

# INTRAVENOUS CATHETERIZATION

## PART 2



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# MENU

**START AT THE BEGINNING**

**PREPARING IV EQUIPMENT**

**SALINE LOCK**

**IDENTIFYING VEINS**

**BLOOD TUBING**

**SELECTING AN IV SITE**

**BURETROL**

**IV PROCEDURE**

**PEDIATRIC VASCULAR ACCESS**

**COMPLICATIONS OF IV THERAPY**

**WHEN NOT TO START AN IV**

**FACTORS AFFECTING IV FLOW**

**SHARP SMART**



STARTING AN I.V

**USE ASEPTIC TECHNIQUE**

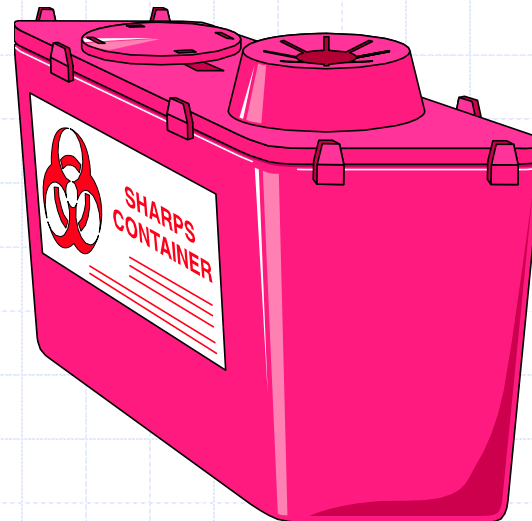
**NO EXCEPTIONS**



# STARTING AN I.V

# BE SAFE WITH SHARPS

## NO EXCEPTIONS



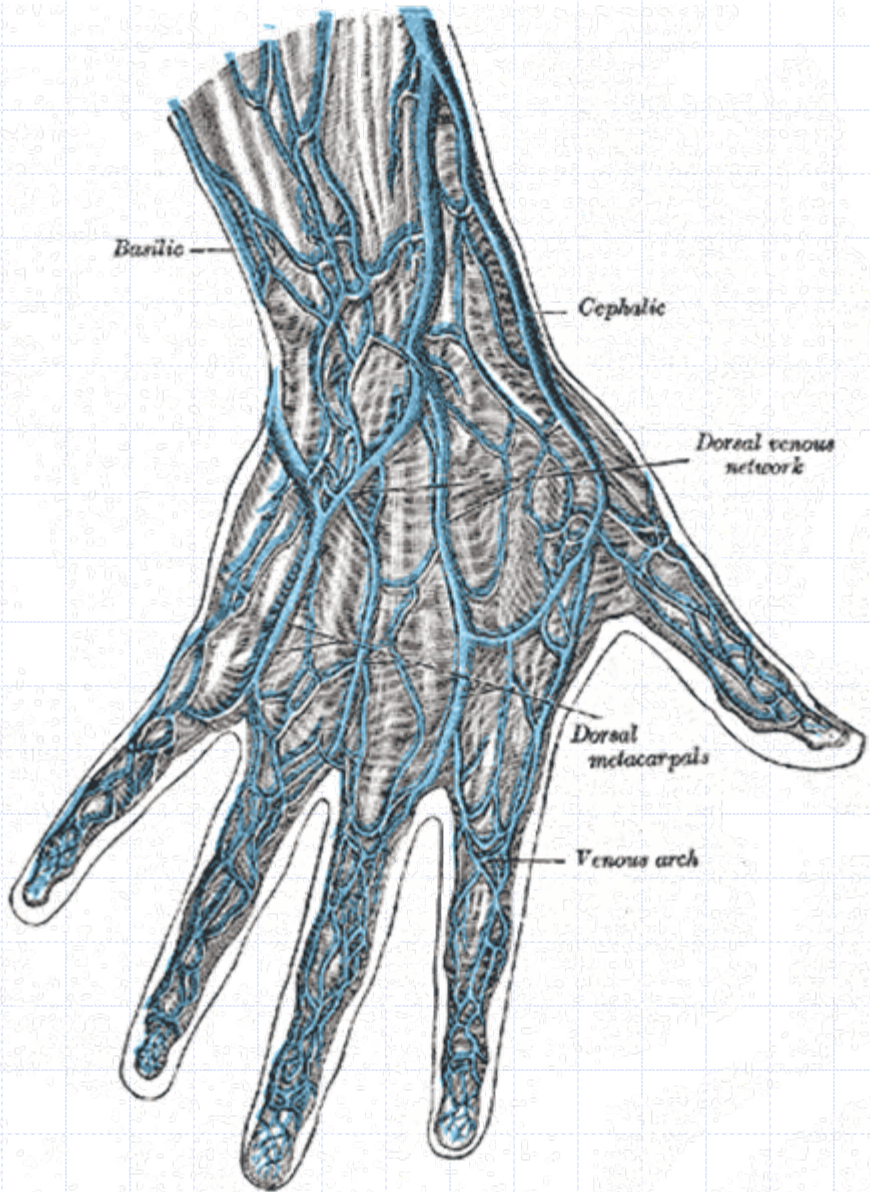
# Preparing IV Equipment





## Equipment to start an IV

- ❖ gloves (plus other PPE as needed)
- ❖ IV bag
- ❖ IV tubing
- ❖ tourniquet
- ❖ IV catheter
- ❖ alcohol swab
- ❖ 2 x 2 dressing
- ❖ transparent dressing
- ❖ strips of tape (3-4) 4-6" long
- ❖ sharps container

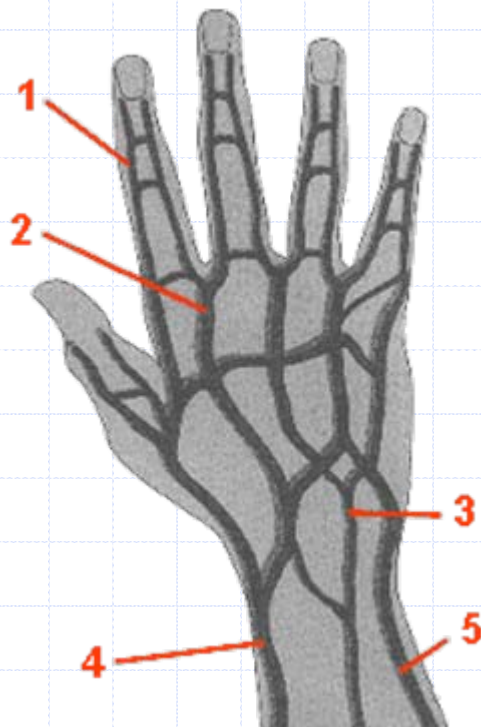


