

## SOCOM PFC WG Analgesia/Sedation Comments (February, 2014)

The following comments are summarized from a sub-group expert panel of the SOCOM PFC working group. They should be considered in the context of the South Sudan Case Studies recently circulated.

Please use these comments when considering case discussions and training of medics.

All comments are directed at the level of the SOF medic, and their training.

### GENERAL COMMENTS:

PFC pharmacology is a core concept to be discussed in any training session.

Any discussion of PFC pharmacology should include a discussion about the CONCEPTS of analgesia, amnesia/anxiolysis, and sedation.

A reasonable formulary of “working drugs” for the SOF medic should include: morphine, Fentanyl, ketamine, and midazolam (Versed). Adjunctive medications could include: narcan, romazicon, antiemetics, antihistamines, atropine and others.

The first time a medic administers these drugs should NOT be on a sick (unstable or complicated) patient. Practice with their use.

As with any medication, a medic should be able to demonstrate an active knowledge of the pharmacology of any medication they are allowed to carry. This should include: indications, therapeutic dosages, half-life, time for peak effect, contraindications, adverse effects, usual concentrations, pitfalls, and your personal strategy for dilution and administration.

Any procedure that involves sedation should also include monitoring the patient, ideally with end-tidal CO<sub>2</sub> (with a waveform), and at a minimum, have oxygen saturation (pulse ox) monitoring. Also, airway adjuncts, to include suction, BVM with oxygen source, and advanced airway equipment, should be available.

If a patient is too unstable, pain control and sedation should be withheld until the patient can be stabilized.

### COMMENTS ABOUT THE AGENTS (in the context of the case study):

-There is a difference between analgesia (pain control) and sedation. Some patients who appear to only need pain control MAY need sedation in order to perform prolonged evacuations (travel over rough roads, for instance). Other examples of clinical scenarios that may require sedation include: chest tube insertion, cricothyrotomy, reduction of fractures or dislocations, large burn debridements, surgical procedures such as fasciotomies, and rapid sequence induction for intubations.

-The reason opioids have been around for centuries is they work. This is in the case of the need for analgesia. It is perfectly reasonable to treat >80% of patients with **morphine**. Stable patients can get morphine.

-Hemodynamically unstable patients should get Fentanyl (or ketamine at pain control doses). Remember, fentanyl and ketamine have very short half-lives and will need to be dosed and re-dosed. A drip for *analgesia* can be very problematic and is NOT advised.

-**Fentanyl lollipops** are effective and easy to administer. 1 x 800mcg lollipop, in its entirety, which has about 50% bioavailability, would be the equivalent of approximately 400mcg IV. Do not discount this when adding drugs that are synergistic. A major side effect of the lollipops is nausea.

-Get away from IM and go to IV meds as quickly as feasible. There is a time for non-IV/IO administration, but that time ends with the establishment of IV's and a couple of minutes to think through the process. *In these cases (South Sudan case studies)*, the patients received two different drugs through delivery mechanisms that make them very difficult to titrate.

-Mantra should be “titrate to effect,” as there is a range for every patient and tolerance.

-**Ketamine**, in general, is an excellent medication if you understand its effects and pitfalls. There are three ranges: effective pain range with little or no mental status effects (start with 10-20mg IV and titrate to effect), the mid-range where they're still awake but agitated and actively hallucinating (0.3-1.0 mg/kg; 30-80mg IV), and the dissociated range where they're sedated and dissociated: 1.0-2.0 mg/kg IV. Decide ahead of time if you're going high or low, but don't get stuck in the middle. This is also an excellent medication to induce unconsciousness prior to RSI (rapid sequence induction) prior to intubation (1.0 mg/kg IV push). PLEASE NOTE: these are all IV/IO dosages, NOT IM. *IM dose* for initial administration is 4X the IV/IO dose.

-**Versed** (and other benzodiazepines) is a great drug. Great for the correct indication, but there can be some serious pitfalls with its use, especially when added to other potent drugs. Understand the synergy of benzodiazepines and opioids (synergistic effect). Occasionally, it can drop blood pressures or over-sedate your patient.

**Below is a recommendation for a sedation (not pure analgesia) mix that can be used to prepare and administer an infusion over time:**

**Basic principle:** ketamine/versed drip with IV fentanyl bumps if needed.

**Mix:** 250ml bag of NS, filled with 750mg ketamine and 25mg Versed. The initial drip rate is KG body weight/2 = cc/hr. For example a 100kg patient would be started at 50cc/hr drip rate. At this rate, you can calculate the bag lasting about five hours. In practice, it is observed that the majority of the time, the drip rate could be cut in half after 20-30min, and the bag may last 8-9 hrs. (For reference, the initial doses are: ketamine: 1.5 mg/kg/hr, and Versed: 0.05mg/kg/hr).

Remember, there is NO such thing as a cookbook. BE VIGILANT and *titrate the drugs to effect*

Romazicon should be available with this drip combination in the event that the entire bag is infused mistakenly as a bolus. There is a large safety margin with inadvertent high doses of ketamine, but this dose of Versed would be problematic.

For reference, many sedation procedures in anesthesia are a combination of 2-3mg Versed followed by 50-100mcg of fentanyl and then 20mg bumps of ketamine until the patient has nystagmus (normally 60-80mg of ketamine).

For the sedation infusion combination above, some units package it and seal/band it to distribute as a complete kit. This helps with both accountability of the various medications and operational medical planning (one small package for the purpose of sedating one critical casualty for approximately 8 hours).