

Academy of Surgical Research



Surgical Savvy

Tech Tips: An alternative method for securing peripheral IV catheters in rabbits

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Announcements

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Anesthesia always has its risks. One of the fundamentals of being prepared for an emergency anesthetic situation is securing intravenous access and a patient airway as early as possible. Central intravenous access is not often indicated; however peripheral access in some species can be difficult.

One of the most common points of access for peripheral IV catheter placement in the rabbit is the marginal ear vein. Typically a 22-24 gauge $\frac{3}{4}$ "-1" length angiocatheter is used. Accurate placement can be difficult, but keeping it secure once placed can be the bigger challenge. Often in the taping process the catheter becomes dislodged, or occluded. The technician must then unwrap the catheter to inspect the insertion site, flush the catheter, and often may end up having to replace the catheter. The catheter may also become occluded while moving the rabbit into the OR, a critical time when IV access may be crucial.

(Cont.)

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- In order to attempt to solve some of these issues, we have developed a different method for securing peripheral IV access in these patients.

Materials:

- 22-24g 3/4"-1" Angiocatheters
- Flushing solution (0.9% NaCl or LRS)
- IVC cap/ injection port
- Tegaderm™
- Clippers
- Isopropyl alcohol
- Rolled up gauze squares wrapped with tape



Figure 1: Materials

Shave the ear along the entire medial side extending to the central ear artery. The marginal ear vein should be visible through the rabbit's transparent skin on its ear. Clean the area appropriately with isopropyl alcohol.

(Cont.)



Fill both the injection port and the IVC with flushing solution, being careful to keep these pieces sterile.

Insert the catheter with inner stylet positioned bevel up through the skin and into the marginal ear vein. Note: you should be able to visualize the lumen of the catheter within the vein.

Hold the stylet steady, and advance the lumen of the catheter until the hub is against the site of percutaneous access. Remove the stylet. Place the injection cap on the end of the catheter. Note: once you do this step, the weight of the injection cap can easily pull the catheter out of the vessel. Be careful to hold the catheter in place. Apply Tegaderm onto the ear centered directly over the catheter and cap. Place rolled gauze into the ear



Figure 2: Catheter placement

(Cont.)



Wrap the Tegaderm™ around the ear and rolled gauze until snug and secure it to itself. Remove any of the frame of the Tegaderm™ as needed. Flush IV catheter to confirm patency and accurate placement.



Figure 3a and 3b: Tegaderm™ placement



**Advantages to this method:**

1. The catheter, insertion point, and cap are always visible.
2. Blanching of the vein during flushing can be viewed without unwrapping the catheter.
3. Patency can be assessed in most cases without unwrapping.
4. The catheter and cap stay more secure against the skin of the ear.
5. No need to get tangled up in ½" tape.

Tech Tips: Techniques for anesthesia induction in ferrets

By: Jillian Horvath, SRA

Ferret anesthesia can be challenging, understanding the correct technique is essential for success. Most ferrets have an easy-going disposition that makes them simple to handle and restrain. A good technique to restrain a ferret is to scruff it by the back of the neck with one hand while supporting the lower limbs with the other. If your technique is correct, the animal will 'yawn', relax, and its limbs will go limp. Another successful technique to handle a ferret is to place one hand around the torso of the animal and use the other hand to support the lower half. A properly restrained and supported animal guarantees a relaxed and easy to handle animal. Prior to anesthetic induction, ferrets should be fasted for at least 2 hours, but no longer than 4 hours to prevent hypoglycemia that can result in peri/post operative complications.

Pre-anesthetic drugs commonly used in ferrets are acepromazine maleate (0.22 mg/kg) and atropine (0.04mg/kg). Both can be administered subcutaneously (SC) or intramuscularly (IM). With SC administration, one should use a 23g-25g needle, injecting in the pocket under the forelimb (i.e. the armpit). With IM administration, drugs should be given using a 25g needle in an area with heavy muscle mass, such as the quadriceps or hamstring. Once pre-anesthetic drugs are administered, the animal should be given 20 minutes for the drugs to effect. The acepromazine is used to sedate the animal and allow for smooth transition to anesthesia when ketamine is added. Atropine should be administered to decrease gut motility and salivary secretions. (Cont.)

