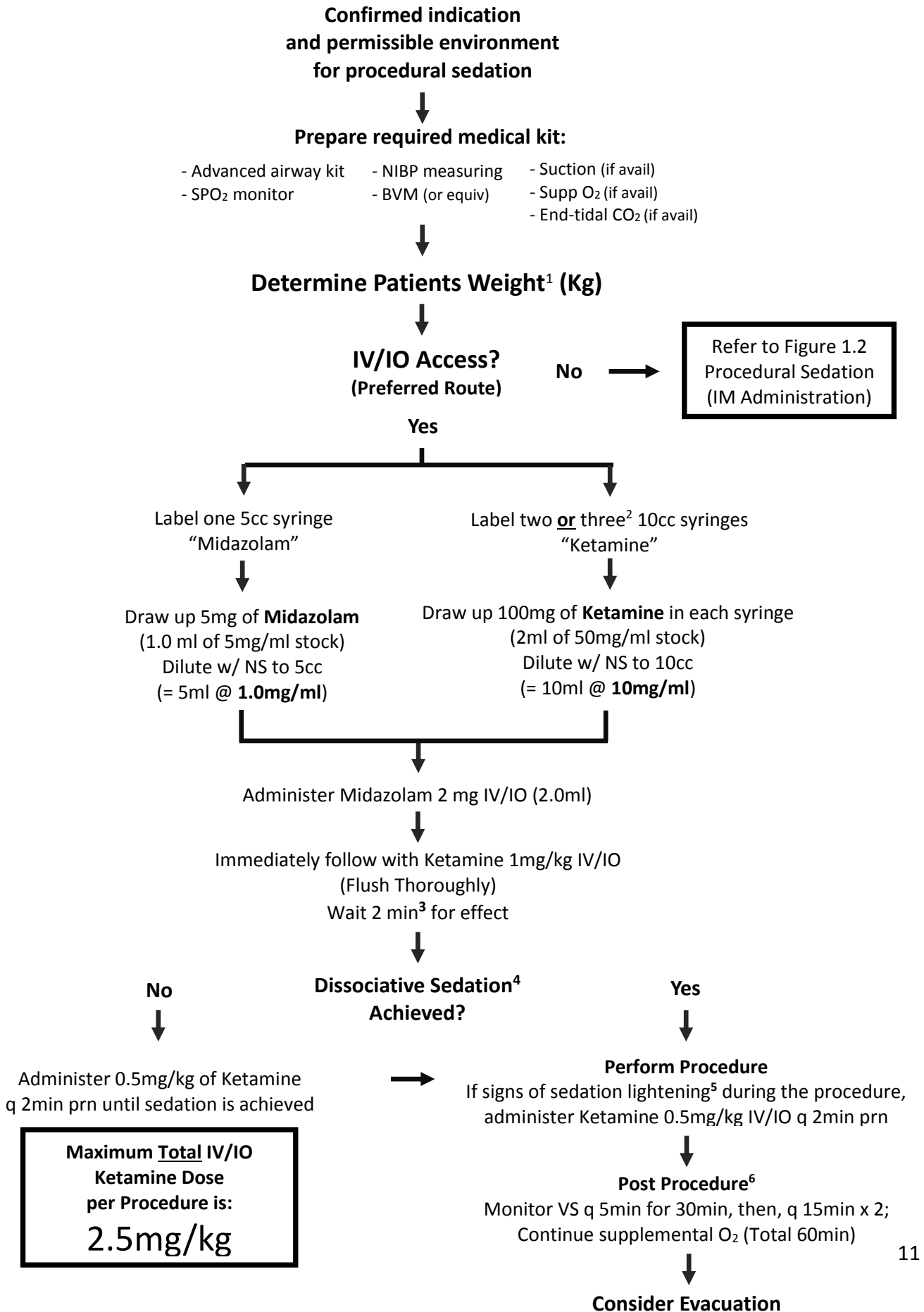