then attempt proximal



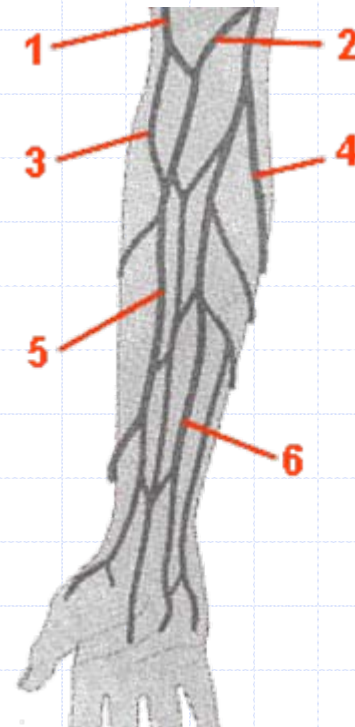
IV attempts: start at a distal site





### Veins of the Hand

1. Digital Dorsal veins
2. *Dorsal Metacarpal veins*
3. Dorsal venous network
4. *Cephalic vein*
5. Basilic vein



### Veins of the Forearm

1. Cephalic vein
2. *Median Cubital vein*
3. Accessory Cephalic vein
4. Basilic vein
5. Cephalic vein
6. Median antebrachial vein

# Selecting I.V. site - tourniquet on

- ❖ vein anatomy, size of vein
- ❖ valves (stay away from)
- ❖ movement
- ❖ pulsation
- ❖ hardness
- ❖ presence of shunts
- ❖ sites with infection
- ❖ previously used sites (injured, sclerotic)
- ❖ reason for I.V (T.K.V.O, fluid therapy, medication)
- ❖ again, attempt access in a distal to proximal fashion

# Preparation of the vein (s)

- ❖ place arm in dependant position (below the heart)
- ❖ tourniquet to block venous return
- ❖ warm skin
- ❖ flexion arm and hand
- ❖ gentle palpation / tapping

