

Vascular Access Techniques

INTRODUCTION

A variety of methods can be used for placement of peripheral, central venous, and arterial catheters. If a peripheral or central catheter cannot be placed due to small patient size, severe hypovolemia or dehydration, or hypotension, intraosseous catheters can be placed in the femur, humerus, or wing of the ileum. This chapter will discuss indications, contraindications, and methodologies listed above.

Through-the-needle catheters or over-the-wire central venous catheters can be placed in the jugular, medial saphenous, or lateral saphenous veins. The indications and contraindications for central venous catheter placement, irrespective of type, are similar.

CENTRAL VENOUS CATHETER PLACEMENT

Introduction

Central venous catheters can be placed into the jugular, lateral saphenous, and medial saphenous veins. Central venous catheters can be used for infusion of colloid and crystalloid fluids, infusion of continuous or intermittent drugs, and infusion of hyperosmolar solutions including parenteral nutrition. Catheters placed into the jugular vein can be used for measurement of central venous pressure to guide fluid therapy and help avoid volume overload. An additional benefit of indwelling central venous catheters is ease of repeated blood sample collection without the need for repeated venipuncture.

Supplies Needed

Antimicrobial scrub and solution
Central venous catheter(s)

Cotton roll gauze
Electric clipper
Electric clipper blades
Gauze, 4- × 4-inch squares
Heparinized flush
Kling or gauze bandaging material
T-port
1-inch white tape

Indications

Large volume crystalloid or colloid infusion
Continuous drug infusion
Repeated blood sample collection
Infusion of parenteral nutrition or other hyperosmolar substances
Central venous pressure measurement

Contraindications

Coagulopathies
 Thrombocytopenia
 Thrombocytopathia
 Vitamin K antagonist rodenticide
Hypercoagulable states
 Hyperadrenocorticism
 Disseminated intravascular coagulation (DIC)
 Protein losing enteropathy
 Protein losing nephropathy
Catheters should not be placed in the jugular vein in cases of increased intraocular or intracranial pressure or thrombosis of one jugular vein



Video available online

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Fig. 1.1. Set-up for central venous through-the-needle catheter placement.

Helpful hint: Have all components ready before restraining the patient and attempting to place the catheter.



Fig. 1.2. Place the patient in lateral recumbency. Clip the jugular furrow from the ramus of the mandible caudally to the thoracic inlet and dorsally and ventrally to midline.

Helpful hint: In long-haired patients, make sure to clip the “feathers” that might lay over your field.



Fig. 1.3. Aseptically scrub the clipped area.

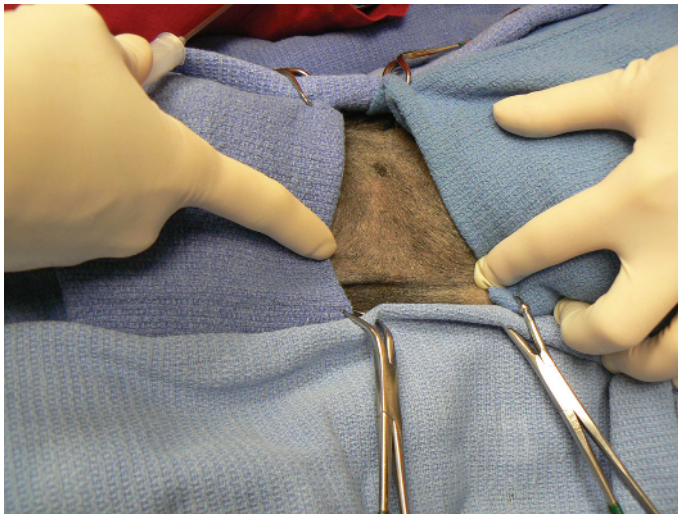


Fig. 1.4. Drape the sterile field, then occlude the jugular vein at the thoracic inlet. Note the jugular vein under the skin.

Helpful hint: In overweight patients, the jugular vein may not be visible, even after occlusion at the thoracic inlet.

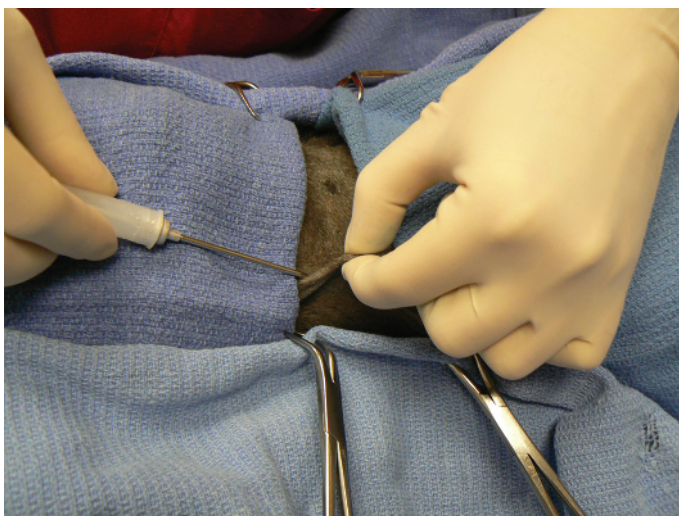


Fig. 1.5. Wearing sterile gloves, tent the skin over the proposed site of catheter insertion, and insert the needle through the skin.



Fig. 1.6. Insert the needle into the vessel. In some cases, you will feel a “pop” as the needle is inserted into the vessel. Watch for a flash of blood in the catheter. Once a flash of blood is observed, push the catheter through the needle into the vein.

Helpful hint: In extremely hypotensive or hypovolemic patients, a flash of blood may not occur.

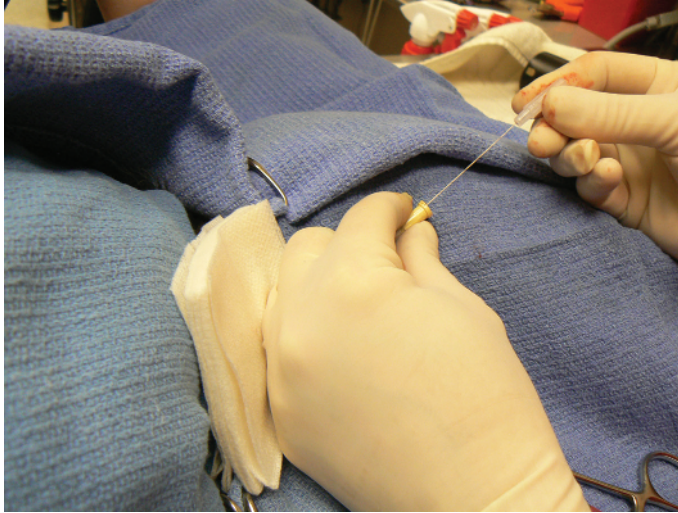


Fig. 1.7. Once the catheter is pushed to the hub securely, remove the stylette from within the catheter.

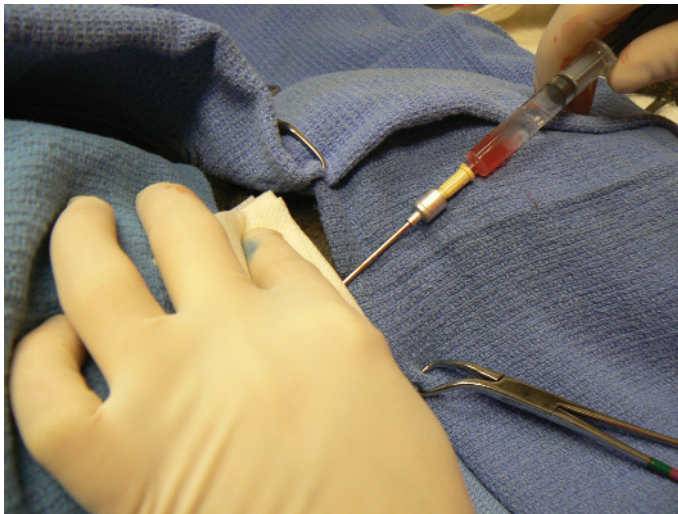


Fig. 1.8. Flush the catheter with heparinized saline.

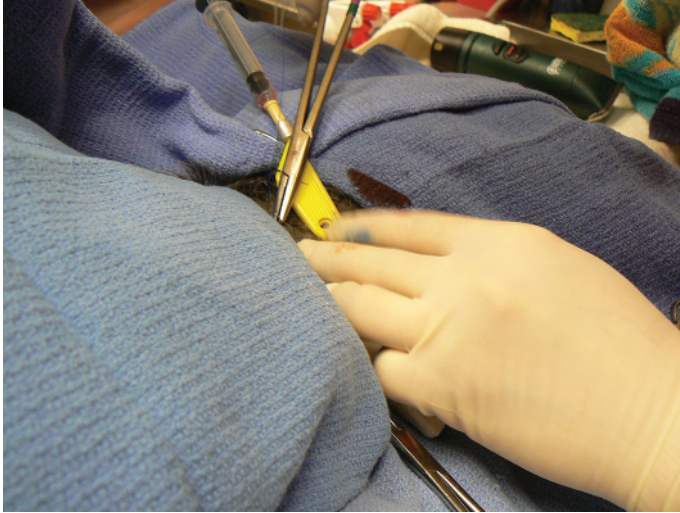


Fig. 1.9. Remove the needle from the vessel, and secure the plastic pieces over the needle for safety.

