

# R T 72: VENIPUNCTURE

## Foothill College Course Outline of Record

Heading	Value
<b>Units:</b>	1.5
<b>Hours:</b>	1 lecture, 1.5 laboratory per week (30 total per quarter)
<b>Prerequisite:</b>	R T 51C or current Certification in Radiologic Technology; current Health Care Provider CPR card.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	CSU
<b>Grade Type:</b>	Letter Grade Only
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- Identify vascular anatomy, potential sites and equipment needed for venipuncture and intravenous infusion.
- Describe various contrast materials, signs, symptoms and treatment of adverse reactions during contrast injection.

## Description

Principles and practices of intravenous injection. Includes theory, demonstration and application of venipuncture equipment and solutions, puncture techniques, complications, and post-puncture care. Meets state of California qualifications for didactic certification in venipuncture for radiologic technologists. Intended for students in the Radiologic Technology Program and/or currently certified Radiologic Technologists; enrollment is limited to students accepted in the program.

## Course Objectives

The student will be able to:

- identify and describe vascular anatomy.
- identify potential sites for venipuncture.
- identify the technique in achieving medical and surgical asepsis.
- identify equipment needed for venipuncture and intravenous infusion.
- describe and identify equipment and techniques of intravenous line establishment.
- describe the disposal of sharps and syringes.
- describe proper post puncture care.
- distinguish between the chemical, generic and trade names for select drugs.
- describe biopharmaceutics, pharmacokinetic and pharmacodynamic principles of drugs.
- discuss patient safety issues involved in medication administration.
- discuss classifications of drugs utilized in radiology in terms of uses and side effects.
- describe and compare the various contrast materials.
- recognize signs, symptoms, and treatment of adverse reaction during contrast injection.
- composition and purpose of antianaphylaxis tray.
- identify and describe parts and functions of automatic injection devices.
- discuss the purposes and advantages of intravenous drug administration over other routes.

Q. analyze patient care, communication, and medicolegal ethics related to venipuncture and radiology.

## Course Content

- Vascular anatomy
  - Layers of the vein
  - Veins of the forearm
  - Veins of the hand
- Venipuncture sites
  - Hand/wrist
  - Forearm
  - Veins that should be avoided
    - Previously used veins
    - Injured veins
    - Sclerotic, hard veins
    - Veins of a surgically compromised limb
- Pick the best access
- Medical and surgical asepsis
  - Package integrity
  - Product expiration dates
  - Use single use medications
  - Don't reuse needles or syringes
  - Preparing the site
- Equipment
  - Needles
  - IV solutions
  - Tubing
  - Gloves
  - Alcohol wipes
  - Tourniquet
  - 2 x 2 gauze
  - Tape
  - Syringe
  - Bandaid
  - Elbow board
- Intravenous line establishment
  - Select best site
  - Clean the skin
  - Apply tourniquet
  - Put on gloves
  - Anchor the vein with thumb
  - Puncture the vein
    - Bevel up
    - Angle from skin
    - Watch for blood flashback
  - Lower the needle almost flush with the skin
  - If using angiocath:
    - Advance 1/4 to 1/2 inch
    - Hold stylet, remove catheter
  - Release tourniquet
  - Apply tubing or syringe
  - Tape
- Disposal of contaminated materials
  - Needles, tubing and syringes
    - Sharps container
    - Alcohol wipe, tape, gauze, gloves, Bandaid
      - Plastic lined waste receptacle
    - Do not recap needles
  - Post puncture care
    - Apply pressure
      - Do not bend the arm