# Tourniquet application and getting veins up



# I.V procedure

- ❖ patient communication
- ❖ site selection
- ❖ assemble equipment (gloves)
- ❖ tourniquet applied
- ❖ cleanse site
- ❖ check catheter for integrity
- ❖ stabilize vein puncture with bevel up
- ❖ observe for flashback in chamber
- ❖ advance catheter 2mm further (drop angle)
- ❖ pull stylet 1-2mm back
- ❖ advance catheter at shallow angle
- ❖ release tourniquet
- ❖ apply transparent dressing
- ❖ place 2x2 under hub
- ❖ connect I.V site
- ❖ assess patency and regulate drip rate
- ❖ secure I.V tubing and site
- ❖ label site with size of catheter, time, date, initials, length of catheter
- ❖ communicate with partner

# Cleaning Site



# Catheterization



# Attaching I.V. Set



# Complications of IV Therapy: Local/Systemic

## Potential complications

- ❖ infiltration, extravasation - local
- ❖ infection - local or systemic
- ❖ fluid overload - systemic
- ❖ catheter/air embolism - systemic
- ❖ “speed shock” (cold fluid into core) - systemic
- ❖ phlebitis (chemical, mechanical) - local
- ❖ vasospasm - local

# Possible complications

## Infiltration

- ❖ accumulation of fluid (I.V. or blood, or medication) in tissue
- ❖ S&S: white, puffy, hard, cool, pain,
- ❖ treatment: discontinue I.V., restart I.V. away from site, chart the incident, including what was done to treat it (e.g. cold pack)

## Extravasation

- ❖ I.V fluid is fluid is flowing into surrounding tissue instead of vein because vein wall is punctured, broken or catheter is outside of vein

# Infection

**IV access is never so urgent that aseptic technique can be bypassed**

## Infection at insertion site

- ❖ cause: contaminated site or equipment
- ❖ S&S: swelling and tenderness at site

Systemic infection (Sepsis) due to invasion of bacteria, virus, or fungus into bloodstream

- ❖ onset 1-2 days post I.V, fever, chills, shaking, malaise, tachycardia, hypotension
- ❖ cause: use of contaminated equipment or solutions, contamination at site of venipuncture

# Infection



# PHLEBITIS

NOT USUALLY SEEN IN SHORT TERM I.V THERAPY  
INFLAMATION OF VEIN WITH/WITHOUT CLOT FORMATION

## Mechanical

- ❖ occurs due to motion and pressure of catheter on the endothelial wall

## Causes

- ❖ catheter too large for vein, movement of catheter within the vein

## Chemical

- ❖ occurs when an irritating solution is introduced with a catheter that is too large for the vein
- ❖ the relative occlusion of blood flow prevents adequate hemodilution of the solution

