Methods of Drugs Administration

D Allam,MD,MSc,MBA(USA)
Cardiovascular Anesthesiologist
& Critical Care Physician
Lecturer at Umm Alqura University

Safety Considerations of any Drug Administration

Safety Considerations

- Five patient "rights" of drug administration
  - Drug
  - Dose
  - Patient
  - Route
  - Time

Safety Considerations

- Read drug label and compare it to the order three times before administration:
  - When removing the drug from the drug kit
  - When preparing the drug for administration
  - Just before giving it to the patient.

Safety Considerations(Cont)

- Verify route of administration
- Be sure medication label matches the order
- Never give a drug from an unlabeled container
- If unsure of your drug calculation, have a coworker or medical direction recheck

Safety Considerations(cont)

- *Never* administer unlabeled medication prepared by another person

- *Never* give medication that is:
  - Outdated
  - Discolored
  - Cloudy

Safety Considerations(cont)

- Document medications given:
  - Name of drug, dosage, time, and route
  - Note injection site of parenteral drugs
  - Record patient's response

Universal Precautions

- Universal precautions on *every* patient
  - When administering drugs, observe hand washing and gloving procedures if indicated
  - Face shields indicated during administration of endotracheal drugs

Enteral Medication Administration

- Enteral medications
  - Administered and absorbed in GI tract
- Routes
  - Oral
  - Gastric
  - Rectal

Oral Route

- Most frequently used method
- Position patient upright or sitting
  - If drug is in a suspension, shake before pouring
  - Drug not packaged as a unit dose should be measured in a medicine cup or syringe

Gastric Tube

- Most oral drugs that can be given by gastric tube:
  - Orogastric tube (OG)
  - Nasogastric (NG) tube

Gastric Tube

- Before giving drug by this route:
  - Verify correct tube placement by injecting 30-50 mL of air into the tube
  - Auscultate epigastric region for air movement
- Once position is confirmed, administer drug through tube
- Follow with water (about 30 mL) to flush drug

Rectal Administration

- Some drugs designed for rectal administration
  - Suppositories
- Can give other drugs rectally if vascular access cannot be established
  - Diazepam (Valium)
  - Lorazepam (Ativan)

Parenteral Routes

- Parenteral drugs are administered outside the GI tract
  - Usually refers to injections

- Administration
  - Intradermal
  - Subcutaneous
  - Intramuscular
  - Intravenous
  - Intraosseous

