



Standard Operating Procedure: Venipuncture in Dogs and Cats

These SOPs were developed by the Office of the University Veterinarian and reviewed by Virginia Tech IACUC to provide a reference and guidance to investigators during protocol preparation and IACUC reviewers during protocol review. They can be used as referenced descriptions for procedures on IACUC protocols. However, it is the sole responsibility of the Principal Investigator to ensure that the referenced SOPs adequately cover and accurately represent procedures to be undertaken in any research project. Any modification to procedure as described in the SOP must be outlined in each IACUC protocol application (e.g. if the Principal Investigator plans to use a needle size that is not referenced in the SOP, simply state that alteration in the IACUC protocol itself).

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I. Procedure Summary & Goals

- a. Venipuncture is an essential skill in veterinary medicine and is used to collect diagnostic samples as well as administer therapeutic agents.
- b. Common venipuncture sites in the dog
 - i. External jugular vein
 - ii. Cephalic vein
 - iii. Lateral saphenous vein
 - iv. Accessory cephalic vein
- c. Common venipuncture sites in the cat
 - i. External jugular vein
 - ii. Cephalic vein
 - iii. Lateral saphenous vein
 - iv. Medial saphenous vein

II. Personal Protective Equipment & Hygiene

- a. Hands should be washed thoroughly or sanitized before and after venipuncture.
- b. Personal protective equipment appropriate to the setting should be used.

III. Supply List

- a. Syringe(s), 1-20 mL
- b. Sterile hypodermic needle, 20-25 gauge, ½- 1-inch length
- c. +/- Clippers
- d. 70% isopropyl alcohol
- e. Blood collection tubes (plasma, serum, coagulation, culture)

IV. Detailed Procedure

- a. Venipuncture Basics
 - i. Clip the hair covering the injection site if necessary and/or wipe with alcohol to facilitate better visualization of the vessel.
 - ii. Occlude the vein with a tourniquet or digital pressure.
 - iii. Insert the needle with the bevel facing up through the skin and into the vein at approximately a 25-degree angle.

- iv. To insure access within the vessel, draw back on the syringe plunger to create negative pressure and watch for a flash of blood in the needle hub or within the syringe.
 - v. Release pressure on the vein.
 - vi. Release the syringe plunger.
 - vii. Remove the needle from the vein.
 - viii. Apply pressure to the venipuncture site as soon as the needle is removed, until hemostasis occurs.
 1. Manual pressure or a light bandage.
 - ix. Immediately transfer blood to the collection tube.
 1. Detach the needle from the syringe and remove the stopper from the collection tube prior to transferring blood to the tube.
 - a. This will reduce the amount of hemolysis that may occur if the blood is forcefully ejected through the narrow lumen of the needle.
- b. External Jugular Vein
- i. The external jugular vein is one of the most common venipuncture sites.
 - ii. Location
 1. Angle of the mandible to the thoracic inlet.
 - iii. Restraint
 1. Dogs
 - a. Most dogs will sit for this procedure.
 1. Place large dogs with their back to a wall or table.
 2. An assistant may have to restrain the front legs of small dogs.
 - b. Gently tip the dog's head back exposing the jugular grooves. Ideally, the neck is at a 90-degree angle with thoracic spine.
 2. Cats
 - a. Position the cat at the edge of a surgery or prep table.
 - b. Hold the front legs over the edge with your left hand, and tip the neck back and nose up with your right hand.
 1. The front legs and neck up to the point of the mandible should be in a vertical plane.
 - iv. Compress the jugular vein just dorsal to the thoracic inlet
 1. The vein may be easier to palpate than to see.
 - v. The venipuncture should be performed in the middle 1/3 of the jugular vein with a needle and syringe.