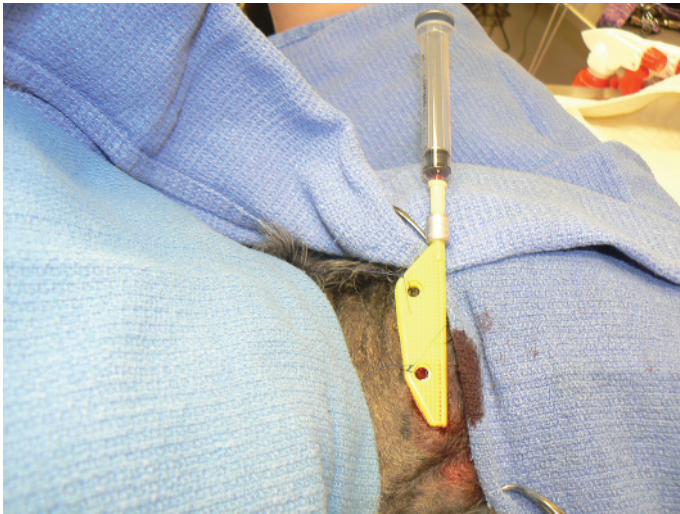


Fig. 1.10. Suture the plastic pieces and catheter hub in place to the skin.

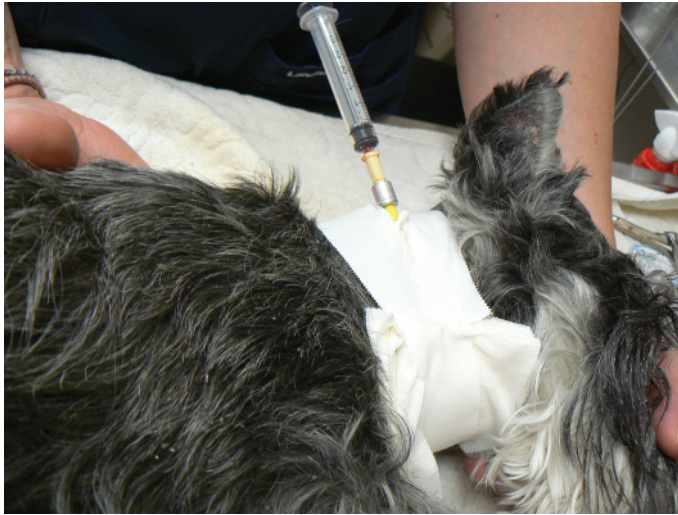


Fig. 1.11. Place sterile gauze squares over the site of catheter insertion, and bandage in place first with lengths of 1-inch adhesive tape.



Fig. 1.12. Next, secure cotton roll gauze over the catheter site.

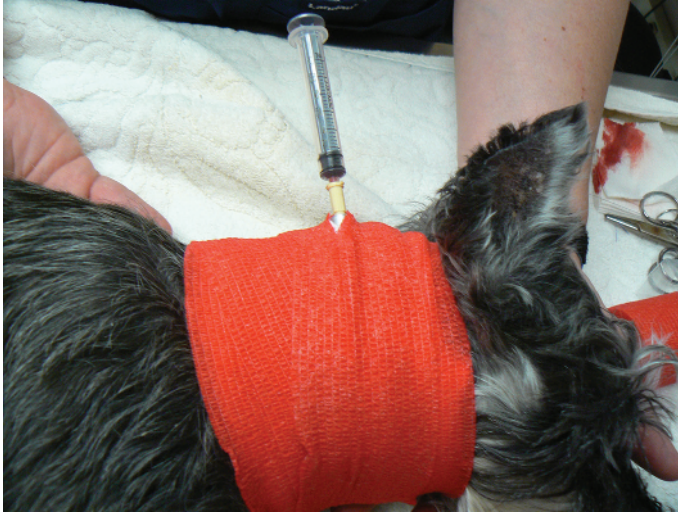


Fig. 1.13. Finally, secure a final outer layer over the catheter bandage.



Fig. 1.14. Lateral saphenous vein.

(a)



(b)



Fig. 1.15. Place the patient in lateral recumbency (Fig. 1.15a) and have an assistant restrain. Clip the distal limb circumferentially in between the stifle and hock, over the lateral saphenous vein. Have an assistant occlude the vessel proximally, and visualize the vessel as it courses under the skin. Aseptically scrub with antimicrobial cleansing solution (Fig. 1.15b).

(a)



(b)



Fig. 1.16. Tent the skin over the vessel and insert the through-the-needle catheter through the skin (Fig. 1.16a), then into the vessel, bevel up (Fig. 1.16b). Watch for a flash of blood in the catheter.

Helpful hint: To hold the vessel in place while you are attempting to insert the catheter, pull the skin tightly around the back of the leg.



Fig. 1.17. Insert the catheter to the hub, then push the through-the-needle catheter and stylette into the vessel.



Fig. 1.18. Remove the stylette from the catheter. Don't let go of the catheter.



Fig. 1.19. Pull the needle and hub off of the catheter, leaving the catheter in the vessel. Don't let go of the catheter.



Fig. 1.20. Place the luer-lock hub/clip adapter over the catheter.



Fig. 1.21. Place a length of 1-inch adhesive tape around the catheter hub, then around the patient's limb. Next, flush the catheter with heparinized saline.



Fig. 1.22. Wrap a second length of tape under, then around the catheter. Next, wrap bandage material around the limb, then secure tape over the catheter and T-port. Label the catheter. It is now ready for use.



Fig. 1.23. Place the patient in lateral recumbancy and have an assistant restrain. Clip the rear limb circumferentially in between the stifle and hock.



Fig. 1.24. Aseptically scrub the clipped area with antimicrobial solution.

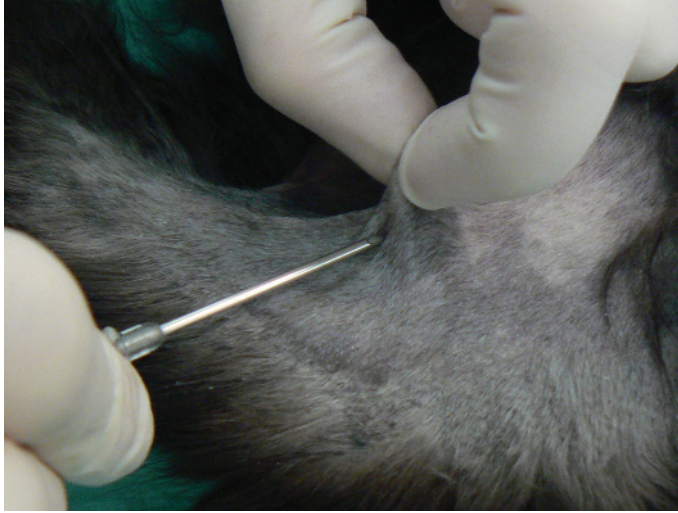


Fig. 1.25. Pull the skin tightly around the leg to keep the vein from rolling under the skin. Insert the needle through the skin just adjacent to the vessel. Avoid lacerating or puncturing the vessel.

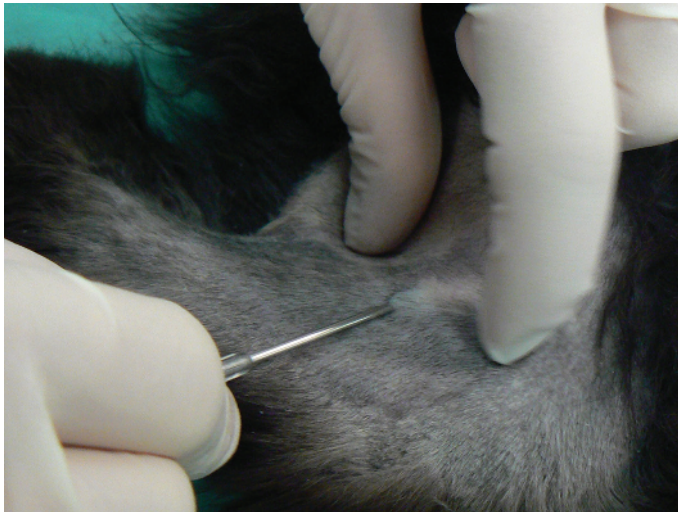


Fig. 1.26. Place the needle directly over the vessel, and insert into the vessel at a 15° angle. Watch for a flash of blood in the catheter. Insert the catheter into the vessel.