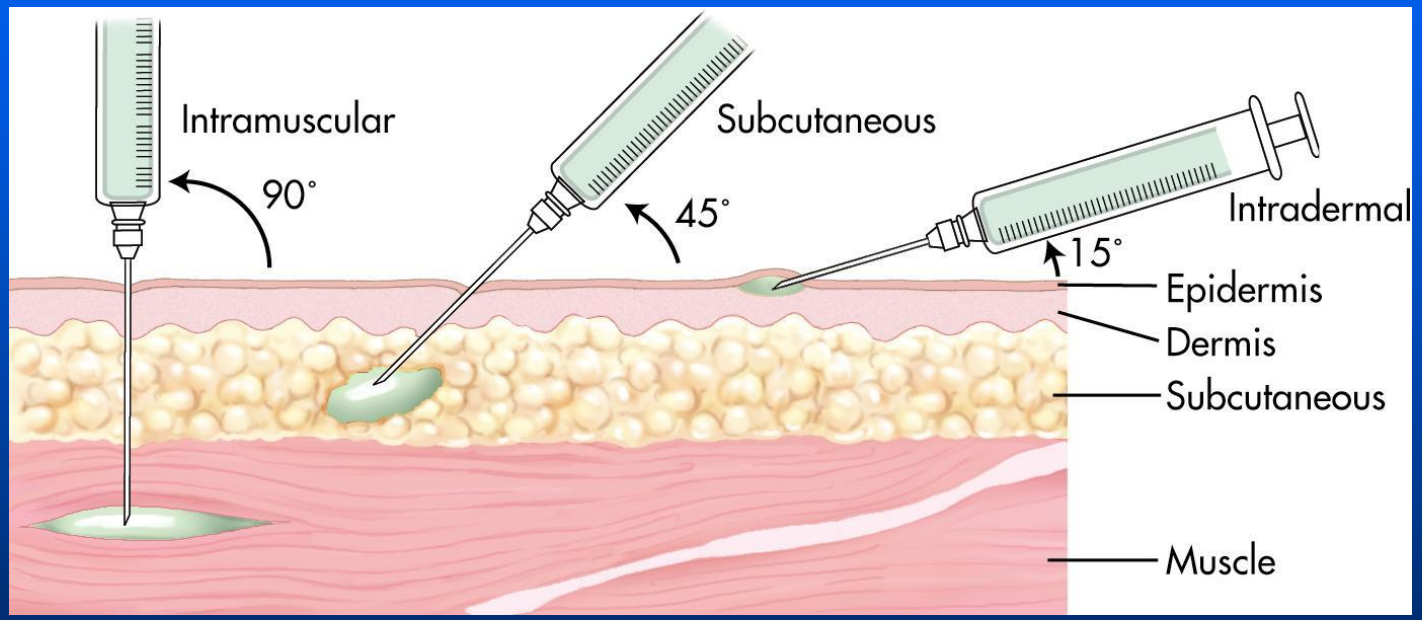
Syringes and Needles

- Choice of syringe and needle depends on:
  - Route of administration
  - Characteristics of the fluid
    - (e.g., aqueous, oil based)
  - Volume of medication

Needles

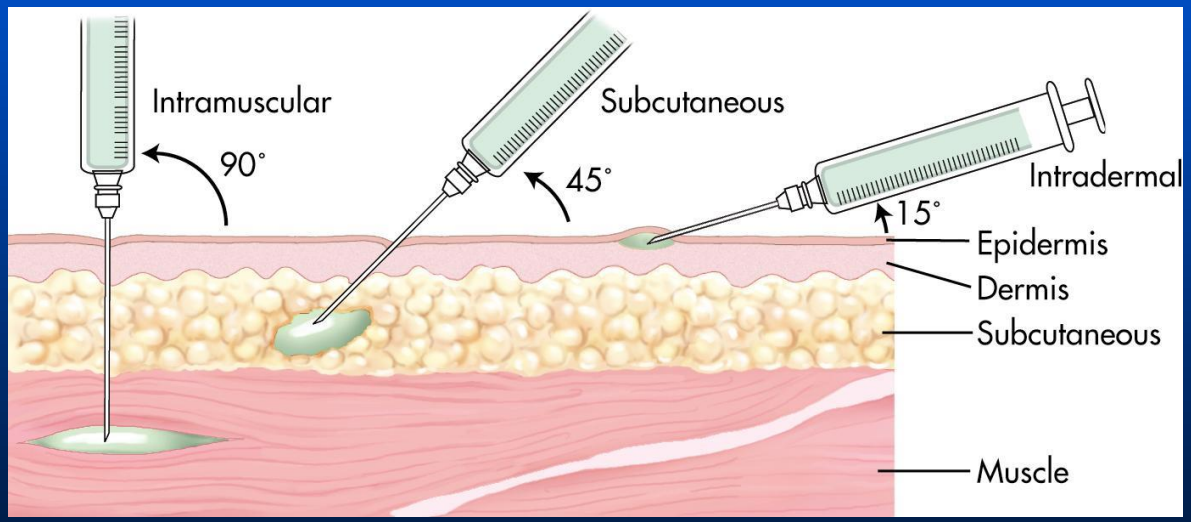
- Vary in length and gauge
  - Larger gauge means a smaller needle

Angle of Injections



Subcutaneous Injection

- Given to place medication below the skin into the subcutaneous layer
  - Volume usually less than 0.5 mL
- Use a ½- or ⅝-inch, 23- or 25-gauge needle

