10. Venous Access and Medication Administration



**Team Leader: Nada Al-Madhi**

**Anesthesiology**

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From slides Doctor's Notes Team's Notes From the book Important

**Safety Considerations**

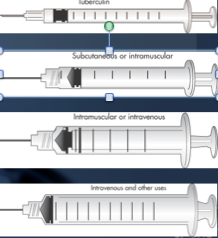
* Five patient “rights” of drug administration
  + Drug
  + Dose
  + Patient
  + Route
  + Time
  + Correct and thorough documentation (sixth patient right of drug administration)
* Read drug label and compare it to the order three times before administration:
  + When removing the drug from the drug kit
  + When preparing the drug for administration
  + Just before giving it to the patient (before the container is discarded)
* 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
* Handle multidose vials with aseptic technique so that medicines are not wasted or contaminated
* When preparing multiple injections, always label the syringe immediately
  + Keep the medication container with the syringe
  + Do not rely on memory
* *Never* administer unlabeled medication prepared by another person
* *Never* give medication that is:
  + Outdated
  + Discolored
  + Cloudy
  + Tampered with
* If anyone expresses concern about a medication or dose
  + Recheck to be certain that there is no error
  + Patient has right to refuse medication
* Monitor patient for any adverse effects for at least 5 min after administration
  + Longer observation time may be need for intramuscular and oral medications
* Document medications given:
  + Name of drug, dosage, time, and route
  + Note injection site of parenteral drugs
  + Record patient's response
    - Adverse as well as intended
* For return and disposal of unused medication, follow:
  + Governmental guidelines
  + Local EMS policies

**Medication Errors:**

* Common causes
  + Wrong dose ordered by the prescriber
  + Drug calculations in error
  + Drugs administered by wrong route
  + Wrong patient received drug
* If a medication error occurs:
  + Accept responsibility for your actions
  + Immediately advise medical direction
  + Monitor patient for effects of drug
  + Document the medication error as required:
    - State guidelines
    - Medical direction
    - Employer
* If a medication error occurs:
  + Modify practice to avoid a similar error
  + Follow EMS agency policy for documentation and quality improvement
* Removal or destruction of disease-causing organisms or infected material
* Sterile technique (surgical asepsis)
* Clean technique

**Antiseptics and Disinfectants**

* Chemical agents used to kill specific microorganisms
* Disinfectants
  + Used on nonliving objects
  + Toxic to living tissue
* Antiseptics
  + Applied to living tissue
  + More dilute to prevent cell damage
* Some chemical agents have antiseptic and disinfectant properties
* Universal precautions on *every* patient
  + When administering drugs, observe hand washing and gloving procedures if indicated
  + Face shields indicated during administration of endotracheal drugs

**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
* Range from 1 mL tuberculin and insulin syringes to 60 mL irrigation syringes
* Tuberculin syringes
  + 0.01 mL gradients
* Insulin syringes
  + 1 unit increments

**Needles**

* Vary in length and gauge
  + Larger gauge means a smaller needle

**Parenteral Medication Containers**

* Single-dose ampules
  + Glass containers
  + Hold one dose of a medication for injection
* Multidose vials
  + Glass containers with rubber stoppers
  + Hold several medication doses
* Prefilled syringes

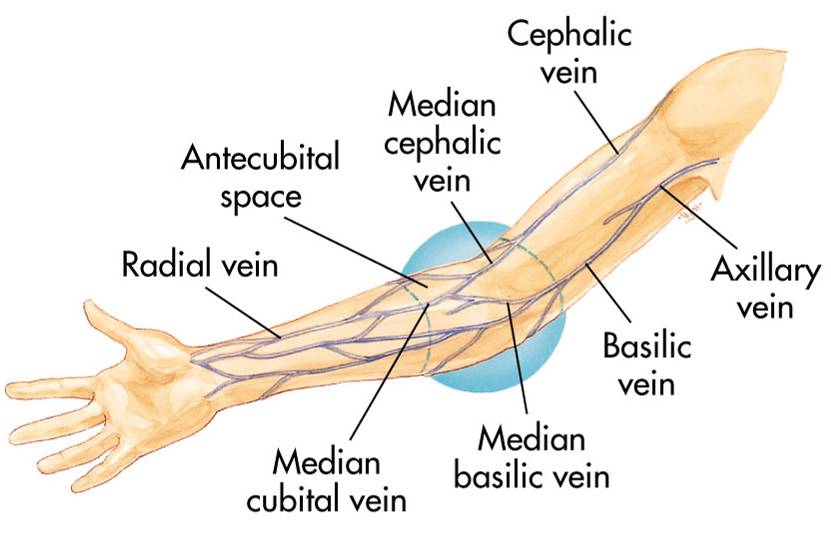
**Preparing Medication for Injection**

* Assemble equipment
* Compute volume of medication to be administered
* Using a vial:
  + Clean stopper with alcohol
  + Inject air into the vial equal to amount of solution to be withdrawn
* Withdraw volume required
* Remove syringe from vial
* Advance plunger of syringe to expel air from solution

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

**Type of IV catheters**

* Hollow needles
  + Butterfly type
* Indwelling plastic catheter over hollow needle
* Indwelling plastic catheter inserted through a hollow needle
  + Intracath