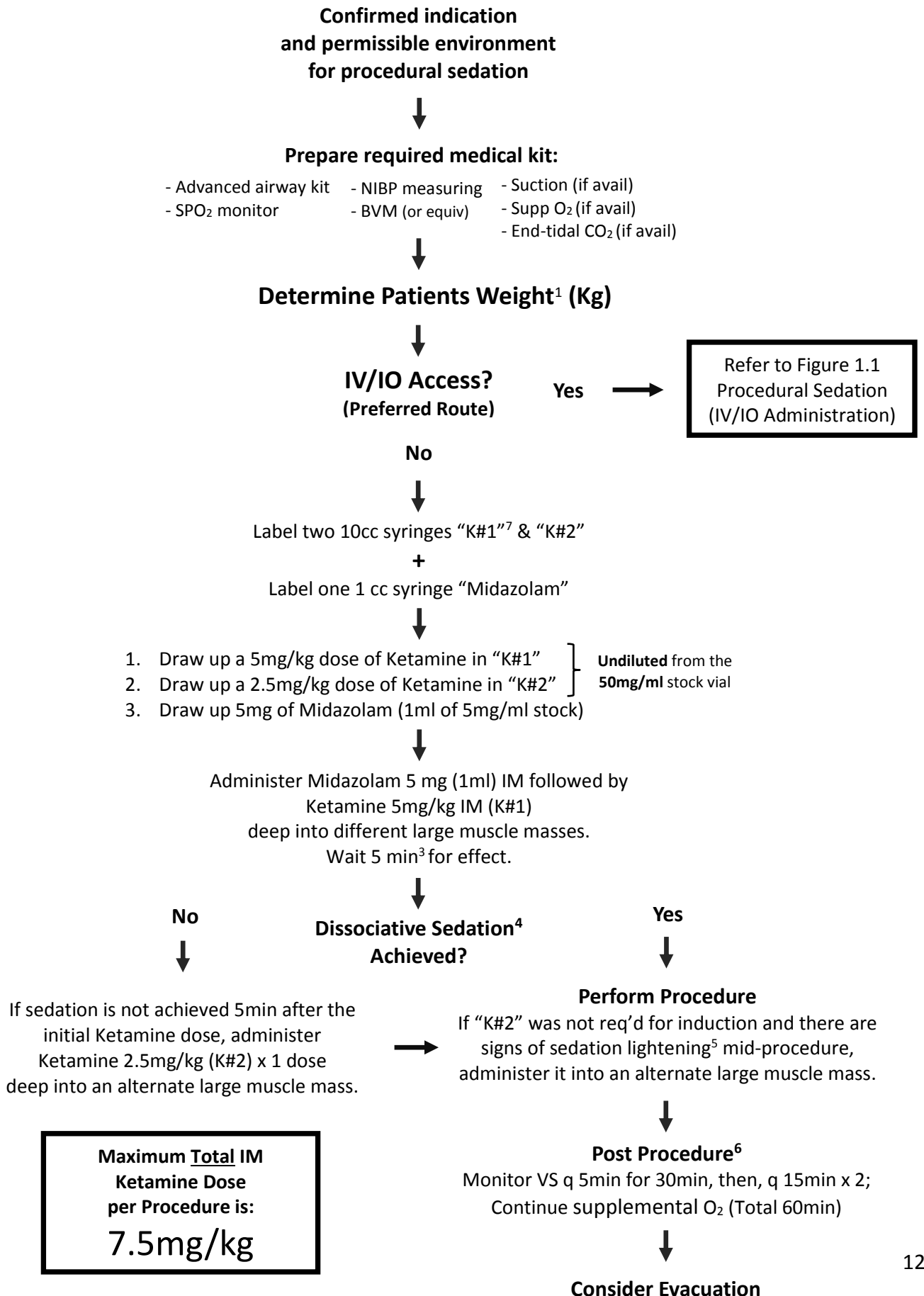


