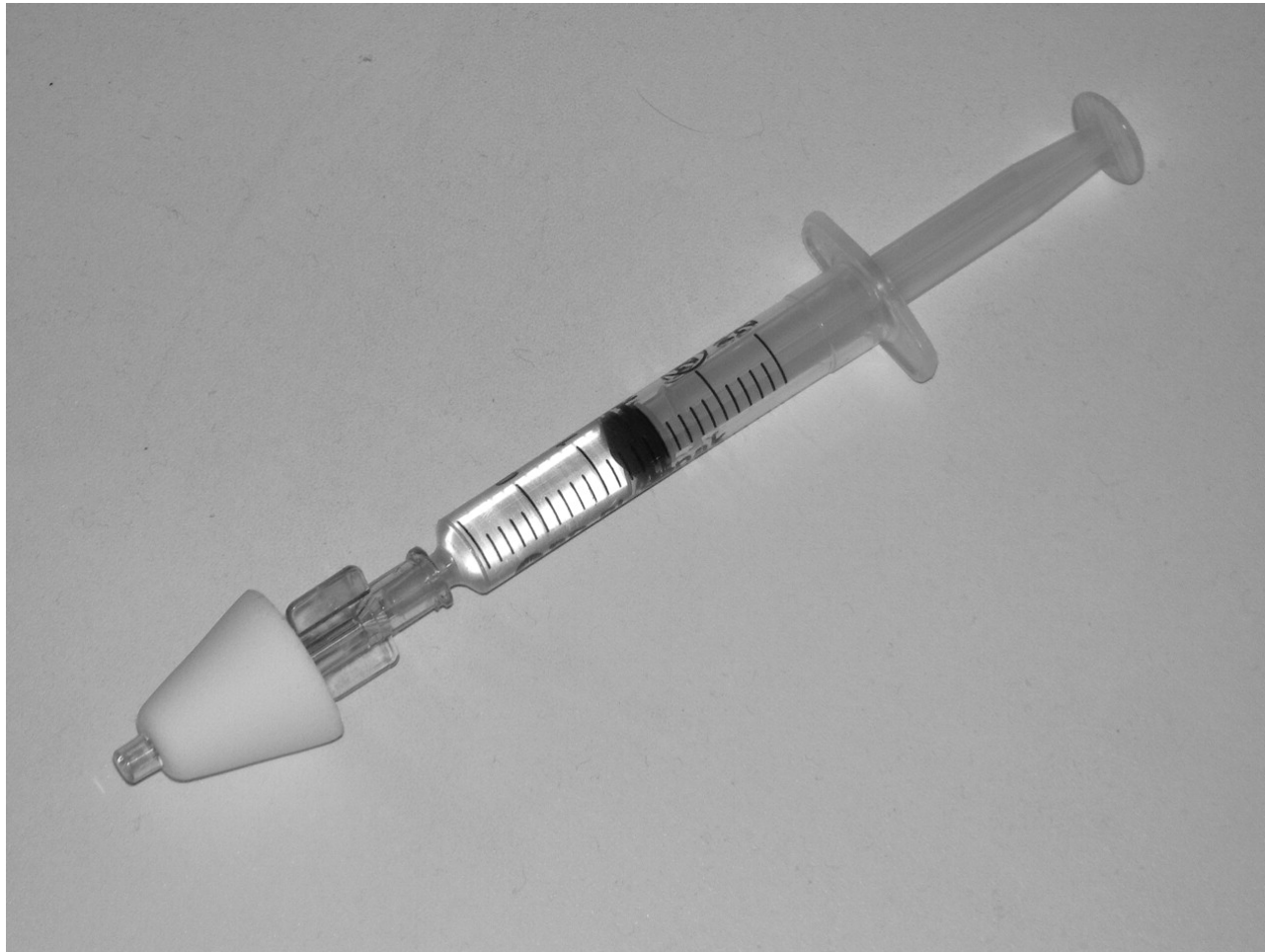


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# The Nose Knows: Intra-nasal Medication Options are Growing!