# Phlebitis



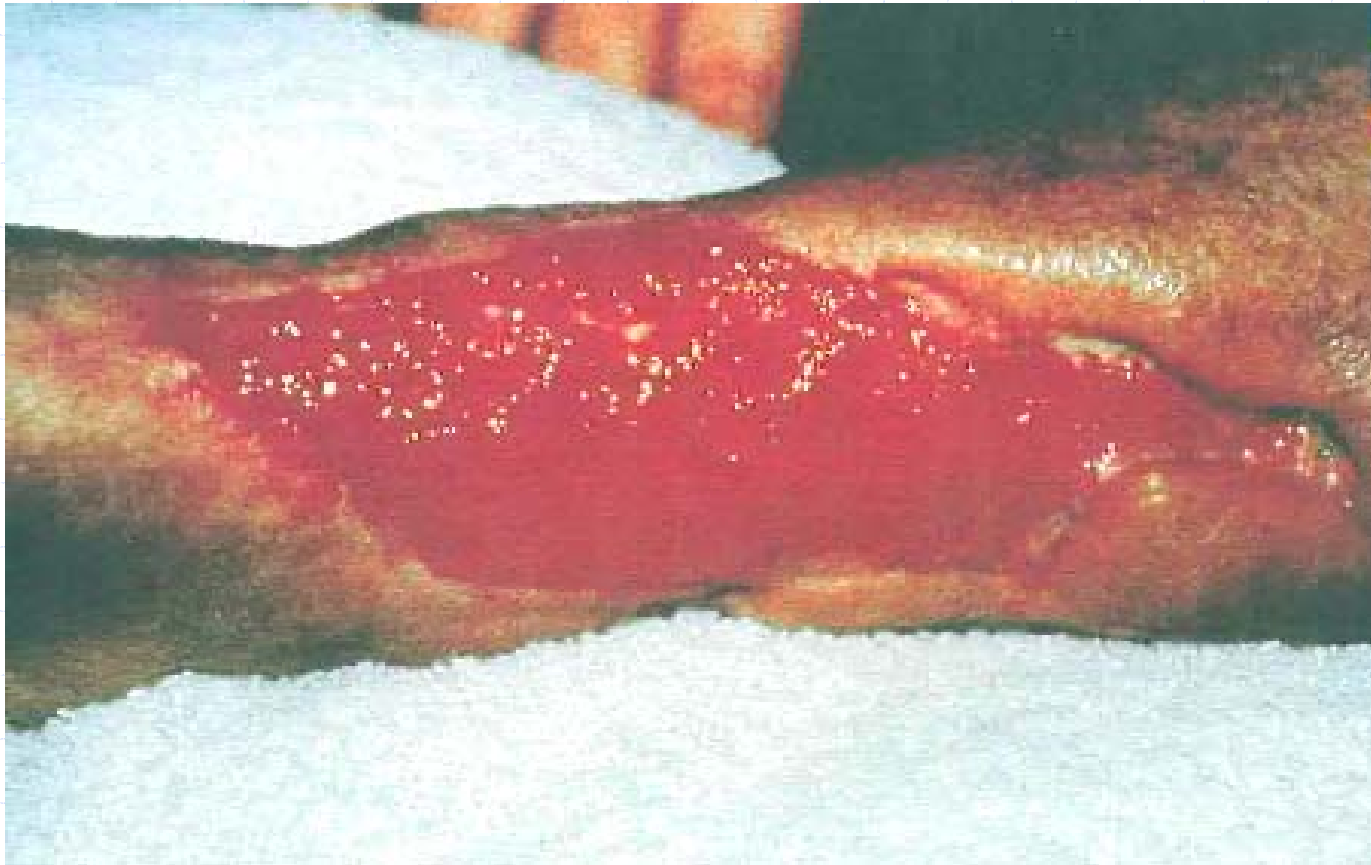
# Hematoma



# Infiltration



# Tissue Sloughing



# Fluid Overload

- ❖ causes: excess fluid administration, renal failure, cardiac failure
- ❖ S&S: headache, hypertension, coughing, dyspnea, pulmonary edema, restlessness, JVD
- ❖ treatment: slow I.V to TKVO, oxygen, elevate head
- ❖ document and notify receiving hospital

# Air Embolism

## Air Embolism

- ❖ air inadvertently enters the vasculature and heads through the right side of the heart to the pulmonary circuit and blocks a pulmonary vessel
- ❖ 10 ml air can seriously harm or kill a patient

## Signs & Symptoms

- ❖ clear chest (or wheezing), coughing, sudden onset of SOB, chest pain, dizziness
- ❖ tests – ABGs, lung scan, pulmonary angiogram

## Treatment

- ❖ administer O<sub>2</sub>, put pt. in sitting position, IVC filter
- ❖ Or - place pt. on left side with head down trapping air in right atrium
- ❖ report to hospital staff stat and document incident

# CATHETER EMBOLISM

## Catheter Embolism

- ❖ piece of catheter breaks off entering blood stream
- ❖ will travel to right side of heart and most likely will become lodged in pulmonary capillary bed causing signs and symptoms of a pulmonary embolism

❖ tests: CXR

❖ risk of PE, CVA, MI

**DON'T RE-THREAD THE NEEDLE THROUGH THE CATHETER WHEN YOU MISS ON INITIAL ATTEMPT(S)**

# Factors that affect flow

- ❖ catheter against valve
- ❖ catheter too large for vein
- ❖ vasospasm
- ❖ kinked tube
- ❖ I.V bag too low- i.e. height of bag
- ❖ elevated arm
- ❖ thrombosis
- ❖ flexion
- ❖ tourniquet inadvertently left on
- ❖ amount of fluid in bag low
- ❖ line taped to tight - circulation restricted

# Saline Lock

- ❖ allows for venous access without I.V fluid set attached
- ❖ used for patients that need extricated
- ❖ if only medications needed: good alternative (e.g. seizure patient)
- ❖ prevents fluid overload