1. Bending the needle may help to maintain a good angle for venous access.
 2. Depending on the maneuverability of vein, it may be easier to insert the needle into the subcutaneous tissue directly over the venipuncture site and then enter the vessel with a swift puncture motion.
 3. Otherwise, one quick and controlled motion is often enough to enter the vein.
- c. Cephalic Vein
- i. Location
 1. Dorsal aspect of the antebrachium
 2. Runs in a slightly medial to lateral orientation
 - ii. Restraint
 1. Sternal recumbency or standing position on an exam table or the floor.
 2. The assistant restraining the animal should be on the opposite side of the leg that is being used for venipuncture.
 - iii. The assistant then places a thumb over the proximal aspect of the vessel and rolls the thumb toward the lateral aspect of the animal's leg.
 1. This serves to occlude and stabilize the vein.
 - iv. Grasp the animal's leg at the carpus from the underside and extend the elbow.
 - v. To prevent the vein from rolling, place the thumb of your hand to the side of the vessel.
 - vi. The needle should be angled approximately 25-30 degrees and inserted swiftly into the vessel beginning distally on the leg and moving proximally, especially if multiple attempts are required.
- d. Accessory Cephalic Vein
- i. The accessory cephalic vein is an alternative venipuncture site in medium to large dogs.
 - ii. Location
 1. Dorsomedial aspect at the level of carpus, distal to the cephalic vein.
 - iii. To facilitate venipuncture of this vessel, follow the same steps as for the cephalic vein.
- e. Lateral Saphenous Vein
- i. Location
 1. Runs from the craniomedial side of the talus to the popliteal notch.
 - ii. Restraint
 1. Lateral recumbency with the intended venipuncture site on the upper leg.
 2. Restraint may require multiple individuals to both maintain the animal in lateral recumbency and to occlude the vessel.

- iii. Place pressure over the vessel proximal to the venipuncture site and roll the vessel from caudal to lateral to isolate it on the upper-facing aspect of the leg.
 - iv. Grasp the leg at the tarsus from underneath and place the thumb of that same hand on the side the vessel to prevent it from rolling.
 - v. The needle should be angled approximately 25-30 degrees and inserted swiftly into the vessel beginning distally on the leg and moving proximally, especially if multiple attempts are required.
- f. Medial Saphenous Vein
- i. Restraint
 - 1. Lateral recumbency, intended venipuncture site is on the down leg
 - 2. Restraint may require multiple individuals to both maintain the animal in lateral recumbency and to occlude the vessel.
 - ii. Location
 - 1. Typical site in cats.
 - 2. Between the stifle and the femoral triangle.
 - iii. Place pressure over the proximal vessel, just below the coxofemoral joint, using the lateral side of the hand.
 - iv. Grasp the leg from the underside and start as far distally on the leg as possible.
 - v. The needle should be angled approximately 25-30 degrees and inserted swiftly into the vessel beginning distally on the leg and moving proximally, especially if multiple attempts are required.
 - vi. Apply very slight suction to the syringe when aspirating at this site.

V. Potential Adverse Effects, Mitigation, or Treatment

- a. Hematoma, hemorrhage, damage to surrounding structures
- b. Avoidance Measures:
 - i. Decrease number of attempts in same site
 - ii. Release suction on syringe and compression on vessel prior to needle withdraw
 - iii. Apply compression to venipuncture site after withdrawal of needle

VI. Variations

- a. Contraindication for jugular venipuncture: suspected coagulation disorder (i.e. thrombocytopenia, DIC, Vitamin K antagonism, etc.).
 - i. Venipuncture at this site could/can result in hematoma formation or hemorrhage and upper airway compromise.
- b. Aseptic preparation of the venipuncture site must be performed if blood is to be collected for bacterial culture.

- c. Vacutainer needles may be used for blood collection with vacutainer tubes.

VII. Links to Multimedia Aids and References

- a. <http://www.youtube.com/watch?v=ERFkpswPraU>
- b. <http://www.youtube.com/watch?v=PGi5eeBHU9M>
- c. http://www.youtube.com/watch?v=_y5mmSqXlal