**Peripheral IV insertion**

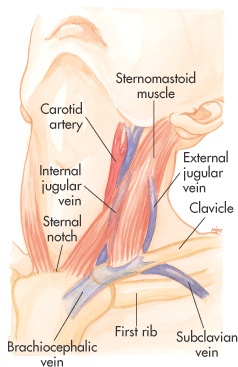
* Common sites:
  + Hands and arms
  + Antecubital fossa (AC space)
  + Alternate sites: long saphenous veins, external jugular veins 🡪 embolism rate and infection🡪 higher
* On insertion 🡪 Avoid sites that have injury or disease:
  + Trauma
  + Dialysis fistula
  + History of mastectomy

1. Explain procedure
2. Assemble equipment
3. Inspect fluid for contamination, appearance, and expiration date
4. Prepare infusion set
   1. Attach infusion set to bag of solution
5. Clamp tubing and squeeze reservoir on infusion set until it fills half way
6. Open clamp and flush air from tubing
7. Close clamp
8. Maintain aseptic techni
9. Select catheter:
10. Large-bore catheter used for fluid replacement🡪 14 to 16 gauge
11. Smaller bore catheter used for “keep open” lines 🡪18 to 20 gauge
12. Prepare other equipment
13. Put on gloves
14. Select site
15. Apply tourniquet above antecubital space
16. Prepare site
17. Cleanse area with alcohol or iodine wipes (per protocol)🡪 Check for iodine allergy
18. Stabilize vein
19. Apply pressure and tension to point of entry
20. Bevel of the needle up in adults
    1. May be down in infants and children
21. Pass needle through skin into vein from side or directly on top
22. Advance needle and catheter about 2 mm past point where blood return is seen in hub of needle
23. Slide catheter over needle and into vein
24. Withdraw needle while stabilizing catheter
25. Lock in protective sheath if present
26. Apply pressure on proximal end of catheter to stop escaping blood
27. Obtain blood samples if needed
28. Release tourniquet
29. Attach IV tubing
30. Open tubing clamp and allow fluid infusion to begin at prescribed flow rate
31. Cover puncture site dressing
32. Antibiotic ointment if indicated by protocol
33. Anchor tubing
34. Secure catheter
35. Document procedure
36. Monitor flow

**Central Venous Access**

* Within scope of paramedic practice in some EMS systems
* Requires special training
* Authorization from medical direction
* Not for rapid fluid replacement in prehospital setting
* Sites include:

Femoral vein Internal jugular vein Subclavian vein

* Prepare as for peripheral veins
* Success depends on:
* Patient's body position
* Paramedic's knowledge of anatomy
* Familiarity with the procedure
* Advantages:
* Available when peripheral vessels collapse
* Access to central pressure measurements🡪 In-hospital procedure
* Safer vasopressor administration
* Disadvantages
  + ****Excessive time for placement
  + Sterile technique
  + Special equipment
  + Skill deterioration
  + High complication rate
    - Pneumothorax, arterial injury, abnormal placement
  + Chest x-ray should be obtained immediately
  + Can’t initiate during other patient care activities
  + Not generally considered to be a useful prehospital technique
  + Lower flow rates than peripheral IV

**Complications**

Local:

* Pain and irritation
* Infiltration and extravasation
* Phlebitis
* Thrombosis and thrombophlebitis
* Hematoma formation
* Venous spasm
* Vessel collapse
* Cellulitis
* Nerve, tendon, ligament, and limb damage

Systemic:

* Contamination and infection
* Hypersensitivity reactions
* Sepsis
* Septic shock
* Emboli (blood clot, air, and catheter)

**Infiltration—Causes**

* Dislodgement of catheter or needle cannula during venipuncture
* Puncture of vein wall during venipuncture
* Leakage of solution into surrounding tissue from insertion site
* Poorly secured IV
* Poor vein or site selection
* Irritating solution inflames vein’s intima
* Improper cannula size
* High delivery rate or pressure

**Signs & Symptoms**

* Cool skin around IV site
* Swelling at IV site
  + With or without pain
* Sluggish or absent flow
* Infusion flows when pressure is applied to vein above tip of cannula
* No backflow of blood into IV tubing when clamp is fully opened and solution container is lowered below IV site

**Management**

* Lower fluid reservoir to check for presence of backflow of blood into the tubing
  + Absence of backflow suggests infiltration
* Discontinue IV infusion
* Remove needle or catheter
* Apply a pressure dressing to the site
* Choose new site
* Initiate IV therapy with new equipment
* Document

**Air Embolism**

* Uncommon but can be fatal
* Air enters bloodstream through catheter tubing
* Risk greatest with catheter in central circulation
  + Negative pressure may pull air in
* Air can enter circulation
  + During catheter insertion
  + If tubing is disconnected
* If enough air enters the heart chamber:
  + Blood flow is impeded
  + Shock develops
* **Signs and symptoms:**
  + Hypotension
  + Cyanosis
* **Management**
  + Close the tubing
  + Turn patient on left side with head down
  + Check tubing for leaks
  + Administer high-concentration oxygen
  + Notify medical direction
  + Weak and rapid pulse
  + Loss of consciousness

Complications🡪 central vein

* Femoral vein
  + Local complications
  + Systemic complications
* Internal jugular and subclavian veins
  + Local complications
  + Systemic complications

Rest of the slides weren’t mentioned in the lecture.