## Limitations

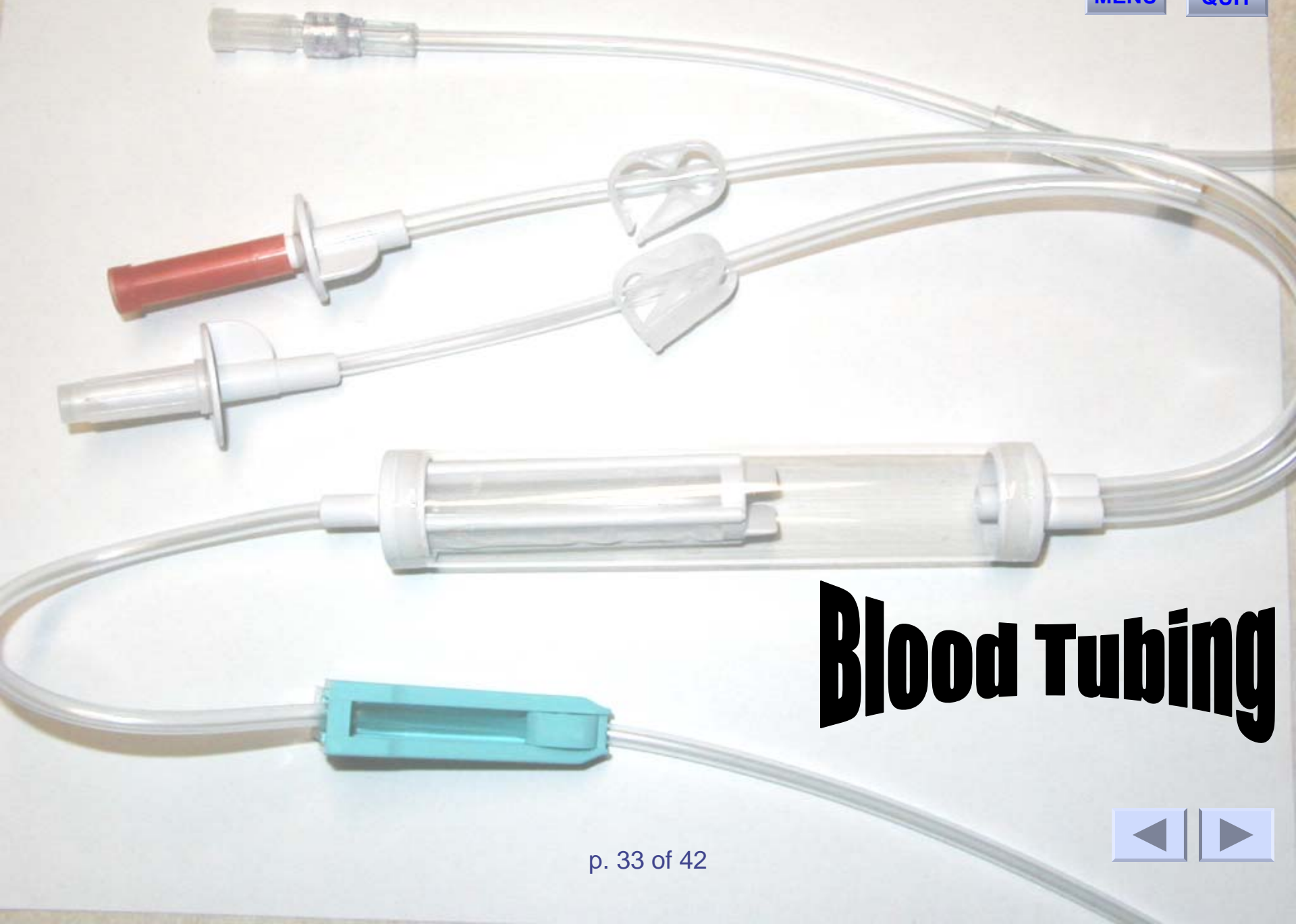
- ❖ can be time consuming
- ❖ catheter can become occluded



- Equipment for saline lock
- ❖ 10 cc syringe
  - ❖ NaHCL 10 cc nebule/vial
  - ❖ lock device (prn adaptor)
  - ❖ tourniquet
  - ❖ IV catheter
  - ❖ alcohol swab
  - ❖ 2 x 2 dressing
  - ❖ transparent dressing
  - ❖ strips of tape (3-4) 4-6" long
  - ❖ sharps container

