Naloxone Therapy in Opioid Overdose Patients: Intranasal or Intravenous?

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NALOXONE THERAPY IN OPIOID OVERDOSE PATIENTS: INTRANASAL OR INTRAVENOUS?
A RANDOMIZED CLINICAL TRIAL
There is an opioid crisis in the United States
Naloxone is the drug of choice for reversing a suspected opioid overdose
The intranasal route could be a viable option for the use of naloxone
Intranasal could prove to be quicker with less skill needed to give while putting the healthcare workers, police, and firefighters at less risk of blood borne pathogen exposure
**KEY TERMS**

- **Opioid** – a class of drug that interacts with the opioid receptors in the brain and body, often causing a euphoric state to the user.
- **Overdose** – when too much of a drug is in a user's system - can cause severe negative physiologic effects (coma, respiratory/cardiac arrest, death).
- **Congener** – a variant of a common chemical structure.
- **Antagonist** – interferes with the physiological action of another substance.
- **Receptors** – a cell that accepts and transmits a signal to sensory nerves.
- **Glasgow Coma Scale (GCS)** – method for evaluating conscious level impairment.
- **Intravenous** – administered through a vein.
- **Intranasal** – administered through the nasal cavity.
- **Intramuscular** – administered in a muscle.
In 2015, 33,000 people died from an opioid overdose.

Not just illegal opioids are responsible for deaths:
- Methadone, oxycodone and hydrocodone are the most commonly abused prescription drugs.

Heroin use is on the rise.

One recommended action by the CDC is to allow the use of naloxone to be expanded.
Molecular formula: C19H21NO4

Molecular weight: 327.38 g/mol
Naloxone is an opioid antagonist and is used for treatment of opioid overdose

- It is a competitive antagonist for the opioid (mu) receptors in the brain
- The mu receptors are where opioids bind themselves
- Naloxone displaces the opioid and attaches to the receptors, not allowing the opioid to reattach
- The effects of Naloxone last for ~30-90 minutes (re-dosing may be required) allowing for the respiratory depression caused by the opioid to be suppressed
- Naloxone is a very safe drug with no risk for dependency
- Routes for delivery include intranasal (IN), intravenous (IV), intramuscular (IM)
Naloxone has a stronger affinity to the opioid receptors than opioids, such as heroin or oxycodone, so it knocks the opioids off the receptors for a short time (30-90 minutes). This allows the person to breathe again and reverse the overdose.
Naloxone is a “synthetic congener of oxymorphone”

The difference is an allyl group replaces the methyl group that is on the nitrogen atom.

Chemical Structure Naloxone/Oxymorphone
Generally speaking, IV access can be difficult in IV drug users resulting in a delay in IV naloxone treatment.

Patients who have cardiovascular compromise also are difficult to obtain IV access.

There is a need for alternative delivery methods.

Other drugs have been proven effective when delivered IN route\(^7\)
The trial was designed to compare the effects of IN vs IV administration.

They looked at 100 patients, ages 15-50, who had an opioid overdose.

- There were 2 groups that were both given 0.4 mg naloxone either IV or IN.
- Patient who failed to respond after the first dosing were re-dosed via the same route with another 0.4 mg.
- Responses were gauged using the Glasgow coma scale (GCS) and level of consciousness (LOC), vital signs, arterial blood oxygen saturation, side-effects and how long they patient was hospitalized with LOC being the primary measure.
RESULTS OF THIS STUDY

- There was not significant difference between the IN route and the IV route of administration
  - They were both effective
- The IN route resulted in a better response with regards to LOC
- There was less agitation reported amongst the IN patients\(^7\)
There are some discrepancies between this study and other studies of this type

- Kerr et al. does not show there to be enough evidence to support first line IN dosing whereas this, and other studies, disagree

- Merlin et al. reported no significant difference between IV or IN dosing

Further studies need to be performed as this was a single institution and may not be representative of the population as a whole
Thousands of people die every year related to the opioid overdose epidemic

There is evidence that supports the use of IN naloxone administration

IV access is sometimes very difficult if not impossible in some patients

IV access potentially puts healthcare workers at risk for blood borne pathogens

It is possible to give IN naloxone without specialized training meaning that lay people could be able to give IN naloxone if needed

More research needs to and should be done\textsuperscript{7}
REFERENCES