# Intranasal Medications



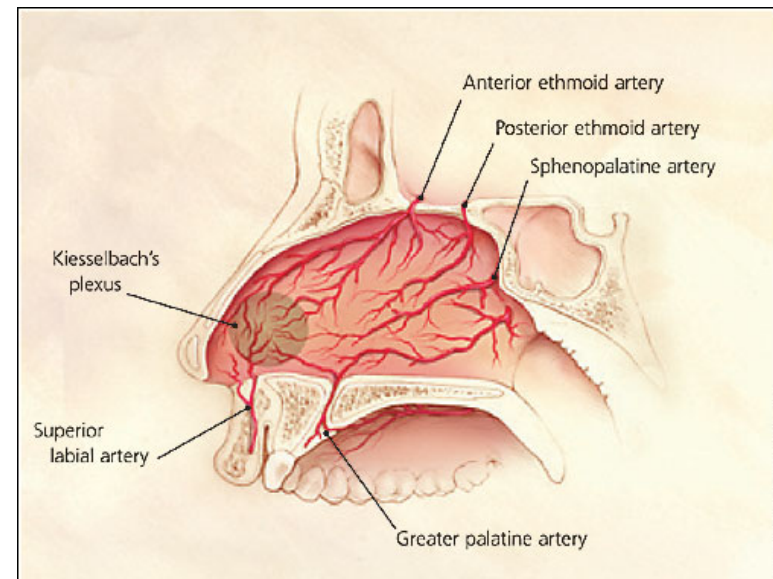
# History

- Treatment for allergies
- Earliest studies from the 1920s
- Outpatient/home management
  - 1970s
- Emergency medicine
  - 1990s
- Prehospital
  - 2000s



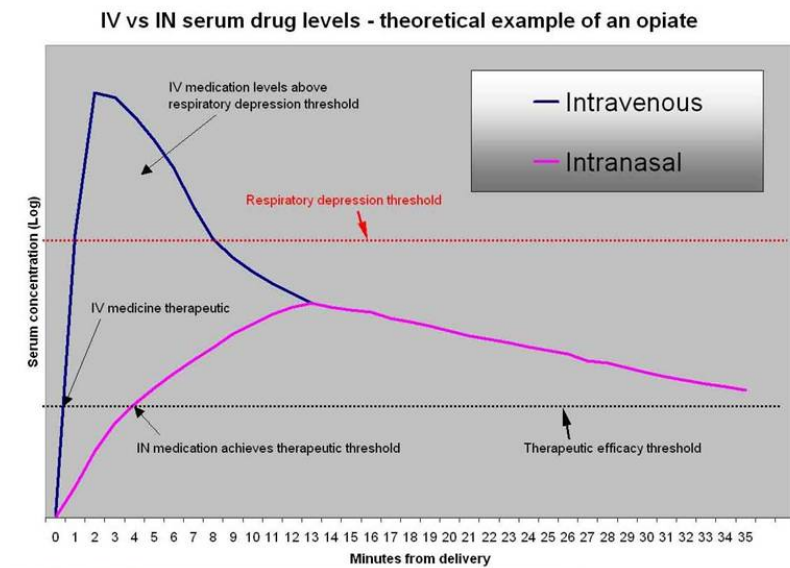
# Nasal Administration

- Rich vascular plexus
- Avoids first-pass metabolism
- Comparable to IV
  - Better than SC, IM, or rectal
    - Sirsi et al, Neurology 2011
    - McMullan et al, Acad Emerg Med 2010
    - Coda et al, Anest Analog 2003
  - Olfactory mucosa directly to the brain and CSF
- Easy
- Convenient



# Nasal Administration

- Safe
  - Less chance of blood exposure
- Effective
  - Holdgate et al, Acad Emerg Med 2010
  - Borland et al, Ann Emerg Med 2007
- No respiratory depression
  - Sufentanil
- Adults and kids!
- Painless?



