

Intranasal (IN) Medication Administration MBED Clinical Practice Guideline

Purpose and Indications: Intranasal administration of medications can be used to achieve rapid sedation/anxiolysis, pain control, and/or control of seizure activity when IV access is not available, desirable, or indicated.

Contraindications: Nasal trauma or obstruction (copious mucous, bleeding, anatomic obstruction, or foreign body) or a known allergy to the medication being considered for IN administration.

General Points About IN Medication Use:

- Medications most commonly administered via the IN route are: fentanyl for pain and midazolam (Versed) for anxiolysis/mild sedation. Additionally, other medications may be administered by this route (see Dosing Guideline Chart below). Dosing is ordered in *mg/kg*, except for fentanyl which is dosed in *mcg/kg*.
- The maximum volume to be delivered is 1 mL per nostril. Greater volumes are not effective as they cannot be further absorbed by the nasal mucosa. However, repeat doses can be given after waiting at minimum 5-10 minutes between doses.
- Time of onset of action is rapid and similar to that with IV administration of the same medication. Therefore, the medication should only be administered once all supplies are assembled and the physician is ready to begin the procedure (or the patient is ready to go for imaging, etc)
- **Monitoring and documentation is the same as would be done for IV administration of the same medications.** Charting and monitoring of patient should fall under individual institutional sedation guidelines. For example, children receiving medication via this route for pain or anxiolysis would typically fall under "mild sedation" category
- **In general, IN medications alone are usually not sufficient to achieve moderate/deep levels of sedation.** However, the exceptions to this are the use of IN Ketamine (in the sedation dosing range of 6-9 mg/kg). Even IN Fentanyl and IN Midazolam can achieve a moderate/deep level of sedation by using them in combination or by repeated dosing). If moderate to deep sedation levels are required or achieved then charting and monitoring of the patient should correspond to institutional guidelines for moderate to deep sedation.

Practical Considerations When Preparing for Administering of IN Medications¹⁻³:

- 1) Items needed: 1 ml or 3 ml luer-lock syringe, needle to draw up the medication, mucosal atomization device (MAD), and medication vial
- 2) Utilize the patient's developmental level to provide procedural education prior to administration and allow the parent to participate in patient positioning/swaddling. Remember that this route of administration is desirable to reduce anxiety, pain, fear, and trauma, so we should not be causing these things when we administer them.
- 3) IN medications can cause a mild burning sensation for up to 30 seconds (usually with midazolam and it lasts 30-45 seconds) so forewarn the parents that the child will initially cause discomfort.
- 4) Volume and Concentration:
 - 0.25 – 0.5 mL is the ideal volume per nostril
 - 1 mL is the maximum volume per nostril

- For best absorption, the dose should always be divided with half of the dose administered in each nostril. The divided doses may be administered simultaneously by 2 providers or one at a time by the same provider.
- If a higher volume (more than 1 ml per nostril) of medication is required, apply it in two separate doses allowing a few minutes (5-15 minutes) for the former dose to be absorbed.
- Always use the MOST concentrated form of the medication available – dilute forms are less effective (example – use midazolam 5 mg per ml, not 1 mg per ml).

Intranasal Medication Administration Technique Using the Mucosal Atomizing Device (MAD)¹⁻³

1. Draw up the full medication dose in luer-lock syringe (remember to draw up an extra 0.1 mL of medication into the syringe to account for dead space in the MAD device.)
2. Remove needle (or vial adapter if used) and attach the MAD to the syringe via the luer-lock connector
3. Using a free hand to hold the head stable, place the tip of the MAD gently but firmly against the nostril aiming slightly up and outward (toward the top of the ear).
4. Rapidly compress the syringe plunger to deliver half of the medication into the nostril (If the plunger is not pushed fast enough, the atomized misting of the medication will not be achieved and which will likely cause the medication to be swallowed).
5. Repeat this technique with the second half of the dose in the other nostril. Alternatively, the total dose may be administered to both nostrils at the same time.
6. After administration, it is best to step back and allow the patient to be comforted by family and allow the medication to take effect.



Medication-specific information:

- **Midazolam (Versed):** onset of mild sedation/anxiolysis occurs within 5-10 minutes of administration and lasts for about 30-50 minutes. IN lidocaine can be given several minutes before giving the IN Midazolam to decrease the mild burning sensation that is sometimes experienced by patients. Of course doing this means having to give 2 medications via the IN route. Therefore, it is recommended to ask the parents (or the child if it is developmentally appropriate to do so) whether or not they would like to have the IN lidocaine given.
- **Fentanyl (Sublimaze):** onset of analgesia occurs within 1-2 minutes and it lasts for about 15-30 minutes. Therefore, it would be ideal to give the patient an oral analgesic medication (if no contraindications exist to taking PO medications) at about 15-20 minutes after the IN Fentanyl administration so that oral medication will kick in at about the time that the IN Fentanyl is wearing off. Another option is to simply repeat the IN Fentanyl dose.

Ketamine (Ketalar): IN Ketamine can provide some mild sedation(anxiolysis) and pain control, not unlike IN Midazolam and IN Fentanyl respectively, but it does not consistently achieve a moderate/procedural sedation level (as is needed for laceration repair, fracture reduction, I&D of complex skin abscesses, etc). There is some limited evidence that using higher doses of IN Ketamine, up to 9mg/kg/dose, can achieve a moderate/procedural sedation level but experience thus far is that this is inconsistent (that is in contrast to intramuscular, IM, ketamine at 5mg/kg which is quite effective and its use for procedural sedation has been well studied

Intranasal Medication Dosing Guideline:

Drug	Indication	Dose	Maximum Dose	Concentration	Mean Onset (minutes)	Mean Duration (minutes)
Fentanyl⁴⁻⁶	Pain	1.5 – 2.0 mcg/kg	100 mcg	50 mcg/mL	1-2	15-30
Midazolam⁷⁻¹⁴	Seizures	0.2-0.3 mg/kg	10 mg	5 mg/mL		
	Anxiolysis	0.4 – 0.5 mg/kg			5-10	30-50
Lorazepam¹⁵	Seizures	0.1 mg/kg	4 mg	2 mg/mL		
Dexmedetomidine^{16-22*}	Sedation	0.5 – 2 mcg/kg	200 mcg	100 mcg/mL	25-30	60-90
Ketamine²³⁻²⁷	Sedation	6 – 9 mg/kg	200 mg	100 mg/mL	5-15	40-70
	Pain	0.5-1 mg/kg				
Naloxone^{28-30**}	Opioid reversal	0.1 mg/kg	2 mg	1 mg/mL		
Flumazenil	Benzodiazepine reversal	0.01 mg/kg	0.2 mg single dose, 1mg or 0.05mg/kg cumulative dose	0.1 mg/mL		

*Studies using IN Dex as sedation for imaging studies or for pre-procedural sedation in the OR setting prior to general anesthesia.

**Adult data from studies in pre-hospital settings.

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This guideline is endorsed by Mary Bridge Emergency Department but it is not intended as a substitute for clinical judgment. It should be used as an adjunct to sound clinical decision making which accounts for individual patient considerations.