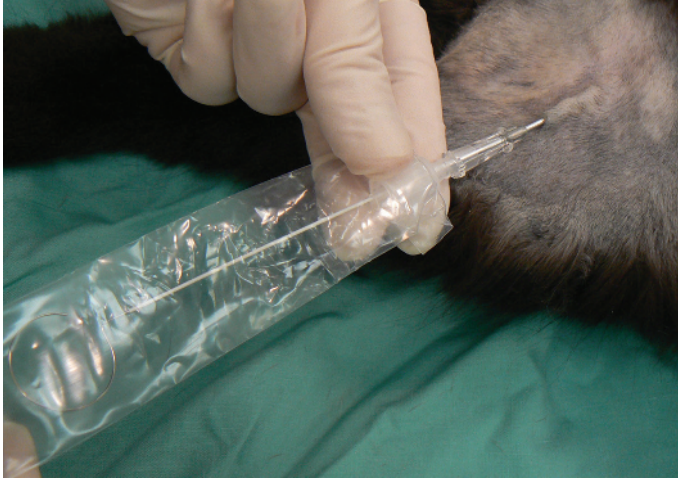


Fig. 1.27. Insert the catheter through the needle, into the vessel.

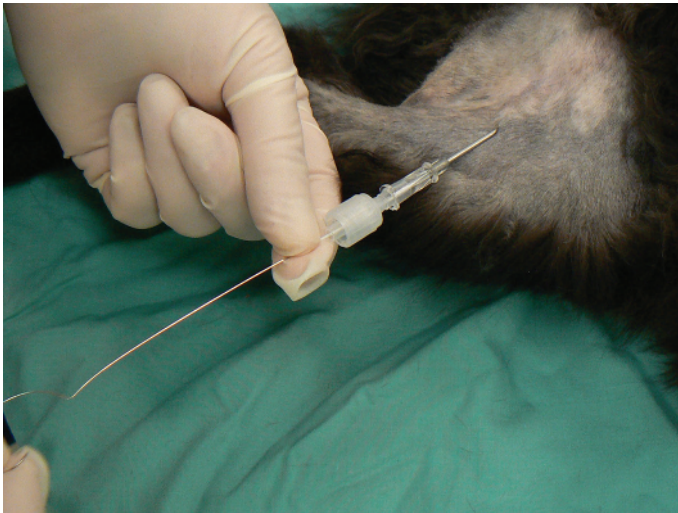


Fig. 1.28. Withdraw the stylette from the catheter.

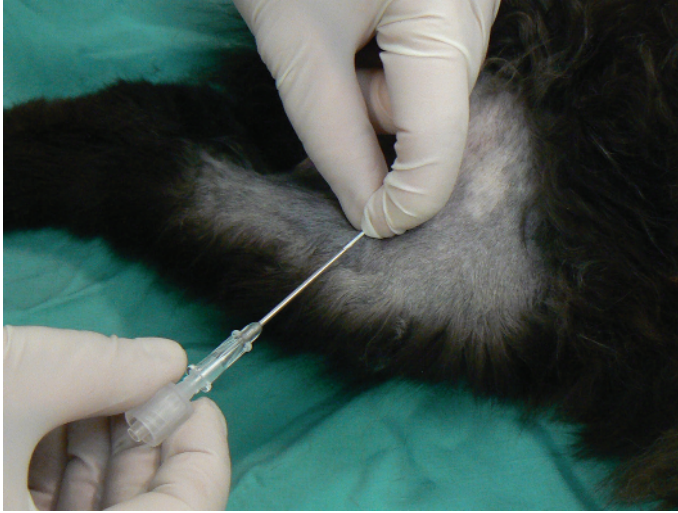


Fig. 1.29. Remove the needle off of the catheter. Take care to not let go of the catheter.

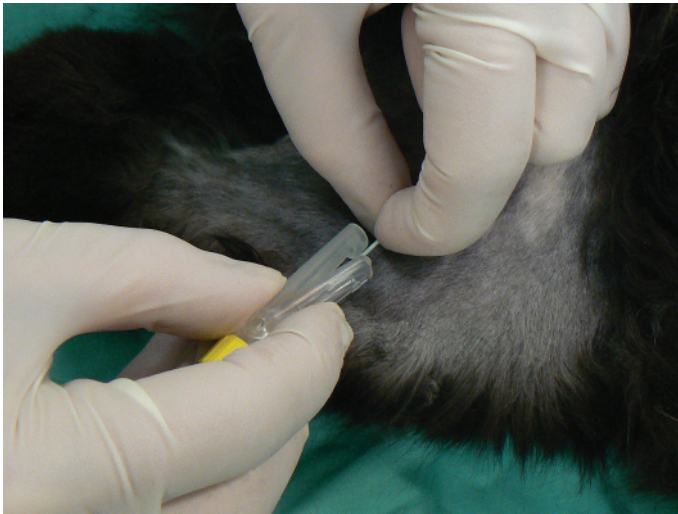


Fig. 1.30. Attach the luer-lock clamp adapter onto the catheter.



Fig. 1.31. Secure the catheter hub to the medial aspect of the limb with lengths of 1-inch adhesive tape.



Fig. 1.32. Bandage the limb in layers of cotton roll gauze, Vetrap™, or Elastikon®, and secure a T-port that has been flushed with heparinized saline to the lateral aspect of the limb for easy access.



Fig. 1.33. Label the catheter bandage, and the catheter is ready for use.

OVER-THE-WIRE CATHETERS (SELDINGER TECHNIQUE)

Introduction

Over-the-wire (Seldinger) central venous catheters can be placed into the jugular, lateral saphenous, and medial saphenous veins. Central venous catheters can be used for infusion of colloid and crystalloid fluids, infusion of continuous or intermittent drugs, and infusion of hyperosmolar solutions including parenteral nutrition. Catheters placed into the jugular vein can be used for measurement of central venous pressure to guide fluid therapy and help avoid volume overload. An additional benefit of indwelling central venous catheters is ease of repeated blood sample collection without the need for repeated venipuncture. Many companies supply single- and multi-lumen over-the-wire products. Multi-lumen catheters are beneficial when multiple products are being infused into a patient simultaneously. The added ports allow vascular access without the need for placement of multiple single-lumen central or peripheral venous catheters.

Supplies Needed

- Sterile gloves
- Antimicrobial scrub solution
- Number 11 scalpel blade
- 2% lidocaine
- 3-ml syringe with 24-gauge needle
- Electric clipper and blades
- 1-inch white tape
- 3-0 nonabsorbable suture
- Over-the-wire single or multi-lumen catheter kit
 - Over-the-needle IV catheter
 - Over-the-wire long catheter
 - Vascular dilator
 - Wire for catheter introduction into vessel
- Needle holders
- Suture scissors
- Gauze, 4- × 4-inch squares
- Cotton bandage material
- Kling
- Elastikon[®] or Vetrap[™]

Indications

- Frequent blood sample collection
- Infusion of multiple drugs, fluids, blood products, or parenteral nutrition
- Measurement of central venous pressure

Contraindications

- Venous thrombosis
- Coagulopathies
- Should not be placed in jugular vein in cases of increased intracranial pressure



Video available online

Go to www.wiley.com/go/hackett to view a video of this procedure.



Fig. 1.34. Supplies needed for over-the-wire catheter.



Fig. 1.35. Clip and aseptically scrub over the proposed site of catheter placement.



Fig. 1.36. Insert a bleb of lidocaine over the proposed site of catheter placement.



Fig. 1.37. Make a small incision with a number 11 scalpel blade through the skin. Make sure to not nick the underlying vessel.



Fig. 1.38. Tent the skin and insert the over-the-needle catheter through the skin, and direct the catheter and stylette into the vessel.

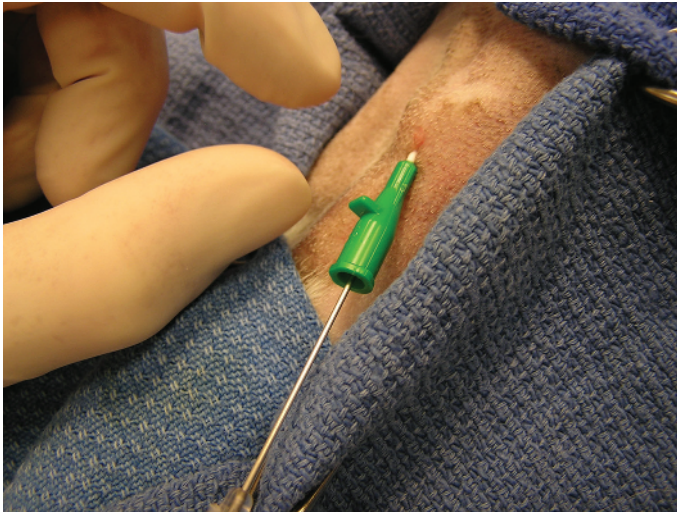


Fig. 1.39. Once the catheter is seated in the vessel, remove the stylette from the catheter. The catheter should bleed freely.