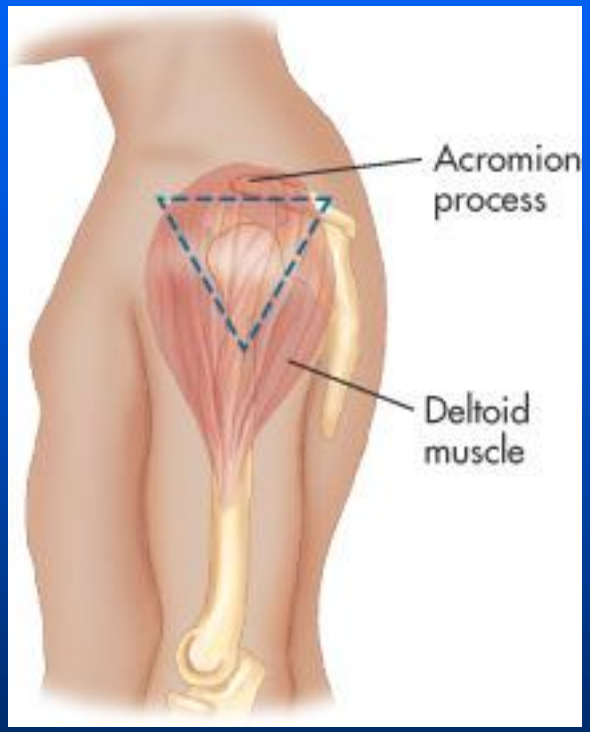


Subcutaneous Injection

- Withdraw needle at same angle it was inserted
- Use alcohol swab to massage site
- Safely dispose of needle

IM Injection—Deltoid

- Upper arm
  - Triangular area
- Use for vaccinations with small volumes
- Muscle is small
  - Avoid hitting radial nerve
- Patient should sit upright or lie flat and relax arm muscles



Intravenous Therapy

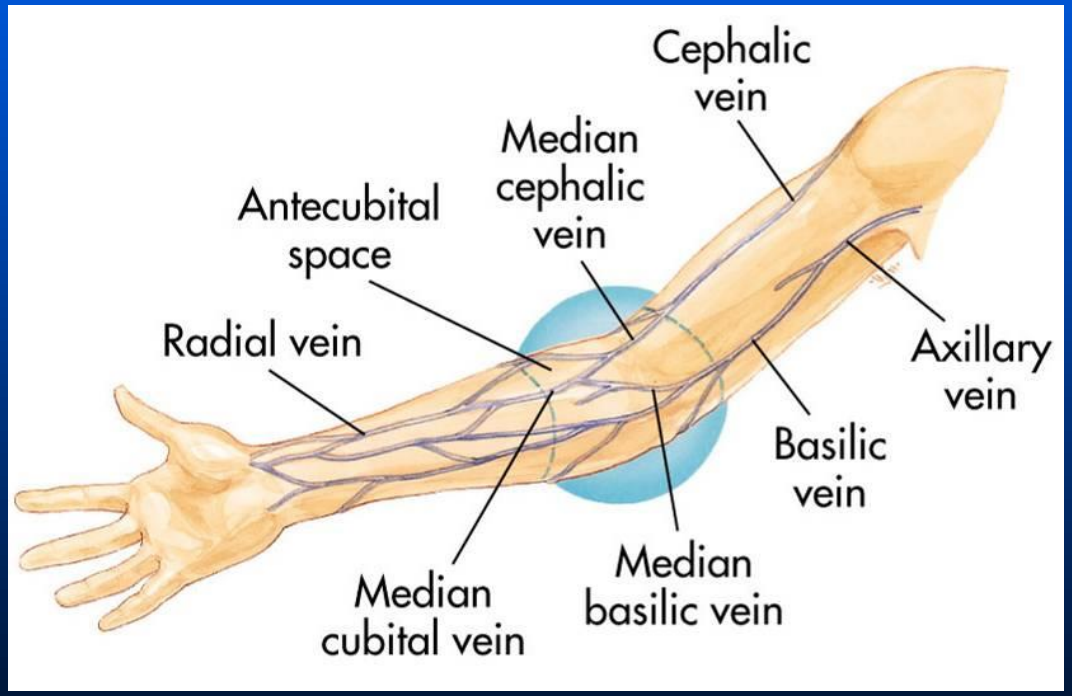
- Used for access to body's circulation
- Indications:
  - Administer fluids
  - Administer drugs
  - Obtain laboratory specimens
- Route of choice for fluid replacement is peripheral vein in an extremity