# Blood Tubing

- ❖ if anticipated that patient will need blood administration, it is recommended that one line be started using blood tubing
- ❖ will not be primary I.V. line due to time
- ❖ needed for preparation
- ❖ 2<sup>nd</sup> I.V. access alternative



# Blood Tubing

# Buretrol

- ❖ used for Dopamine administration and intravenous therapy for children
- ❖ chamber holds 150 ml and is measured in 1 ml increments
- ❖ may or may not be used locally

## Priming a Buretrol

- ❖ ensure all protective caps in place (top valve open)
- ❖ close all roller clamps
- ❖ fill cylinder with 30 ml of fluid
- ❖ use **OSCAR** method
  - Open clamp
  - Squeeze drip chamber
  - Close
  - And
  - Release
- ❖ prime rest of line
- ❖ fill cylinder to 100 ml
- ❖ piggy back dopamine into another line



# BURETROL

Note: Some Base Hospitals allow for a 250 ml bag of NS with microdrip tubing for pediatric patients rather than a Buretrol



# Pediatrics Vascular Access

- ❖ preferred site is the largest most accessible vein (arm, leg, hand, foot, scalp)
- ❖ access is difficult as veins collapse during shock and arrest
- ❖ may be necessary to attempt a blind insertion based upon prediction of anatomic location of vein
- ❖ 2 person job
- ❖ immobilize site with board and cling
- ❖ beware of fluid overload
- ❖ use Buretrol or 250 cc bag with microdrip tubing
- ❖ if volume replacement needed use macro set

Note: Some Base Hospitals allow for a 250 ml bag of NS with microdrip tubing for pediatric patients rather than a Buretrol

# When not to start an I.V.

- ❖ when transport is a higher priority
- ❖ when you “think” the hospital may want one
- ❖ AV fistula – avoid same arm!!
  - ❖ Arterio-venous shunt in a hemodialysis patient
  - ❖ Starting an IV on the same arm will jeopardize hemodialysis treatment
- ❖ Mastectomy – avoid same arm
  - ❖ Lymph nodes in the arm on the same side may have been removed as part of the cancer treatment – if IV fluid goes interstitial, it won't reabsorb well



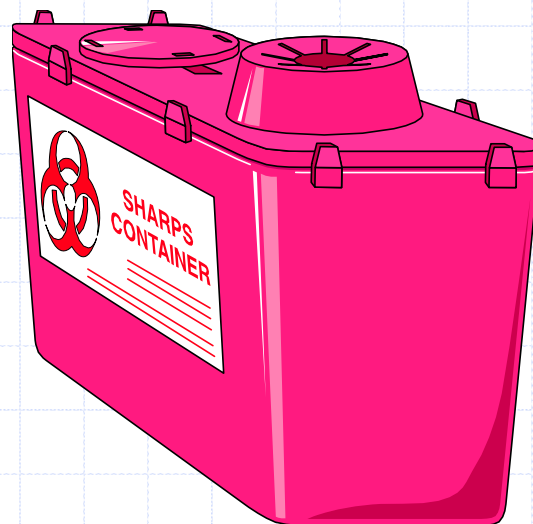
# Fistulas and Shunts

- ❖ hemodialysis access in arm for patients with chronic renal failure
- ❖ limited life span, limited number of sites, preserve each site as long as possible
- ❖ fistula identifiable by palpating for a “thrill” over site

**once again...**

**DO NOT TAKE BLOOD PRESSURE OR PERFORM VENIPUNCTURE ON ARM WITH FISTULA**

# BE SHARPS-SMART



# Sharps and needlestick injuries

## What to do if you have an injury

- ❖ NOTIFY SUPERVISOR IMMEDIATELY
- ❖ COMPLETE INCIDENT REPORT AND DOCUMENTATION
- ❖ COMPLETE ACR DOCUMENTATION (if appropriate)
- ❖ SEEK MEDICAL ATTENTION

## ***NEEDLESTICK POLICY***

Ask for local policy

## ***BASE HOSPITAL MEDICAL DIRECTIVES***

Ask for local Standing Orders / Medical Directives

MENU

QUIT

# *Well Done!*

OBHG Education Sub Committee  
Self-directed Education Program