Fig. 1.40. Draw the “J” back into the introducer. Gently seat the introducer into the catheter hub, and insert the wire through the catheter hub into the vessel. Make sure to never let go of the wire.

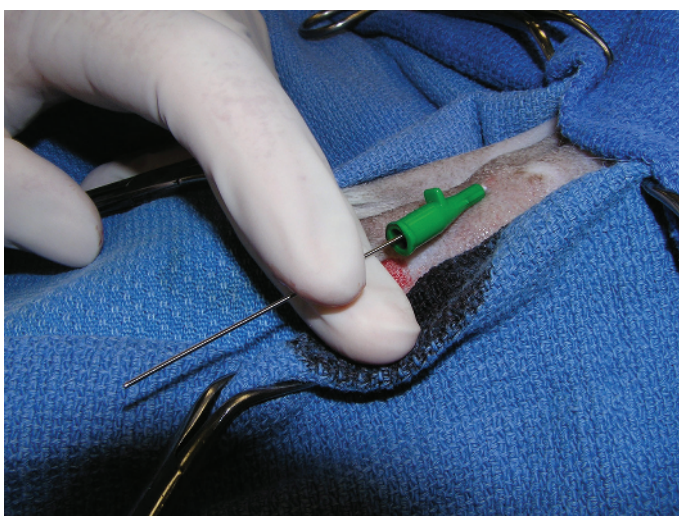


Fig. 1.41. Once the wire is inserted into the vessel, remove the catheter from the vessel, and over the wire. The wire alone will be left in the vessel.

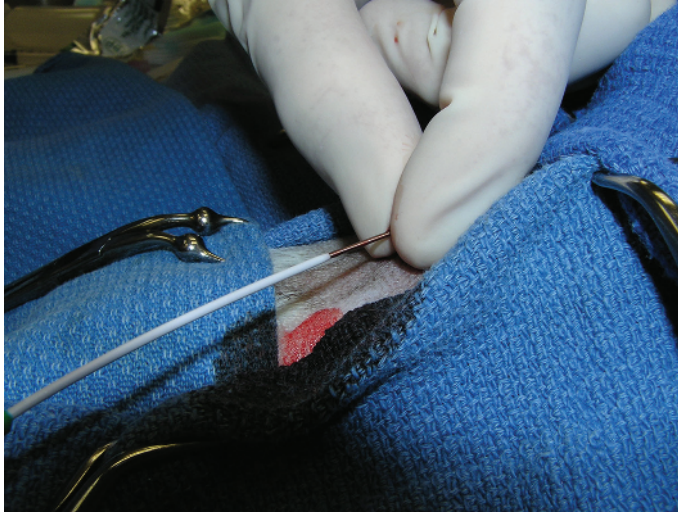


Fig. 1.42. Push the vascular dilator over the wire, through the skin, and into the vessel a short distance to enlarge the opening in the subcutaneous tissues and vessel.

Helpful hint: Hold the vascular dilator as near the skin as possible, and push with a twisting motion into the vessel.

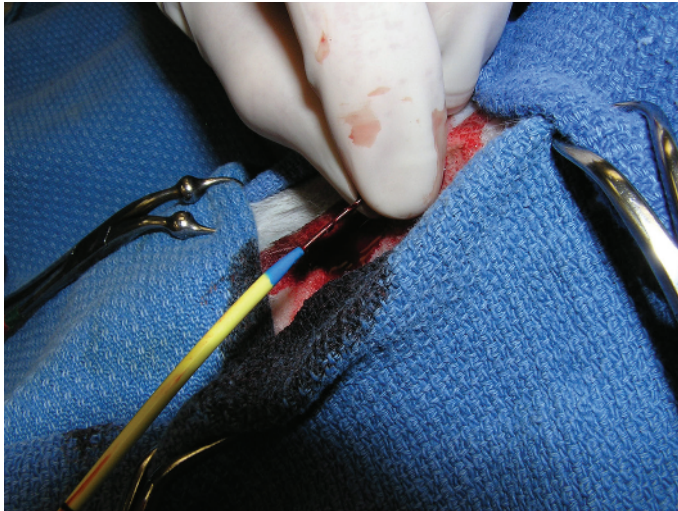


Fig. 1.43. Remove the vascular dilator from over the wire, and flush all ports of the over-the-wire catheter. Insert the catheter over the wire. Pull the wire slowly out of the vessel and feed it into the catheter. The wire will eventually appear out of one of the proximal ports of the catheter. Grasp the wire, and feed the catheter into the vessel.



Fig. 1.44. The wire will eventually appear out of one of the proximal ports of the catheter. Grasp the wire, and feed the catheter into the vessel.

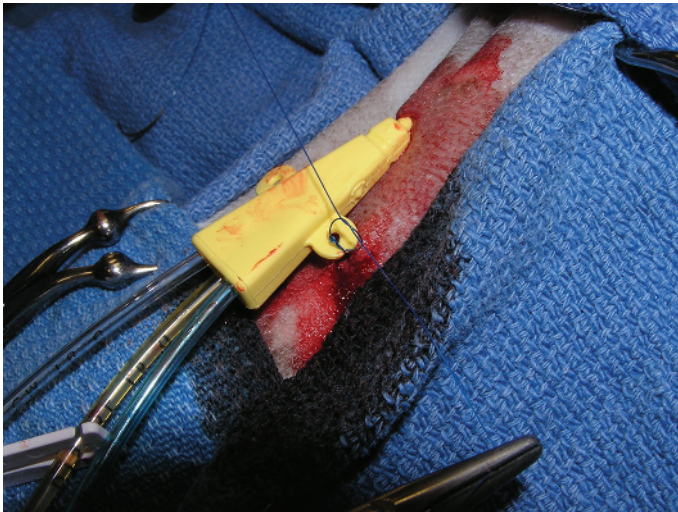


Fig. 1.45. Suture the catheter in place to the skin.



Fig. 1.46. Bandage the catheter, and label it.

Helpful hint: You have placed a large hole in the vessel. Remember to place a pressure bandage over this site when it comes time to remove the catheter, to prevent hemorrhage.

PERIPHERAL CATHETERIZATION

Introduction

Peripheral venous catheters are the most common type of intravenous catheter placed in small animal patients. Peripheral catheters are easy to place and simple to maintain, and have minimal risks to the patient. Peripheral catheters can be used for the infusion of crystalloid and colloid fluids, including blood products, and for the infusion of intravenous drugs and anesthetic agents. In large breeds, larger-bore (16- to 18-gauge) catheters can sometimes be used for blood sample collection.

Supplies Needed

1/2- and 1-inch white adhesive tape to secure and wrap catheter

Kling or brown gauze

Permanent marker to label catheter bandage

Cotton balls

4- × 4-inch gauze squares

T-port or male adapter

Heparinized flush solution in 3-ml syringe

1,000 units of nonfractionated heparin/250 to 500 ml 0.9% saline; bags of unused heparinized saline should be discarded after 24 hours

Antimicrobial scrub product

Electric clippers

Electric clipper blades

Intravenous catheter

Indications

Infusion of crystalloid and colloid fluids

Infusion of blood products

Infusion of intravenous drugs

Blood sample collection

Induce and maintain general anesthesia

Contraindications

Burn, abrasion, or pyoderma over catheter site

Thrombosis of catheter and vein selected for catheterization

Infusion of hyperoncotic solutions (parenteral nutrition)



Video available online

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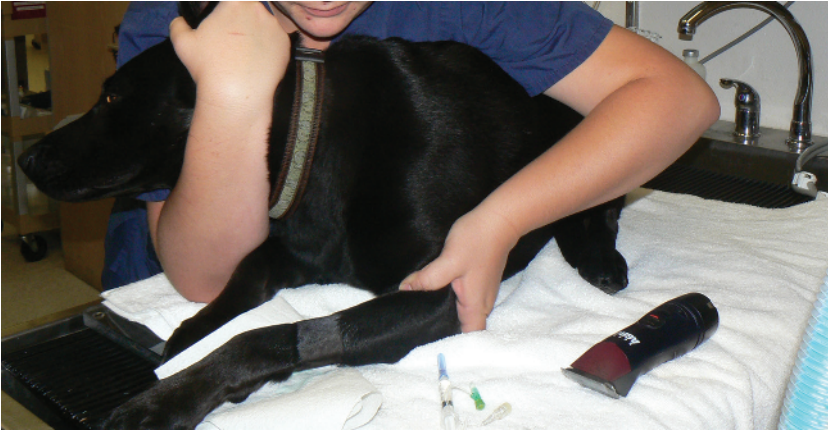


Fig. 1.47. Restraint for cephalic catheterization. The animal is positioned in sternal recumbency, and the assistant drapes one arm under the animal's neck, pulling the head toward the assistant's body, then pushes the forelimb cranially while occluding the vessel at the elbow.



Fig. 1.48. Supplies needed for peripheral catheterization.



Fig. 1.49. Have an assistant restrain the patient and clip the antebrachium circumferentially in between the elbow and carpus, then aseptically scrub the clipped area.