Intravenous Therapy

- IV solution
- Infusion set
- Macrodrip or microdrip
- Tubing clamp
- Injection port

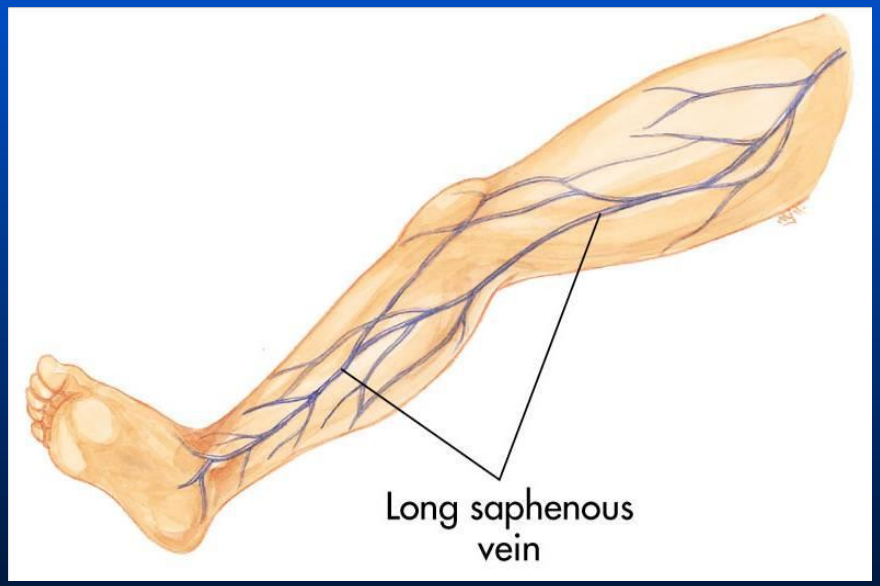
Peripheral IV Insertion

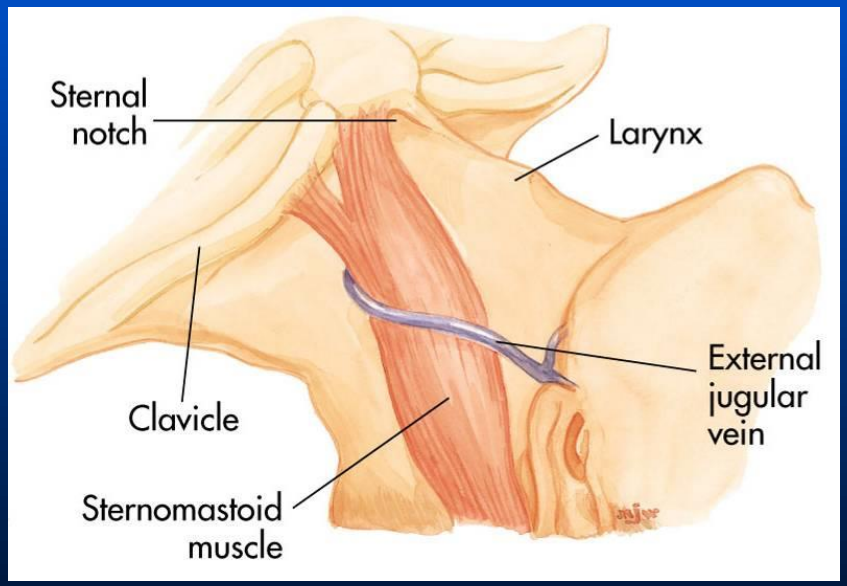
- Common sites:
  - Hands and arms
  - Antecubital fossa (AC space)



Peripheral IV Insertion

- Alternate sites:
  - Long saphenous veins
  - External jugular veins





Peripheral IV Procedure

- Put on gloves
- Select site
- Apply tourniquet above antecubital space
- Prepare site
- Cleanse area with alcohol.