Once adequately sedated, surgical anesthesia can be accomplished with ketamine (20-30 mg/kg) administered either IM or SC¹. It is recommended to give the ketamine SC, avoiding the stinging when given IM due to ketamine's low pH that can cause tissue irritation². Likewise, when ketamine was given IM in a study of 100 animals, the effects of the pain were higher than they were with giving ketamine SC. In this study, when ketamine was given IM the animals would try to turn and bite the handler, the person injecting, and the area in which the injection was given, signaling that the injection was painful to the animal. Alternatively, when the injection was given SC, the occurrence of tissue irritation was drastically reduced and the demeanor of the animal post injection remained calm.

Once the animal is sedated, place the animal on a face mask with 2.0 L/min oxygen. Set Isoflurane between 3-4%. Isoflurane is placed at a higher percentage due to increased metabolism of the ferret. Much like that of the rat, the ferret metabolizes the Isoflurane at a greater rate than other laboratory animal species. Once the ferret is properly anesthetized, a catheter (≤ 25 g) may be placed in the cephalic vein³ to allow for intravenous infusion of antibiotics and the perioperative administration of fluids (i.e. Lactated Ringers Solution (LRS) 10-15 ml/kg/hr). Due to the size of the ferret's forelimb, placing a catheter is not simple. The successful placement of a catheter is based on the holder and/or a tight enough tourniquet. There is not a lot of space to work, thus making it hard to place a catheter that is longer than $\frac{3}{4}$ of an inch

Endotracheal Tube Placement

In ferrets greater than 1000g, a 2.5 to 3.0 cuffed endotracheal tube can be placed. For anything less than 1000g, a 2.5 or 2.0 endotracheal tube is recommended. Intubating a ferret is similar to intubating a combination of a dog and a cat. The view is similar to that of a dog, but trachea and larynx sensitivity more like the cat. Applying lidocaine topically to the vocal folds is helpful to decrease laryngospasm. Identifying the proper length endotracheal tube is important. When measuring for proper placement (depth) of the endotracheal tube, one must remember that the branching of the bronchi is much deeper than in most species. (Cont.)

Using a Millar-0- laryngoscope blade, the animal is placed in ventral recumbency, the endotracheal tube is lubricated with lidocaine jelly, an assisting technician holds the upper jaw open, while the laryngoscope blade is used to open the lower jaw and visualize the larynx. Wait for the animal to exhale and allow for the larynx to open fully and gently place the endotracheal tube. Fog on a dental mirror or any reflective surface, indicates proper placement of the endotracheal tube. Once the animal is intubated properly, the tube is tied to the animal behind the ears to prevent the tube from slipping out and the cuff is inflated. Following this the animal is ready for surgery.

Post-surgery, the animal is returned to the recovery room where supplemental heat and stimulation is applied until full anesthetic recovery. Due to anesthesia, an animal does not have the ability to regulate its body temperature so it is necessary to supplement with some form of heat like a warm water blanket or a warm air circulating blanket until the animal is alert and responsive. Once the animal is swallowing/coughing, the endotracheal tube cuff should be deflated and extubated. The animal may then be placed back into its cage with soft-bedding for recovery monitoring.

1. John C. Thurmon, William J. Tranquilli, and G. John Benson, *Lumb and Jones Veterinary Anesthesia*, Baltimore, Maryland, Williams and Wilkins, 1996, p. 693.
2. John C. Thurmon, William J. Tranquilli, and G. John Benson, *Lumb and Jones Veterinary Anesthesia*, Baltimore, Maryland, Williams and Wilkins, 1996, p. 242.
3. Katherine E. Quesenberry & James W. Carpenter, *Ferrets, Rabbit, and Rodents*, St. Louis, Missouri, Saunders, 2004, p.20.

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Aseptic and Precise Surgical Technique in Rodents

Aseptic and precise surgical techniques are essential components of a successful surgery. In spite of this, not all aspects of aseptic and delicate technique are often considered when planning for rodent surgery, thus leading to questionable outcomes. Implementation of these principles into a rodent surgical plan is especially challenging because there is still a misconception that rodents are less susceptible to infections, and gentle technique requires appropriate training, equipment and instrumentation.

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