

Ecchymosis and Hematoma:
Localized mass of blood outside the vessel wall. Bruise or bleeding under the skin.

Causes:

- 1. Nicking the vein during venipuncture
- 2. Discontinuing IV without applying pressure over site or for too short of duration.
- 3. Applying a tourniquet too tight over previously attempted venipuncture site
- 4. Poor vessel integrity.

Signs and Symptoms:

- 1. Discoloration at site
- 2. Site swelling and discomfort

Prevention:

- 1. If possible, don't fish for veins. Poke with purpose.

Treatment:

- 2. Apply tourniquet just before venipuncture
- 3. Apply pressure dressing over insertion site after DC
- 1. Apply pressure after catheter/needle removed
- 2. Elevate extremity above the patient's heart to maximize venous return
- 3. Apply cold compress for initial 24 hours, then apply warm compress remaining time (15-20 minutes at a time, a few times a day).
- 4. Topical Arnica or Witch Hazel.

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Hematoma

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Thrombosis:
Trauma to the endothelial cells of the venous wall causes platelets to adhere to the vein wall leading to a formation of a clot, thrombus, within a vessel.

Causes:

- Blood backing up into the IV system or restarting after running dry for an extended period of time.
- Low IV flow rate limiting fluid movement
- Location of IV, or too large of catheter.
- Obstruction of flow rate
- Trauma to wall of vein
- Medical Hx – DM, Hx DVT, heart disease, cancer, etc.

Signs and Symptoms:

- Pain in extremity, shoulder, neck
- Site warm to touch
- Sluggish or no infusion rate, minimal or no blood return.
- Signs of pulmonary embolism

Prevention:

- Manage flow rate
- Check IV often
- Choose micro drip tubing of 60 gtt/ml if a low flow rate is desired
- Avoid joint flexion areas for IV placement
- Avoid cannulation of lower extremities
- Use proper size catheter for condition and history.
- Proper flushing protocol.

Treatment: (if non-emergent)

- Discontinue IV and restart in an alternate location (different arm is preferable)
- Apply cold compress
- Refer for medications (thrombolytic-urokinase) and further treatment PRN.

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Types of thrombus—occlusion

- ✓ Persistent withdrawal occlusion
- ✓ Partial occlusion
- ✓ Complete occlusion
- ✓ Fibrin tail
- ✓ Fibrin sheath
- ✓ Mural thrombosis

Thrombosis

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Infiltration

Leakage of IV fluid or medication (NON-VESICANT) into the surrounding tissue outside the vein wall

Causes:

- Puncture of the vein upon insertion of needle
- Dislodgment of cannula
- Phlebitis

Signs and Symptoms:

- Edema or swelling around site
- Pain
- Coolness of skin around site
- Backflow or blood return absent
- Infusion rate slowing, but continues to infuse
- Taut, shiny skin
- Fluid leaking at insertion site

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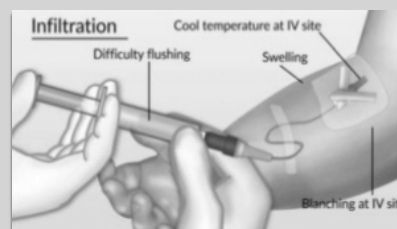
Prevention:

- Make sure catheter or needle is in the vein before infusing IV
- Stabilize IV well with tape
- Check IV site frequently

Intervention:

- Stop IV immediately and remove catheter or needle
- Apply dressing at puncture site – apply pressure.
- Elevate extremity
- Apply **cold pack** for hypertonic solutions.
- Apply **warm pack** for isotonic or hypotonic solutions.

Infiltration



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Extravasation

Leakage of an IV solution or medication (VESICANT) into the surrounding tissue outside the vein

Causes:

- Puncture of the vein upon insertion of needle
- Dislodgment of cannula
- Phlebitis

Signs and Symptoms:

- Edema or swelling around site
- Formation of blisters and subsequent sloughing of tissue leading to necrosis
- Pain or burning at site
- Infusion stopped or slowing
- Skin blanching or coolness

Prevention:

- Make sure catheter or needle is in the vein before infusing IV
- Stabilize IV well with tape
- Check IV site frequently

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Intervention:

- Stop IV immediately.
- Aspirate any fluid remaining in hub of IV catheter. (never flush)
- Remove IV catheter/needle
- Apply dressing to stop bleeding. **DO NOT APPLY PRESSURE.**
- Elevate extremity.
- Initially, apply **cold** compress to localize solution & decrease inflammation.
- Later, apply **warm** compress to increase local blood flow and disperse solution through tissue.
- Refer for further care if necessary.