Peripheral IV Procedure

- Withdraw needle while stabilizing catheter
- Lock in protective sheath if present
- Apply pressure on proximal end of catheter to stop escaping blood
- Obtain blood samples if needed

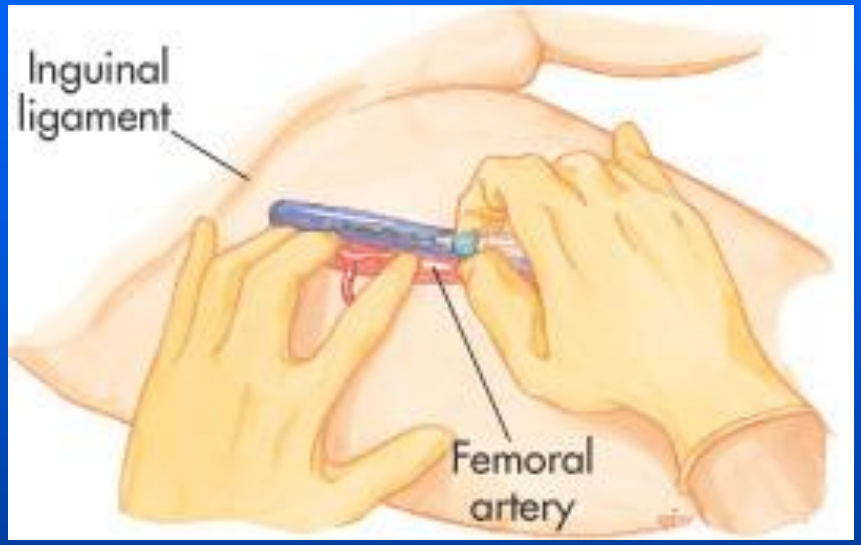
Central Venous Access

- Sites include:
  - Femoral vein
  - Internal jugular vein
  - Subclavian vein

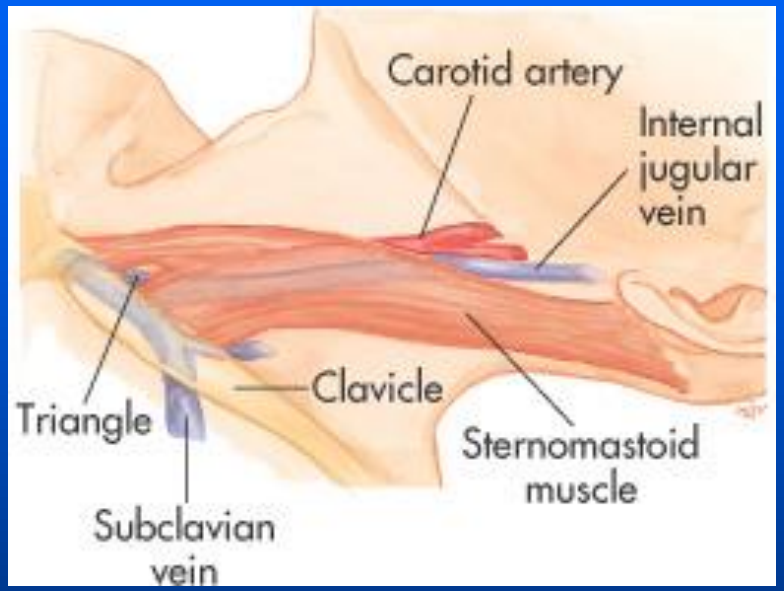
Central Venous Access

- Prepare as for peripheral veins
- Success depends on:
  - Patient's body position
  - knowledge of anatomy
  - Familiarity with the procedure