Helpful hint: Remove any loose fur with a piece of dry 4-×4-inch gauze prior to scrubbing the limb.



Fig. 1.50. If the skin is very tough, or the patient severely dehydrated, make a small nick incision through the skin with the bevel of an 18-gauge needle. This is called “percutaneous facilitation,” and will make the task of catheter insertion easier.

Helpful hint: Use care to avoid lacerating the vessel during this procedure.



Fig. 1.51. Have an assistant occlude the vessel, then insert the needle through the skin at a 15° angle. Bluntly but gently penetrate the vein.



Fig. 1.52. Watch carefully for a flash of blood in the hub of the catheter and stylette.



Fig. 1.53. Have an assistant occlude the vessel just over the point of catheter insertion, then remove the stylette.

Helpful hint: Having the assistant occlude the catheter during this step helps to prevent backflow of blood into your field.



Fig. 1.54. Tape the catheter around the hub and limb with a half-inch length of white adhesive tape.

Helpful hint: Make sure that the catheter hub and skin are completely dry, so that the tape will securely attach itself to the catheter hub and the catheter will not spin around, or else the catheter will not remain in place and will pull out of the vessel.



Fig. 1.55. Place a T-port flushed with heparinized saline and flush the catheter.



Fig. 1.56. Finish taping the catheter in place with layers of 1-inch white adhesive tape, Kling or brown gauze, Elastikon[®], or Vetrap[™].

Helpful hint: Label the top layer of tape with the size of the catheter, date of catheter placement, and initials of the person who placed the catheter.



Fig. 1.57. Clip and aseptically scrub along the lateral ear margin to visualize the vein.

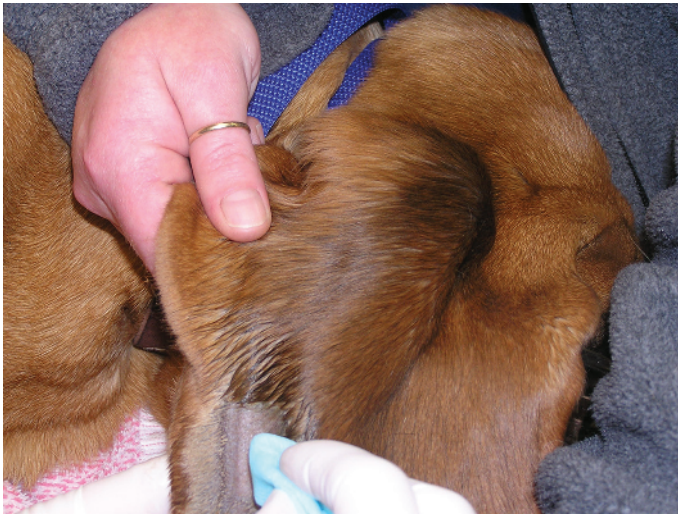


Fig. 1.58. Have an assistant occlude the vessel proximally.



Fig. 1.59. Hold the ear in the non-dominant hand, and insert the over-the-needle catheter through the skin into the vessel. Watch for a flash of blood in the catheter hub.



Fig. 1.60. Once a flash of blood is observed in the catheter hub, push the catheter off of the stylette, into the vessel.



Fig. 1.61. Place a length of half-inch white tape around the catheter hub and around the ear. Place a roll of cotton gauze under the ear during catheter wrapping. The roll of cotton allows the ear to fold, rather than remain flat.



Fig. 1.62. Place a second length of 1-inch white tape under the catheter, and around the ear in a similar manner.



Fig. 1.63. Place nonadhesive bandage material over the catheter.

VASCULAR CUTDOWN

Introduction

In small animal patients with severe hypovolemia, dehydration, and hypotension, percutaneous vascular access may be difficult or impossible. Surgical cutdown allows direct visualization of the vein for ease of catheter placement. Vascular cutdown is usually performed in emergent situations. Although sterile technique should be maintained at all times, the risk of introducing bacteria into the patient's vessel is great. For this reason, cut-down should be performed in emergencies, and then the catheter changed to a percutaneous catheter as soon as the patient's volume and blood pressure have been normalized.

Supplies Needed

- Electric clippers and blades
- Antimicrobial scrub solution
- Sterile gauze 4- × 4-sponges
- Sterile gloves
- Sterile surgical pack
 - Scalpel handle and number 11 scalpel blade
 - Field towels
 - Towel clamps
 - Tissue/thumb forceps
 - Mosquito hemostats
 - Mettzenbaum scissors
 - Needle holders
- 3-0 absorbable suture
- 14- to 18-gauge venocath or over-the-needle peripheral catheter
- Heparinized saline flush solution
- T-port connector or male adapter
- 2-inch Kling bandaging material
- 1-inch white tape
- Elastikon® bandaging material

Indications

- Catheterization of vessel in patients with extreme hypotension, peripheral vasoconstriction, or obesity
- Infusion of crystalloid or colloid fluids
- Infusion of blood products
- Infusion of drugs
- Obtain blood samples

Contraindications

- Abrasion, burn, or pyoderma over catheter site
- Direct percutaneous catheterization is possible



Video available online

Go to www.wiley.com/go/hackett to view a video of this procedure.

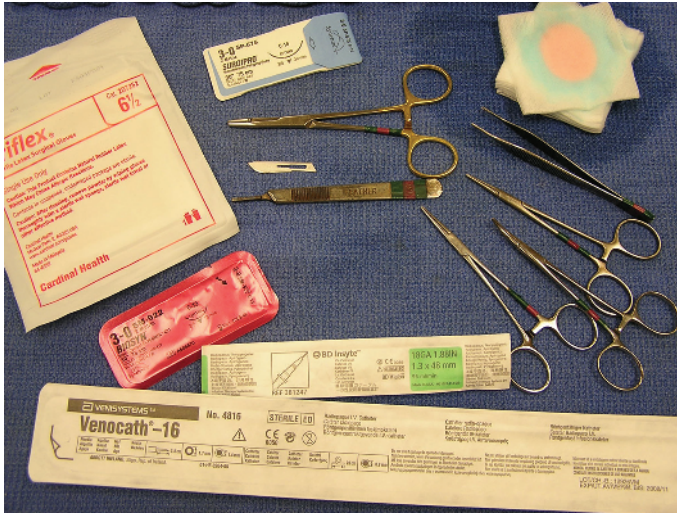


Fig. 1.64. Supplies needed for vascular cutdown.



Fig. 1.65. After clipping the fur and then aseptically scrubbing the clipped area, drape the surgical site with sterile field towels.

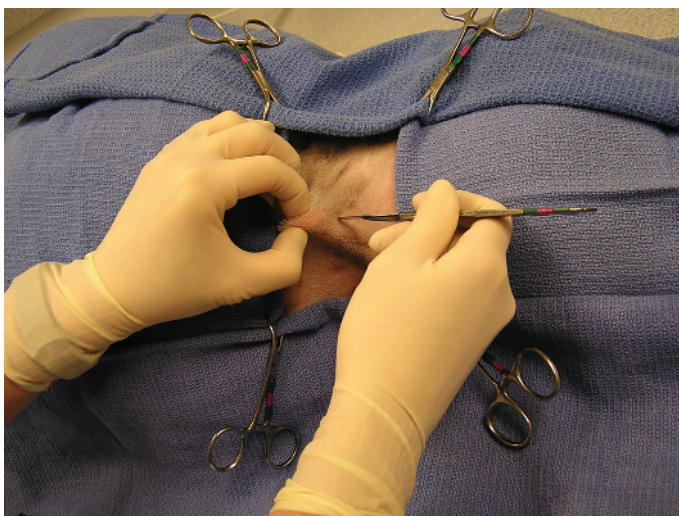


Fig. 1.66. Tent skin over site of proposed vascular catheterization. Incise the skin using a number 11 scalpel blade.

Helpful hint: Gently move the skin away from the vein to avoid cutting the vessel.



Fig. 1.67. Visualize the vessel under the skin incision.

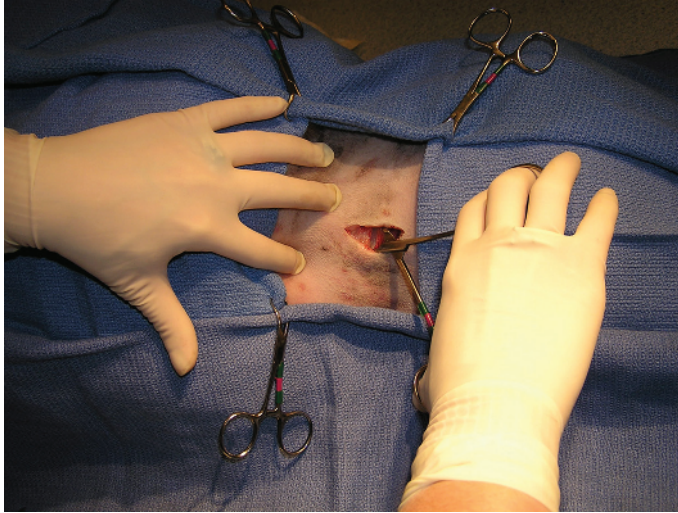


Fig. 1.68. Bluntly dissect the fascia overlying the vessel using a curved mosquito forceps.