Figure 1.2 – Procedural Sedation Protocol (IM Administration)



Notes:

¹ The following Table should be used as a guide to convert pounds to kilograms and to determine respective IV/IO and IM weight based **ketamine** dosing:

Table – Ketamine Weight Based Dosing

Weight (Kilograms)	Weight (Pounds)	IV/IO Dosing # mg (# ml of DILUTED 10mg/ml solution)		IM Dosing # mg (# ml of UNDILUTED 50mg/ml stock solution)	
		1mg/kg (Initial Dose)	0.5mg/kg (Follow up Dosing)*	5mg/kg (Initial Dose)	2.5mg/kg (Follow up Dose)*
50	110	50mg (5.0ml)	25mg (2.50ml)	250mg (5.0ml)	125mg (2.50ml)
55	121	55mg (5.5ml)	27.5mg (2.75ml)	275mg (5.5ml)	137.5mg (2.75ml)
60	132	60mg (6.0ml)	30mg (3.00ml)	300mg (6.0ml)	150mg (3.00ml)
65	143	65mg (6.5ml)	32.5mg (3.25ml)	325mg (6.5ml)	162.5mg (3.25ml)
70	154	70mg (7.0ml)	35mg (3.50ml)	350mg (7.0ml)	175mg (3.50ml)
75	165	75mg (7.5ml)	37.5mg (3.75ml)	375mg (7.5ml)	187.5mg (3.75ml)
80	176	80mg (8.0ml)	40mg (4.00ml)	400mg (8.0ml)	200mg (4.00ml)
85	187	85mg (8.5ml)	42.5mg (4.25ml)	425mg (8.5ml)	212.5mg (4.25ml)
90	198	90mg (9.0ml)	45mg (4.50ml)	450mg (9.0ml)	225mg (4.50ml)
95	209	95mg (9.5ml)	47.5mg (4.75ml)	475mg (9.5ml)	237.5mg (4.75ml)
100	220	100mg (10.0ml)	50mg (5.00ml)	500mg (10.0ml)	250mg (5.00ml)
105	231	105mg (10.5ml)	52.5mg (5.25ml)	525mg (10.5ml)	262.5mg (5.25ml)
110	242	110mg (11.0ml)	55mg (5.50ml)	550mg (11.0ml)	275mg (5.50ml)
115	253	115mg (11.5ml)	57.5mg (5.75ml)	575mg (11.5ml)	287.5mg (5.75ml)
120	264	120mg (12.0ml)	60mg (6.00ml)	600mg (12.0ml)	300mg (6.00ml)

* (only if required)

² For IV/IO administration in patients weighing > 80 kg, 3 x 10cc syringes should be prepared (80kg x 2.5mg/kg = 200mg = Full contents of 2 x 10cc syringes). 3 syringes (300mg) will provide a 2.5mg/kg supply for patients weighing up to 120kg.

³ Observe for increased secretions or laryngospasm (When respiratory depression is noticed, it is invariably at the time of peak central nervous system levels (e.g. 1-2 minutes after IV/IO administration and 4-5 minutes for IM). - *Ann Emerg Med. 2011; 57: 449-461*). Be prepared to reposition airway, suction or use BVM to resolve transient laryngospasm.

⁴ Dissociative sedation is described as a trancelike cataleptic state [fixed posture/loss of voluntary motion] characterized by profound analgesia and amnesia, with retention of protective airway reflexes, spontaneous respirations and cardiopulmonary stability. (*Ann Emerg Med. 2005; 45: 177-196*)

⁵ Signs of lightening sedation include nystagmus (repetitive uncontrolled eye movements), vocalizations and/or increasing movement.

⁶ Peri-procedural emergence reaction can be treated with 1 x Midazolam 2mg IV/IO or 5 mg IM (**Max total Midazolam dose per procedure is 4mg IV/IO and 10mg IM**). Post procedural nausea and vomiting can be treated as per *Adjunct Therapies* in the *Adult Pain Protocol*.

⁷ For IM administration, for patients weighing in excess of 100kg, a 2nd syringe will be required to draw up the remainder of the 5mg/kg induction dose. Ensure it is appropriately labelled (e.g. “K#1.1”) and not confused with the 2.5mg/kg reserve dose in “K#2”.

SOMT IV and IM ketamine procedural sedation dosing guidelines are consistent with dosing recommendations available via the CPhA Ketamine monograph which in turn is based on “*Clinical Practice Guideline for Emergency Department Ketamine Dissociative Sedation: 2011 Update*” (*Ann Emerg Med. 2011; 57: 449-461*).