Veterinary Emergency and Critical Care Procedures

Veterinary Emergency and Critical Care Procedures. Second Edition is a step-by-step guide to key emergency and critical care procedures encountered in both general and specialty practice. Now in full color, the second edition includes several new procedures, two new chapters covering cardiopulmonary resuscitation and continuous rate infusions, and a companion website offering videos demonstrating most of the procedures featured in the book. Helpful hints have also been added throughout to make the book even more useful in the practice setting.

Each procedure includes information on the background, supplies needed, indications, and contraindications, followed by a series of images demonstrating the technique. This practical resource, ideally designed for use in fast-paced emergency situations, is an indispensable reference for any member of the veterinary team.

Key features
- Offers detailed protocols for common techniques in emergency and critical care
- Presents a series of color photographs walking the reader through each procedure
- Improves clinical skills and knowledge through a hands-on, practical approach
- Adds procedures information for orogastric lavage, respiratory sampling, and pericardial drainage catheters
- Provides two brand-new chapters
- Includes video clips demonstrating most of the procedures on a companion website at www.wiley.com/go/hackett.

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Second Edition
The companion website provides video clips demonstrating procedures from the book for download at
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Preface

The first edition of this text came about when we realized that there were no textbooks with clear step-by-step photos of emergency procedures that can be used to save lives. While these procedures may be intuitive for an emergency clinician, they are often performed infrequently by those who are fortunate to work in busy day practices and whose patients are often healthy and need wellness care. Thus, the concept for the original text was born. The text is divided into sections, each with a series of procedures that are organized to walk the clinician step by step through the procedures from start to finish. Each photo has a caption for clarification of instructions, and some have helpful hints to avoid complications or frustration.

The photos in this edition are in color, which is a great and added benefit from the authors’ perspective. The most exciting addition to this edition is a video counterpart to many of the procedures, which will help with teaching and refreshing the clinician’s memory. This material is meant to be a useful teaching tool for veterinarians, veterinary technicians, and students to improve clinical skills and knowledge, and to help save the lives of veterinary patients.

TBH, EMM
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

Go to www.wiley.com/go/hackett to view a video of this procedure.
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.
Once the catheter is pushed to the hub securely, remove the stylette from within the catheter.

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.
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).
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.