Helpful hint: Make sure that all of fascia is dissected away from vessel, or else attempts at placing the catheter into the vessel will be difficult.

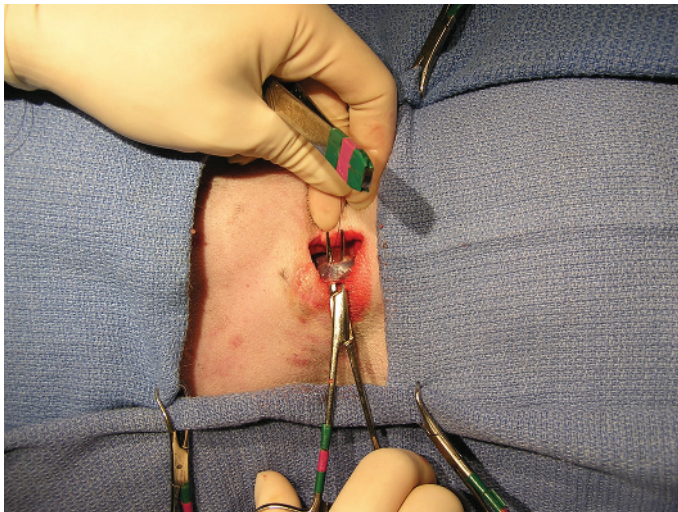


Fig. 1.69. Insert curved hemostats under the vessel and raise the vessel to the skin surface.



Fig. 1.70. Place two separate absorbable stay sutures securely with mosquito hemostats to raise the vessel to the level and parallel with the skin surface.



Fig. 1.71. With the vessel raised and parallel to the skin surface, gently puncture the vessel with the needle, and insert the catheter.

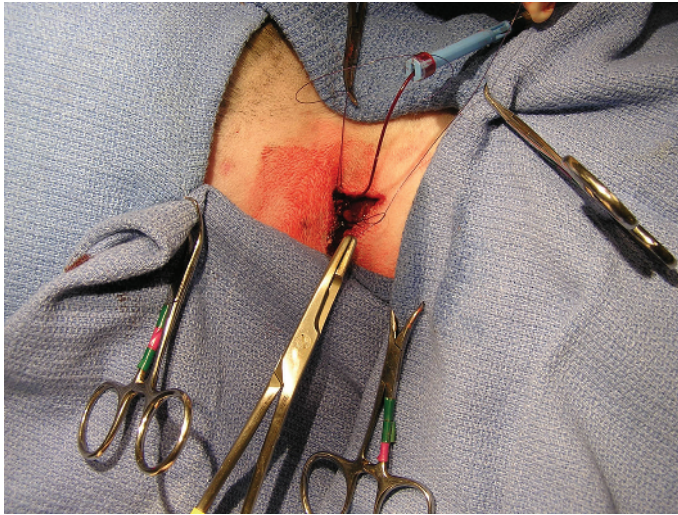


Fig. 1.72. Gently tie the stay sutures, occluding the vessel.

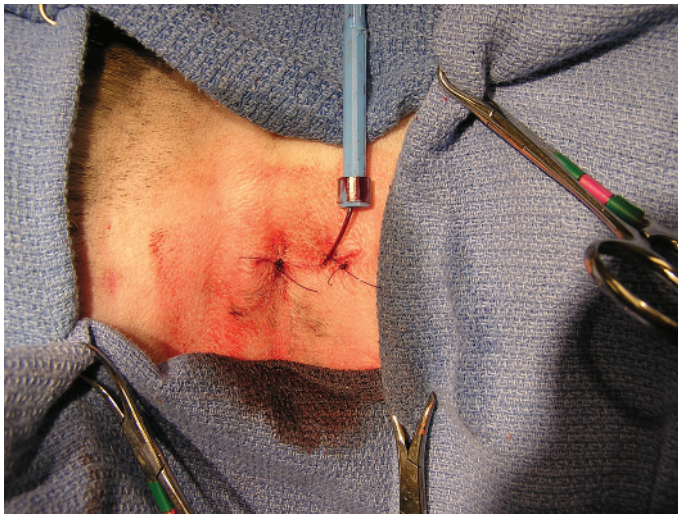


Fig. 1.73. Suture the skin overlying the point of catheter insertion. Bandage in place as with a percutaneously placed catheter. The vessel will remain ligated. Collateral circulation will suffice. If the vessel is not occluded, there will be too much hemorrhage.

Helpful hint: This catheter can be removed when a percutaneous catheter can be placed.

INTRAOSSEROUS CATHETERIZATION

Introduction

Intraosseous catheterization is often necessary in pediatric small animal patients and exotic species when vascular access is impossible. Any fluid, including blood products and parenteral nutrition, that can be infused into a peripheral or central catheter can be infused through an intraosseous catheter. Although intraosseous catheters are well-tolerated, the catheter or needle traverses the periosteum and intraosseous catheters are somewhat uncomfortable; they should be changed to a venous catheter whenever possible.

Supplies Needed

Electric clippers and blades
Antimicrobial scrub solution
2% lidocaine
1- to 3-ml syringe and 22-gauge needle
3-ml syringe with heparinized flush solution
Number 11 scalpel blade
16- to 18-gauge bone marrow needles or spinal needles with stylette
20- to 22-gauge hypodermic needles
1/2-inch to 1-inch white tape
T-port or male adapter flushed with heparinized saline
3-0 nylon suture
Optional supplies: EZ-IO® device and catheter

Indications

Infusion of crystalloid and synthetic colloid fluids, and blood products
Infusion of drugs
Infusion of parenteral nutrition
Vascular access is impossible

Contraindications

Pyoderma or abrasion over site of intraosseous catheter placement
Ambulatory patients, as catheter can become dislodged
Intravenous catheterization is possible



Video available online

Go to www.wiley.com/go/hackett to view a video of this procedure.

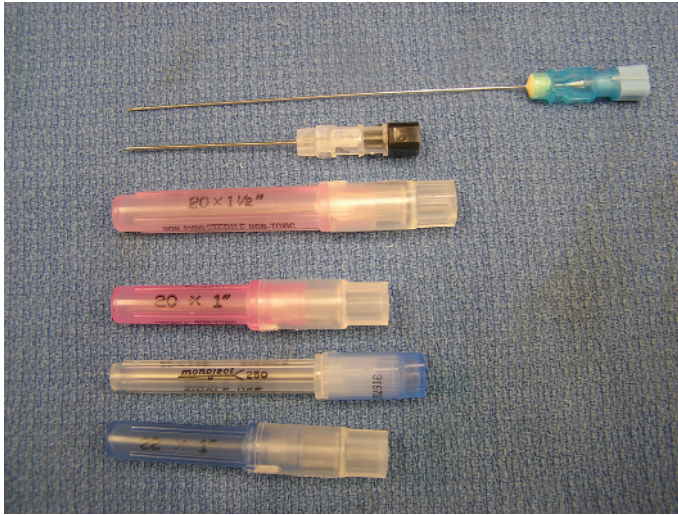


Fig. 1.74. Supplies needed for intraosseous catheterization.

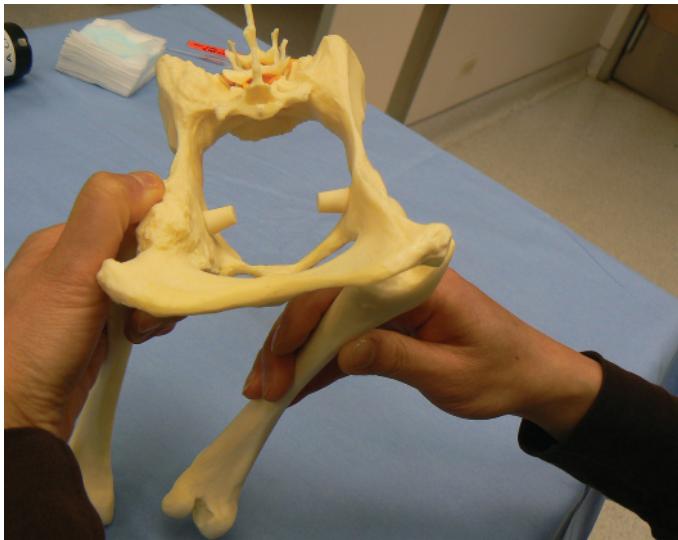


Fig. 1.75. Abduct the femur so that the stifle is away from the body. This allows the sciatic nerve to move out of the way of catheter placement.