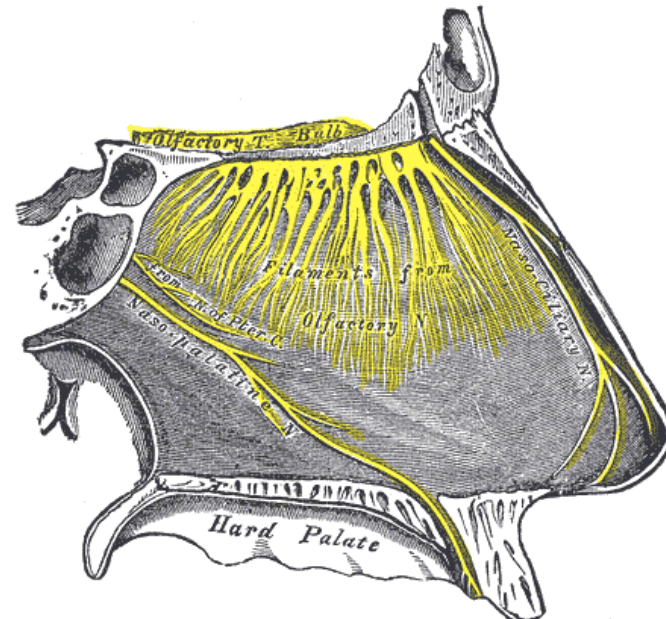
# What Goes Up the Nose?

- Medications
- Drugs
- Foreign bodies
- Alcohol



# Characteristics

- Lipophilic molecules
  - Small
- Physiologic pH
- Volume
  - 0.25 to 0.3 mls ideal
    - Some use up to 1 ml and more
- Surface area
  - Larger the better
    - Use both nostrils



# Medications

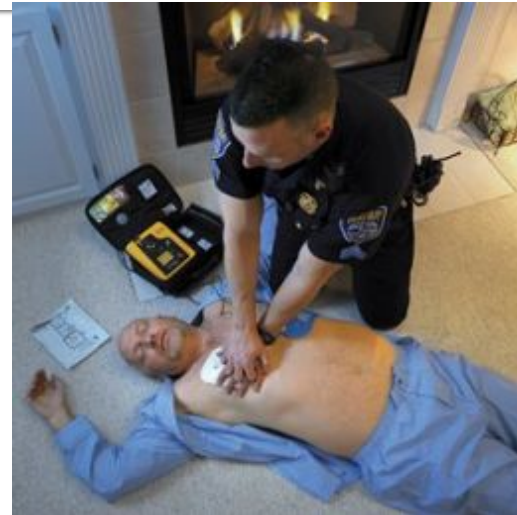
- Naloxone
- Midazolam
  - Seizures or sedation
  - Dose: 0.2-0.4 mg/kg
  - Stings
  - Onset in 5 minutes
- Fentanyl
  - 1.7-2.5 mcg/kg
  - Does not sting
  - Onset in 5 minutes





# More Medications

- Glucagon
- Epinephrine
- Atropine
- Ketamine
- Droperidol
- Propranolol
- Verapamil



# As Tempting As It May Be....

- No adenosine
- No propofol
- No ondansitron
- No succinylcholine
- No bicarb
- No amiodarone
- No procainamide



# Contraindications

- No nose
- Damaged nose
  - Trauma
  - Drug use



# Pitfalls

- Failure to give an adequate dose
  - Technique is important
  - Midazolam dose
- Improper technique



# EAGLES Experience

- 30 responses
  - 25 using IN
    - 3 soon
  - 24 using narcan
  - 18 using midazolam
  - 11 using fentanyl
  - 3 using glucagon
  - 1 dilaudid
  - 1 influenza vaccine



# Conclusions

- Think intranasal
- IV not obsolete.....yet
- Many applications
  - Pain
  - Sedation
  - Seizures
  - Altered mental status
- Publish your experience