2. Check site before patient leaves the department
3. Instruct patient to call if problem develops
- H. Drug nomenclature
  1. Chemical name
  2. Generic name
  3. Trade name
  4. Methods of drug classification
    - a. Chemical group
    - b. Mechanism/site of action
    - c. Primary effect
  - I. General pharmacologic principles
    1. Pharmacokinetics
    2. Pharmacodynamics
    3. Pharmacogenetics
  - J. Patient safety issues
    1. Six Rights of Drug Safety
      - a. The right medication
      - b. The right dose
      - c. The right patient
      - d. The right time
      - e. The right route
      - f. The right documentation
    2. Routes of drug administration
      - a. Systemic
        - 1) Oral
        - 2) Rectal
        - 3) Tube/catheter
        - 4) Inhalation
        - 5) Topical
      - b. Parenteral
        - 1) Intravenous
        - 2) Intra-arterial
        - 3) Intrathecal
        - 4) Intramuscular
        - 5) Subcutaneous
        - 6) Intradermal
        - 7) Intraosseous
  - K. Drug categories of relevance to radiography (side effects, uses and impacts on medical imaging)
    1. Analgesics
    2. Antiemetic drugs
    3. Antianxiety drugs
    4. Antidepressants
    5. Anti-inflammatory drugs
    6. Antiarrhythmic drugs
    7. Vasodilators and vasoconstrictors
    8. Diuretics
    9. Antihypertensive drugs
    10. Anticoagulant and coagulant drugs
    11. Antiallergic and antihistamine drugs
    12. Bronchodilators
    13. Antibacterial drugs
    14. Antiseptic and disinfectant agents
    15. Sedative and hypotonic drugs
    16. Anesthetic agents
    17. Cathartic and antiarrhythmic drugs
  - L. Contrast media
    1. Iodinated contrast/chemical configurations
      - a. Ionic monomer/characteristics
      - b. Ionic dimer/characteristics
      - c. Non-ionic monomer
      - d. Non-ionic dimer
    2. Characteristics of ionic and non-ionic contrast media
      - a. Chemical composition
      - b. Osmolarity
      - c. Iodine concentration
      - d. Viscosity
      - e. Toxicity
      - f. Elimination characteristics
      - g. Dosage
      - h. Preparation
    3. Considerations for use of non-ionic
      - a. Absolute
        - 1) Previous reaction
        - 2) Multiple myeloma
        - 3) Heart disease
      - b. Secondary
        - 1) Allergic history
        - 2) Elderly
        - 3) Renal disease
        - 4) Diabetes
        - 5) Allergy to iodine
        - 6) Anxiety
    4. Paramagnetic contrast medias/gadolinium
    5. Metallic salts
    6. Gaseous
  - M. Adverse reactions
    1. To venipuncture/symptoms/treatment
      - a. Stick an artery
      - b. Extravasation
      - c. Hematoma
      - d. Venous spasm
      - e. Infection
      - f. Phlebitis
      - g. Air embolism
      - h. Drug incompatibility
      - i. Low fluid level in the container
    2. To contrast media
      - a. Anaphalactic reaction/types/symptoms/treatment
        - 1) Gastrointestinal response
        - 2) Cutaneous response
        - 3) Respiratory response
        - 4) Central nervous response
        - 5) Cardiovascular response
      - b. Vasovagal reaction/symptoms/treatment
      - c. Renal effects/symptoms/treatment
      - d. Supplies needed
        - 1) Normal saline/Ringer's solution
        - 2) IV needles/connecting tubes
        - 3) Oxygen/mask/prongs/tubing
        - 4) Syringes/needles
        - 5) Stethoscope/B.P. cuff
        - 6) Benadryl/epinephrine/atropine
    3. Technologist's role in treatment
      - a. Maintain IV site for 15 minutes
      - b. Recognize the type of reaction so drug can be ready
      - c. Have equipment and drugs immediately available
      - d. Release compression/elevate legs
  - N. Composition and purpose of antianaphylactic tray
    1. To decrease and/or reverse patient's adverse reaction to contrast media
    2. Drugs
      - a. Phenergan/compazine (nausea and vomiting)
      - b. Epinephrine (asthma-like symptoms/tachycardia)

- c. Atropine, oxygen, tredelenburg (vagal reaction)
- d. Valium (diazepam–seizures/convulsions)
- e. Benadryl (diphenhydramine–hives)
- 3. Equipment
  - a. Inhaler
  - O. Automatic injection devices
    - 1. Advantages over manual injection
      - a. Delivers large amounts of contrast
      - b. Precise rate
    - 2. Parts
  - P. Intravenous drug therapy
    - 1. Purpose
    - 2. Advantages
    - 3. Methods
    - 4. Sites of administration
    - 5. Complications
    - 6. Initiation of intravenous therapy
    - 7. Discontinuation of intravenous therapy
    - 8. Documentation of administration
    - 9. Documentation of complication/reaction
  - Q. Patient care, communication and medicolegal ethics
    - 1. Professional standards
      - a. Scope of practice
      - b. Practice standards
      - c. Professional liability and negligence
    - 2. State statutes
    - 3. Employer prerogative
    - 4. Informed consent

## Lab Content

- A. perform ten venipunctures on upper extremity phantom under direct supervision.
- B. utilize proper medical and surgical asepsis.
- C. identify and select proper equipment.
- D. demonstrate proper intravenous line set-up.

## Special Facilities and/or Equipment

X-ray laboratory, Venous Access Kits, tourniquets, needles, gloves, syringes, normal saline, IV tubing, IV solution, alcohol wipes, gauze swabs, tape, hand and/or arm mannequin, sharps disposal container.

## Method(s) of Evaluation

Methods of evaluation may include, but are not limited to midterm, final examination and laboratory participation.

## Method(s) of Instruction

Methods of instruction may include, but are not limited to lecture, discussion, cooperative learning exercises, demonstration, and laboratory.

## Representative Text(s) and Other Materials

Jensen, Steven, and Michael Peppers. *Pharmacology and Drug Administration for Imaging Technologists*. 2nd ed. Elsevier, 2005. ISBN: 978-0-3230-3075-5

Although this textbook is older than the suggested "5 years or newer", it remains a seminal text in this field of study.

## Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- A. Weekly reading assignments.
- B. Clinical scenario critical thinking group exercise.
- C. Joint Commission National Patient Safety Goals reflection paper.

## Discipline(s)

Radiological Technology