

Therapeutic Intranasal Drug Delivery

Needless treatment options for medical problems

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Intranasal Naloxone Overview

Topic summary:

Opiate overdose is now among the leading causes of death in young adults in the western world. It is also still a scourge to the IVDU population. However, Naloxone - an effective and very safe antidote is available but must be administered in a timely fashion. Traditionally this antidote is injected either into a muscle or intravenously. This delivery method is effective, but due to issue surrounding needle safety, is not ideal or adequate for adoption by the lay public where effective treatment methods can have the most value. Fortunately, nasal naloxone can reverse the majority of opiate overdoses and is now proven to be safe and highly effective in the hands of the lay public. This overview section provides a quick look at the topic and provides dosing and protocols. Digging deeper behind this page is an extensive review the literature with supporting references ([Click here to skip the overview below and to go directly to the deeper discussion](#)).

News Flash 2015: FDA Approved nasal naloxone for prescription and probably OTC use in the USA

Adapt Pharma company announced formal FDA approval of a 4 mg/0.1 ml single dose, single nostril formulation of naloxone - NARCAN Nasal spray. They also acquired the trademark brand name "Narcan." Sales are expected to begin in the USA early in 2016. They have special pricing for first responders and community based treatment programs of \$37.50 per preloaded device.

Editorial comment: Even though I invented the MAD nasal, began the research on nasal naloxone in the 1990s and have used this therapy for 18 years (so have a bit of a historical bent towards the original method of delivery), it seems pretty apparent to me that this new product is probably a better method for delivery of nasal naloxone than the way we have posted here on this website since 2008. The new formulation is more appropriately concentrated, it has a pre-attached atomizer and because of the recent price increased in generic naloxone (single supplier cranked the price last year) this new formulation is not only better formulated, its also less expensive (in 2016). If they continue pricing it properly they should replace all generic "home made" kit formulations, if not - as of late 2017 - the research data does not show any better results than less concentrated generic formulations so the end user will need to decide which formulation to base based on budget and convenience issues. I have

Key Concepts regarding delivery of any nasal medication to the systemic circulation and brain

Use the right dose!

- Nasal medication doses are NOT equivalent to IV dosing. Using an IV dose will usually fail. (Read about bioavailability in the Overview page)
- Intranasal naloxone has not been studied in any dose other than 2 mg. A lower dose might work - but until confirmed with research it should not be recommended except in a research setting.

Minimize volume, maximize concentration of the drug

- Use the most concentrated (potent) available formulation
 - eg: Use naloxone 2 mg/2 ml, not 0.4 mg/ml
- Do NOT dilute the drug

Large volumes are lost into the pharynx or out the nostril.

Maximize total absorptive surface area

- Use BOTH nostrils for volumes over 0.3 ml. This doubles the absorptive surface area and reduces runoff.
- ABOUT half per nostril is clinically adequate - do not worry about being exact.

Use a delivery system that maximizes mucosal surface area coverage and minimizes loss to the environment and runoff

- Droppers work in research using cooperative patients who hold still for many minutes. They tend to be less effective in clinical trials.
- Atomization (not nebulization over minutes) allows immediate delivery of all the drug directly to the mucosa in a broad area of coverage with little loss to the environment. This improves clinical effect and does not require a cooperative patient.

Be thoughtful about anatomic issues and head positioning to enhance delivery

- If possible place the Occiput/crown of the head down (neck extended in recumbent position) delivers more drug higher onto the turbinate's to enhance absorption and nose-brain transport.
- Blood and mucous should be suctioned if possible to enhance mucosal coverage.
- Use of vasoconstrictors might reduce drug absorption (cocaine, epinephrine, oxymetazoline, phenylephrine)

Key Concepts related to this specific application

Dosing: Naloxone come is two concentrations (2 mg/2 ml and 0.4 mg/ml). Research confirms that either concentration will work, but the 2 mg/ml is lower volume so less with run out of the nose. The only dose studied in every paper to date (as of March 2014) is 2 mg. A lower dose MIGHT work, but until confirmed in research, it should not be recommended.

Awakening: Some medics are concerned that 2 mg will cause violent arousal.

bioavailability and absorption kinetics ([see overview page here](#)). The nasal drug is not completely absorbed (they do NOT get 2 mg in their brain) and it is absorbed over 15 minutes (they slowly wake up). It may be true that a lower dose will work and cause less arousal. However, it should be studied, and only in patients in whom you can easily bag-mask and maintain oxygen delivery for a prolonged time while you wait to find out. Ideally this would be done in volunteer study with controlled opiate sedation and controlled dosing of naloxone.

Dosing information

Naloxone 2 mg/2 ml: Deliver 2 mg, half up each nostril and support ventilation for a few minutes as the drug begins to work.

[Protocol for intranasal naloxone \(click here\)](#).

[Commonly used generic intranasal medications - single page dosing summary \(click here\)](#).

[In Depth literature review, discussion, bibliography \(Click here\)](#).

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