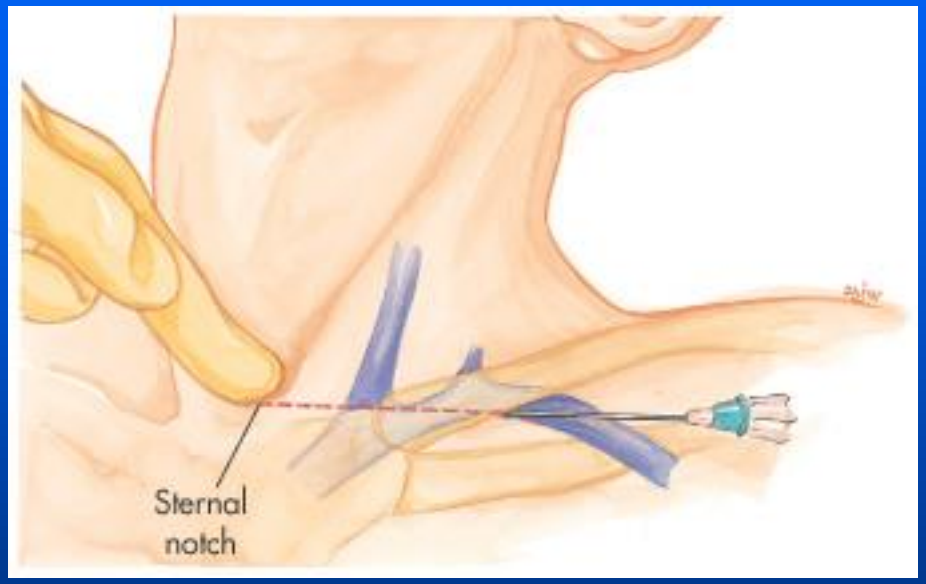
Femoral Vein Cannulation



Internal Jugular Vein Anatomy



Subclavian Vein Cannulation



Central Venous Access

- Advantages
  - Available when peripheral vessels collapse
  - Access to central pressure measurements
    - In-hospital procedure
  - Safer vasopressor administration

IV Push/Bolus Medications

- Resume IV flow
- Monitor patient

IV Infusion

- Administered by:
  - Adding drug to an infusing IV solution
  - Dilute drug in larger volume of fluid

IV Injection Procedure

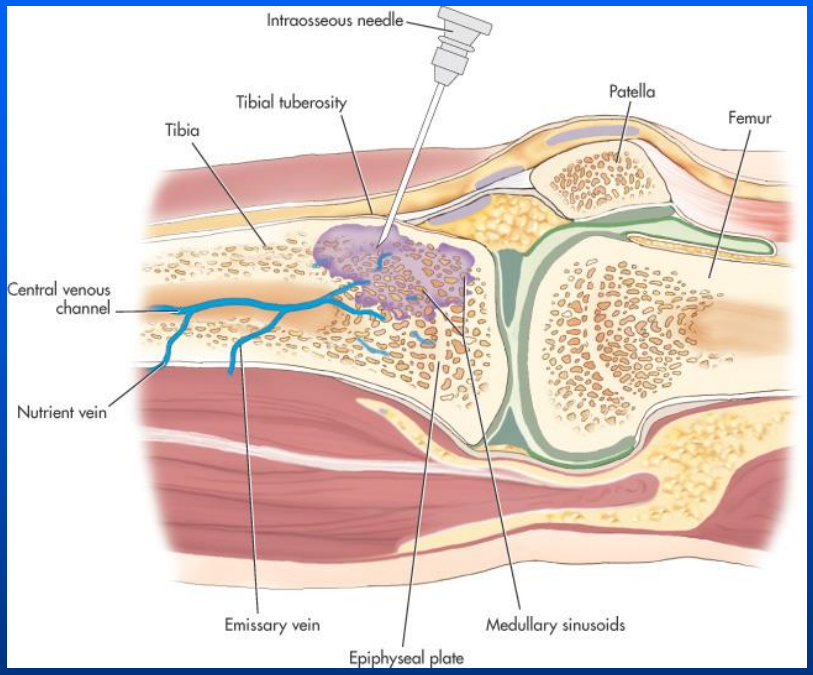
- Inject slowly (over 1-5 min)
  - Rate depends on type of medication and patient response
- Give through one-way valves on IV tubing or clamp the tubing above injection site
- After injection, continue infusion of fluids

Intraosseous Medications

- Relatively safe and effective in children
- Vascular access when peripheral cannulation is unavailable

Intraosseous Medications

- Fluids and drugs pass quickly from marrow cavities to systemic circulation
- Most IV fluids and ALS medications may be infused via this route