Extravasation



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Phlebitis

Inflammation of the intima of a vein due to mechanical, chemical injury or bacterial infection

Causes:

- Trauma to the vein with cannula or needle (**mechanical**)
- Irritation due to type of fluid infused (**chemical**) – low pH or a hypertonic solution can irritate vessel wall. IV infused too fast.
- Introduction of pathogens related to contaminated needle or site prior to insertion (**bacterial**)

Signs and Symptoms:

- Pain/tenderness at site
- Redness at the site
- Local swelling
- Palpable cord along vein
- Site warm to touch
- Sluggish infusion rate
- Increased temperature

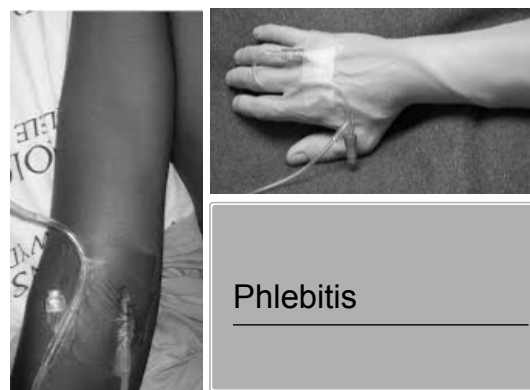
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Prevention:

- Don't use a larger catheter or needle than necessary
- Stabilize IV well
- Dilute IV solution appropriately
- Do not infuse IV too rapidly
- Use filtered IV administration sets
- Use appropriate pH for IV solutions
- Use aseptic/sterile technique and hand washing
- Rotate IV site every 72 hours

Treatment:

- Stop IV
- Elevate limb
- Apply warm compress
- Give oral anti-inflammatory/analgesic, as needed.



Phlebitis

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Grading Scale for Phlebitis

Grade Clinical Criteria – Phlebitis Scale

- 0 No Symptoms – IV site appears healthy
- 1 Redness at access site with or without pain.
- 2 Pain at access site with redness and/or edema.
- 3 Pain at access site with redness, streak formation, and palpable venous cord.
- 4 Pain at access site with redness, streak formation, palpable venous cord > 1 inch in length, purulent drainage.

***Treatment- warm compresses and possible antibiotics, analgesics, and other nutrient agents**

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Infection at Insertion Site

Causes:

- Inadequate skin antisepsis.
- Inadequate insertion technique or D/C
- Inadequate maintenance of site and equipment.

Signs and Symptoms:

- Pain and tenderness at site
- Redness at site
- Swelling at site
- Purulent drainage at site.

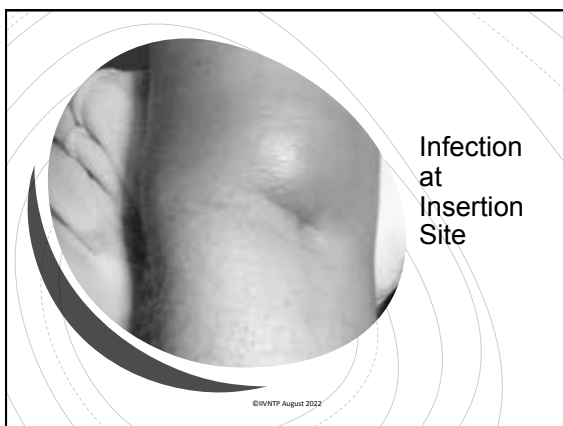
Prevention:

- Hand Hygiene
- Aseptic technique
- Disinfect needleless connectors prior to entry.

Treatment:

- Discontinue IV
- Culture needle, catheter, and/or site
- Clean site and apply anti-microbial ointment
- Further intervention may be required.

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Allergic Reaction

Hypersensitivity to IV solution or materials used for infusing the solutions

Causes:

- Materials used in IV tubing and bag
- Materials used in gloves
- Reactions to solutions and additives to solutions such as preservatives
- Snacks or food

Signs and Symptoms:

- Itching, Rash
- Tachypnea, SOB, Wheezing
- Tachycardia
- Hypotension, Cardiac Arrest
- Anxiety

Prevention:

- Test dose before actual IV given via intradermal injection
- Use DEHP, and latex free supplies.
- Have compounding pharmacist mix IV nutrients
- Use preservative free compounds
- Obtain thorough allergy history before **every treatment**.

Treatment:

- Stop IV immediately, maintain vascular access.
- Initiate basic life support, as needed.
- Perform interventions -Use appropriate medications to treat allergic reactions.

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Circulatory Overload

Infusion of excessive amounts of isotonic or hypertonic and crystalloid solutions.

Causes:

- Too rapid infusion of isotonic or hypertonic (extracellular to vascular system) and crystalloid solution.
- Large amounts of fluids infused.
- Cardiac and renal patients at higher risk for overload.