Fig. 1.76. Palpate the greater (major) trochanter of the femur. The trochanteric fossa drops off medially from the greater trochanter. Insert the needle through the skin after placing a bleb of 2% lidocaine into the level of the periosteum. Walk the tip of the needle medially off the greater trochanter into trochanteric fossa. Once the needle is against bone at the bottom of the trochanteric fossa, push the needle in parallel with the femur. Then use a simultaneous twisting and pushing motion to seat the catheter into the medullary cavity. In larger animals, you can make a stab incision with a number 11 scalpel blade before needle placement to prevent tissue drag.

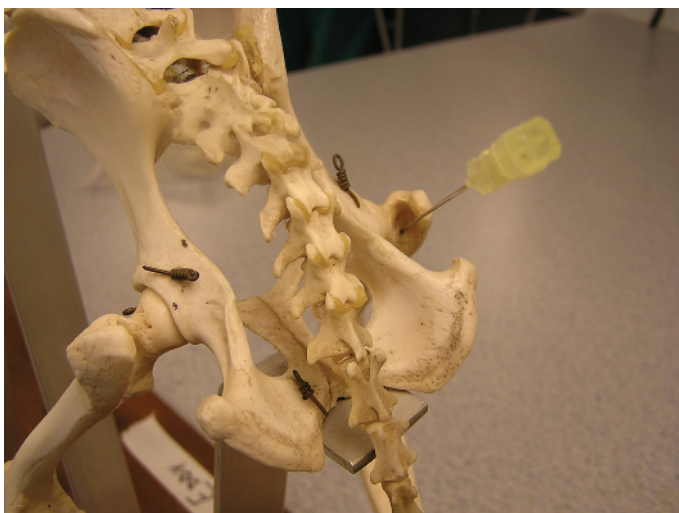


Fig. 1.77. Spinal needle placed through intertrochanteric fossa of femur in skeleton.

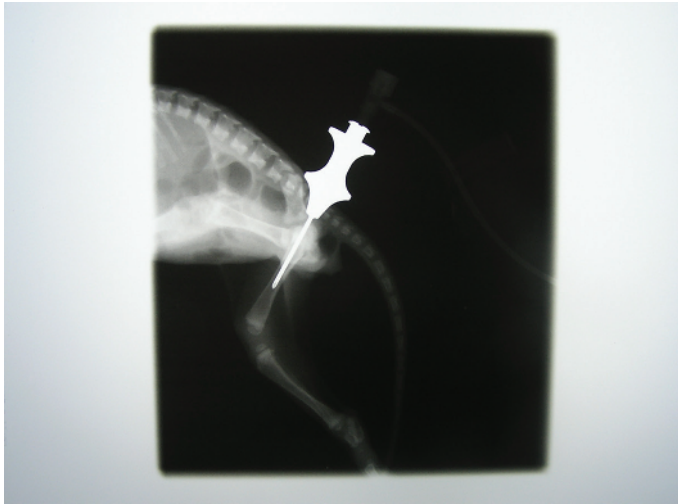


Fig. 1.78. Once the needle is in the correct position, infuse a small amount of saline. The saline should flow freely. Check catheter placement with a lateral and AP radiograph.

Helpful hint: If you place a catheter using a hypodermic needle, the needle can sometimes become clogged with bone debris. If this occurs, remove the needle and replace an identical needle in the same hole.

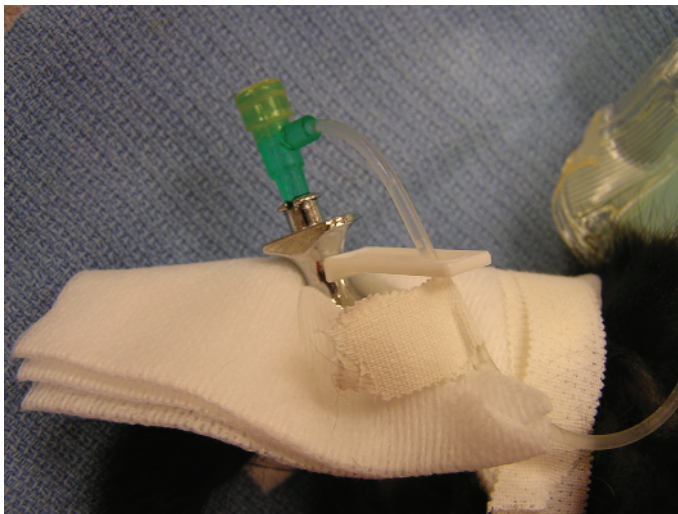


Fig. 1.79. Secure a piece of half- or 1-inch tape around the hub of the needle and male adapter, and tape around body. Alternatively, you can make wings of tape and suture to the skin at the base of the catheter hub.



Fig. 1.80. Patients will tolerate the intraosseous (IO) catheter quite well. Place the patient in lateral recumbency. Mild sedation is usually necessary to place IO catheters in the humerus. Clip and aseptically scrub the proximal humerus cranially, over the greater tubercle, then palpate the greater tubercle, on the anterior portion of the proximal humerus.

Helpful hint: As soon as the patient is ambulatory or vascular access can be obtained, place an intravenous catheter and remove the intraosseous catheter. Helpful hint: It is often necessary to flex and extend the shoulder several times to palpate the scapulohumeral joint, then the greater tubercle of the humerus.

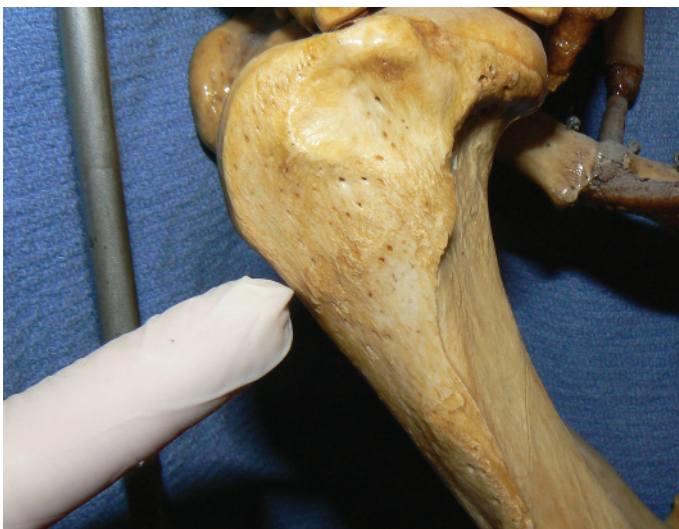


Fig. 1.81. Greater tubercle of the humerus on skeleton.



Fig. 1.82. Infiltrate through the skin and underlying fascia to the level of the periosteum with 2% lidocaine (1 mg/kg).



Fig. 1.83. Make a small nick incision through the skin with a number 11 scalpel blade.



Fig. 1.84. Insert the IO catheter/Jamshidi® IO needle device through the skin.



Fig. 1.85. Bend the limb such that the distal humerus/elbow is almost at a 90° angle to the scapulohumeral joint. Place the nondominant hand on the elbow, and the dominant hand on the IO catheter. Push the IO catheter into the greater tubercle of the humerus, pushing with a simultaneous twisting motion.

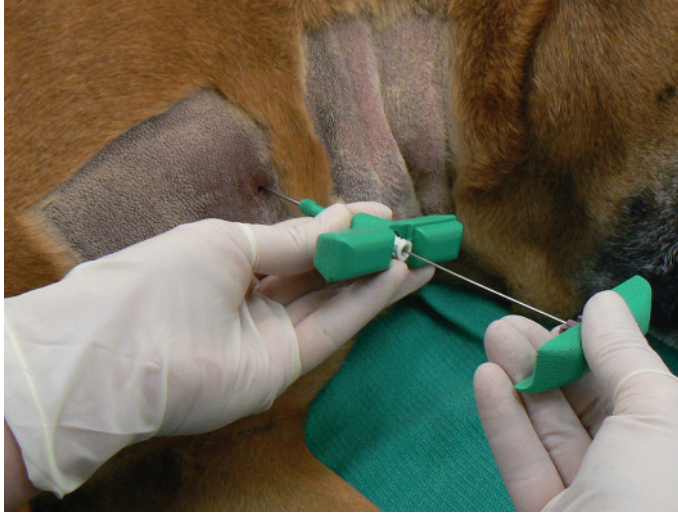


Fig. 1.86. Once the catheter is seated in the marrow cavity, remove the internal stylet.



Fig. 1.87. Flush the catheter with sterile 0.9% saline. If seated properly, the flush will be easy, with minimal resistance.



Fig. 1.88. In veterinary patients, the medial aspect of the proximal tibia is the most easily accessible, and has minimal subcutaneous tissue to interfere with placement of the EZ-IO® catheter.



Fig. 1.89. Clip and aseptically scrub the medial aspect of the proximal tibia. Infiltrate the area with 2% lidocaine (1 mg/kg) from the level of the skin to the periosteum.



Fig. 1.90. Make a small nick incision in the skin, through the anesthetized area, with a number 15 or 11 scalpel blade.



Fig. 1.91. The EZ-IO[®] device is essentially a drill equipped with a disposable metal intraosseous catheter.