Intraosseous Medications

- Considered in unconscious children
- When venous line can't be achieved rapidly
- Examples
  - Cardiopulmonary arrest
  - Peripheral vascular collapse (as in shock, major trauma, or burns)
  - Critical children when IV access impaired by obesity or edema
  - Status asthmaticus

Percutaneous Medications

- Absorbed through mucous membrane or skin
  - Topical drugs
  - Sublingual drugs
  - Buccal drugs
  - Inhaled drugs.
  - Drugs for the eye, nose, and ear

Sublingual Drugs

- Nitrates most common SL drugs
  - Treat angina pectoris
- Place tablet under patient's tongue to dissolve
- Avoid oral fluids during drug absorption
- Swallowing drug may diminish effects

Buccal Drugs

- Dissolve between patient's cheek and gum
- Avoid fluids during drug absorption
- Example
  - Glucose gel preparations

Inhaled Drugs

- Oxygen
- Nitrous oxide (Nitronox)
- Bronchodilators
- Corticosteroids
- Antibiotics
- Aerosols

Aerosols

- Advantages
  - Rapid onset
  - Reduced systemic side effects

Nebulizers

- Aerosols are produced by nebulizers:
  - Intermittent positive-pressure breathing (IPPB) devices (designed for in-hospital use)
  - Metered-dose inhalers (pressure cartridges)
  - Hand-held nebulizers

Endotracheal (ET) Drugs

- Used when IV access cannot be established
- IV route is preferred
  - More reliable absorption

Anesthetic drugs Administration

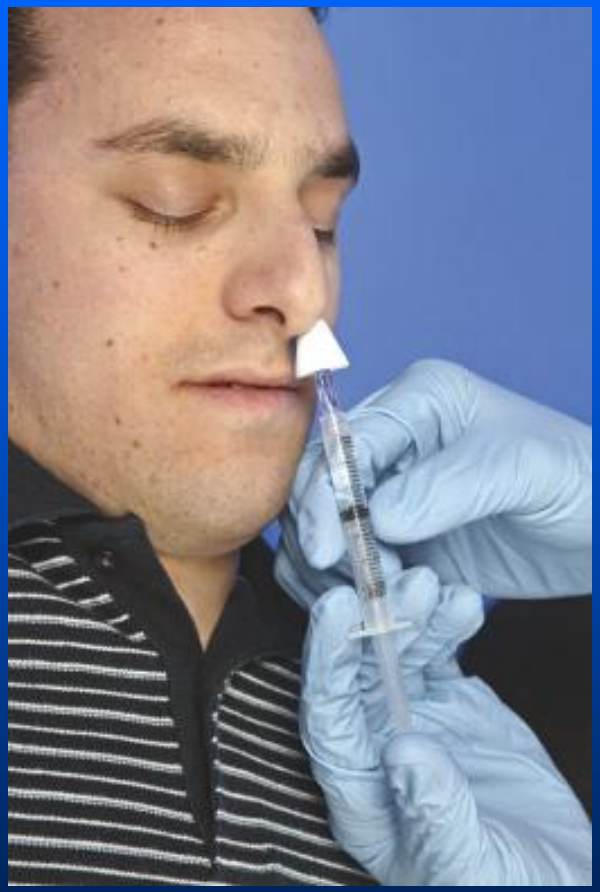
- General Anesthetics by IV or inhalational route.
- Subarachnoid space drugs.
- Nerves block drugs using ultra sound Techniques.

ET Drug Administration

- Ensure proper tube placement
- Ensure adequate oxygenation and ventilation
- Prepare medication:
- Hyperventilate

Drugs for the Nose

- Nose drops
- Nasal sprays



Why Intranasal medications?

- This delivery route has several advantages:
  - Its easy and convenient
  - Almost everyone has a nose
  - The nose is a very easy access point for medication delivery - even easier to access than IM or IV sites
  - No special training is required to deliver the medication
  - No shots are needed
  - It is painless
  - It eliminates any risk of a needle stick to the medical provider

Conclusion

The ability to safely gain access and to administer prescribed medications is a very important part of professional medical practice.