Signs and Symptoms: (use Quick Assessment tool)

- Tachypnea, SOB, moist crackles
- Edema
- Puffy eyelids
- HTN, bounding pulse,
- Weight gain, decrease UO
- Wide variance of intake and output of fluid
- Jugular vein distension in neck

Prevention:

- Monitor infusion rate – infuse at a slower rate.
- Do not catch IV up if it is behind
- Monitor fluid volume in and out
- Know patient's health history
- Monitor VS, Weight, Assessment

Treatment:

- Decrease IV flow rate
- Monitor vital signs
- Give O2
- Raise head of chair or bed
- Administer diuretic if necessary
- Keep patient warm to promote peripheral circulation

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Septicemia

General systemic infection

Causes:

- Poor technique
- Pathogens entering at IV site
- Contaminated IV solutions or medications

Signs and Symptoms:

- Chills followed by abrupt increase in patient temperature
- Nausea, vomiting, diarrhea
- General malaise
- Abnormal pains
- Tachycardia

Prevention:

- Aseptic technique
- Check dating on all solutions
- Check all solutions and equipment for contamination

Treatment:

- Restart IV at alternate site
- Obtain cultures of administration set, IV container, catheter tip, site and blood
- Initiate anti-microbial treatment
- Monitor patient closely

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Speed Shock

Occurs when a foreign substance, usually medication, is rapidly introduced into the circulation causing a sudden adverse physiological reaction.

Causes:

- Too rapid IV push or drip
- Medication not diluted properly

Signs and Symptoms:

- Dizziness
- Headache
- Tightness in chest
- Hypotension
- Irregular pulse
- Progression of shock
- Loss of consciousness
- Cardiac arrest

Prevention:

- Reduce the size of drops of medications by using a micro drip set
- Monitor piggyback solutions closely
- Know the appropriate dose/ administration of medications
- Know what you are administering

Treatment:

- Give antidote or resuscitation medications as needed
- Have emergency equipment available
- Call 911

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Venous Spasm

Vein spasm during insertion of IV and/or during or after infusion of fluid

Causes:

- Patient mental anxiety
- Difficulty inserting cannula or needle
- Irritation of fluid infused

Signs and Symptoms:

- Difficulty locating vein after insertion of cannula or needle
- Pain at site

Prevention/Treatment

- Warm IV site prior to starting IV
- Release and reapply tourniquet
- Dilute any medication used
- Slow IV rate
- Use warm pack during treatment
- Have the patient deep breathe.

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Nerve Injuries

Damage to the nerves while starting an IV or infusing fluids.

Causes:

- Anatomical variations with nerves, veins, arteries. Nerves hit on insertion or while infusing.
- Probing or chasing veins on insertion.
- Inserting IV catheter in high nerve areas.
- Mechanical damage, IV not secured.

Signs and Symptoms:

- Electrical pain, tingling, or burning on insertion, while infusion running, or post infusion.
- Numbness, paralysis.

Prevention:

- Avoid high risk areas, when possible.
- Take caution when inserting catheter/needle high nerve areas (dorsal hand, radial wrist area, antecubital fossa.) *3 fingers breaths on wrist
- No probing or chasing veins.
- Immediately remove catheter/ needle when patient states, "electrical pain, tingling, numbness, etc."
- Use smallest catheter possible for effective treatment.

Treatment:

- Immediate withdrawal when symptoms present.
- May need further assessment or intervention.

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Air Embolism

Blood vessel blockage caused by one or more air bubbles in the circulatory system.

(200cc of air can cause pulmonary obstruction = lethal arrest, 0.5 mL of air into a coronary artery can

cause cardiac arrest)

Causes:

- Connectors, admin sets, luer-locks not tightened correctly.
- Not priming IV tubing or extension sets properly.
- Not purging air from syringes.
- Dislodged or disconnected central vascular device.

Signs and Symptoms:

- Sudden onset dyspnea
- Coughing, Wheezing
- Chest pain
- Hypotension
- Tachyarrhythmias
- Confusion, Anxiety
- Numbness, Paralysis

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Prevention:

- Properly secure infusion sets and connections
- Always clamp (close) lines before D/ C
- Use air eliminating filter on IV lines
- Prime all connectors and admin sets
- Purge air from all syringes.

Treatment:

- IMMEDIATE ACTION: find source of air entry and resolve.
- Place patient on left side Trendelenburg, if not contraindicated, to move air out of R ventricle and into the R atrium.
- Initiate basic life support, if indicated.
- Perform interventions as needed (oxygen, etc.)

Vaso-Vagal Syncope Episode

A sudden drop in heart rate and blood pressure leading to fainting, often in reaction to a stressful trigger.

Causes:

- Reaction to a stressful trigger, such as starting an IV, drawing blood, site of blood or needle.

Signs and Symptoms:

- Paleness
- Nausea
- Sweating
- Rapid heartbeat
- Fainting

Prevention:

- Assess patients previous experience with IV starts, phlebotomy, seeing blood and needles.
- Deep breathing during procedures
- Have patient turn away and not watch
- Trigger avoidance

Treatment:

- Place patient in Trendelenburg position
- Use Ammonia Salts according to protocol.
- Apply Oxygen at 1-2L via face mask or nasal cannula.
- Follow BLS if necessary, according to protocol.
- Call 911, if patient does not recover.
- Stay with patient until paramedics arrive.

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