Fig. 1.92. Insert the IO device through the nick incision in the skin, and push while simultaneously engaging the drill apparatus, to allow penetration of the IO catheter into the proximal tibia.



Fig. 1.93. Once the catheter is firmly inserted into the proximal tibia, remove the inner cannula.



Fig. 1.94. Flush the IO catheter with sterile 0.9% saline. The catheter should flush easily, with minimal resistance, if inserted properly.

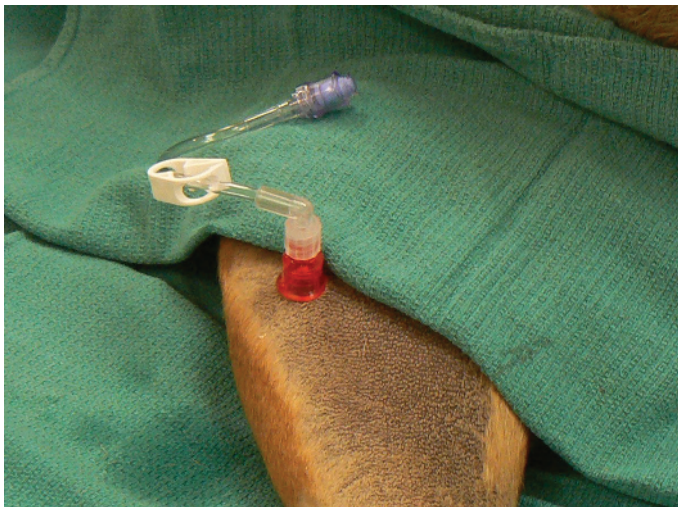


Fig. 1.95. Attach a luer-lock T-port to the IO catheter. The catheter is ready for use.



Fig. 1.96. Radiograph with iodinated contrast material demonstrating immediate entry into peripheral circulation through the intraosseous catheter. Photo courtesy of Dr. Steve Mensack.



Fig. 1.97. Supplies needed for arterial catheterization.

ARTERIAL CATHETERIZATION

Introduction

Arterial catheterization is a technique that is useful in nonambulatory critically ill small animal patients. Arterial catheters should be placed when repeated arterial blood samples are required, such as in patients with pulmonary or cardiac disease when monitoring of oxygenation and ventilation is desirable. Arterial catheters also can be used for continuous invasive blood pressure monitoring. Arterial catheters are commonly placed in the dorsal pedal, femoral, coccygeal, and auricular arteries.

Supplies Needed

- Electric clippers
- Electric clipper blades
- Antimicrobial scrub solution
- Over-the-needle catheters (20-, 22-, and 24-gauge)
- 1/2- and 1-inch white adhesive tape
- T-port or luer-lock male adapters (flushed with heparinized saline)
- Cotton balls
- 3-ml syringes with heparinized saline
- Permanent marker to label catheter
- Stickers “Not for IV infusion”

Indications

- Measurement of direct arterial blood pressure
- Obtain blood samples for blood gas analyses

Contraindications

- Abrasions, burns, pyoderma over site of catheter placement
- Thromboembolic disease or hypercoagulability
- Coagulopathy
- Ambulatory patients that will disconnect catheter
- Never to be used for blood sample, drug, or fluid infusion



Video available online

Go to www.wiley.com/go/hackett to view a video of this procedure.



Fig. 1.98. Clip and aseptically scrub over the site of proposed arterial catheter placement. Common insertion sites include the dorsal pedal, femoral, or auricular arteries.



Fig. 1.99. Insert the needle through the skin at a 30° to 45° angle. Once the needle is under the skin, palpate the arterial pulse and direct the needle into the artery using very small, blunt movements. Watch carefully for a flash of blood in the hub of the stylette. Unlike venous catheterization, there is no “pop” felt as the catheter passes through the thick vessel wall.



Fig. 1.100. Once the blood is in the catheter hub, gently push the catheter off of the stylette into the artery.

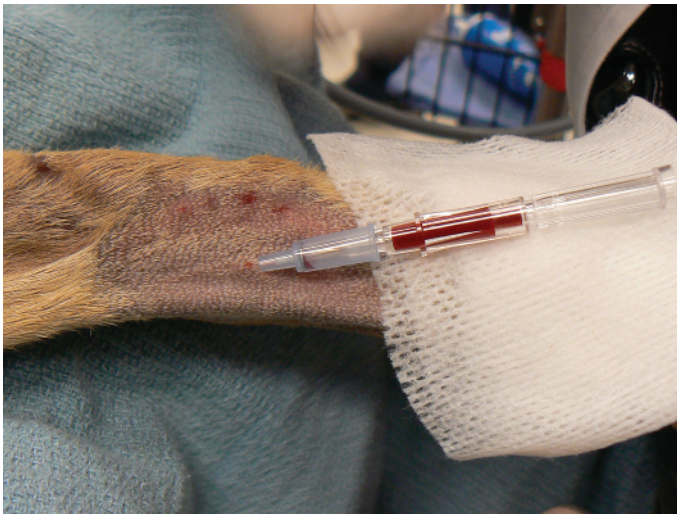


Fig. 1.101a. Catheter in place.



Fig. 1.101b. Once the catheter is in place, blood will flow freely. Flush the catheter immediately with heparinized saline and secure it in place as with any other catheter.

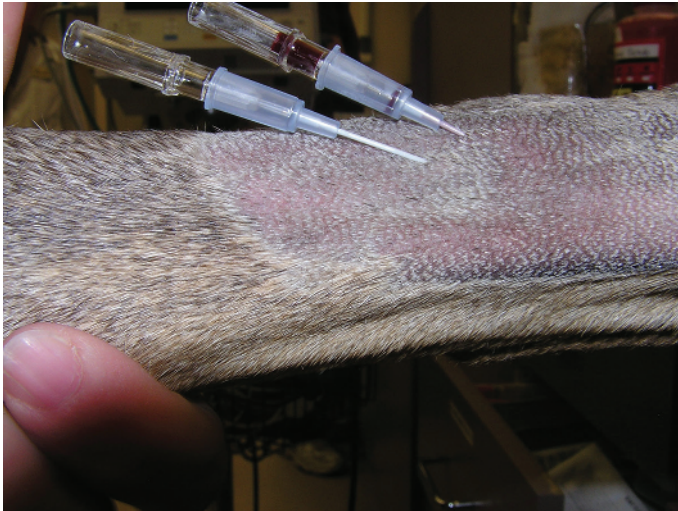


Fig. 1.102. If the catheter won't feed easily, direct it so that it is parallel with the artery. If you cannot feed the catheter, keep the catheter in place and start again proximally to the point of original catheter attempt. If you remove the original catheter, a hematoma will form, preventing further attempts into the same artery.



Fig. 1.103. Tape the catheter around the hub and limb with a half-inch length of white adhesive tape.

Helpful hint: Make sure that the catheter hub and skin are completely dry, so that the tape will securely attach itself to the catheter hub and the catheter will not spin around, or else the catheter will not remain in place and will pull out of the vessel.



Fig. 1.104. Secure the arterial catheter with additional lengths of 1-inch tape, similar to venous catheters.



Fig. 1.105. Flush the arterial catheter with heparinized saline.



Fig. 1.106. Label the arterial catheter prominently with "Not for IV infusion!"

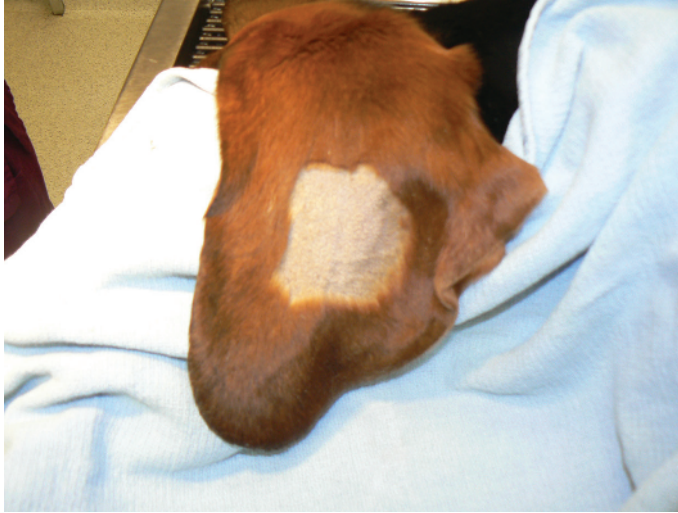


Fig. 1.107. The auricular artery is located on the dorsomedial aspect of the ear.



Fig. 1.108. Clip and aseptically scrub the ear. Fold the ear tip over the fingers of your non-dominant hand. The artery is located in the middle. The catheter can be inserted directly into the artery.



Fig. 1.109. Once the catheter is inserted, secure a length of half-inch adhesive tape around the catheter hub, and then around the ear.



Fig. 1.110. Secure a second length of 1-inch adhesive tape under the catheter hub, then around the ear.



Fig. 1.111. Finally, secure the ear around a roll of gauze or cotton, then bandage in place.

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