

Placement of Epidural Catheter for Pain Management

Shane Bateman DVM, DVSc, DACVECC

Indications: Patients with severe abdominal or pelvic origin pain that is poorly responsive to other analgesic modalities.

Equipment Needed: Epidural catheter set appropriately sized for patient, ingredients for aseptic surgical skin preparation, sterile gloves, 2% lidocaine with 3 or 6 mL syringe and 25 or 22 gauge 1.5 or 2.5 inch spinal needle for local skin anesthetic at site of insertion (optional if patient is anesthetized), sterile catheter injection port (luer lock), preservative free sterile 0.9% saline with 3 mL syringe to flush and test catheter after insertion, preservative free analgesic medications and appropriate size syringe for administration through epidural catheter.

Landmarks for Placement: (See Illustration A/B) The epidural catheter is generally placed into the epidural space at L7-S1. Alternatively the catheter can also be placed at L6-7. The former site can be located by palpating the dorsal spinous processes of the lower lumbar vertebra moving caudally until a large depression can be palpated after the dorsal spinous process of L7 and the beginning of the sacrum (S1). The latter site is located between L6-7 and will be a smaller depression. The catheter must be placed perpendicular to the epidural space, exactly on midline, and in the center of the depression palpated between the appropriate vertebral bodies.

Patient Preparation: Prior to placement of the epidural catheter the patient must be under general anesthesia or adequately sedated to allow placement of local anesthetic in the soft tissues above the epidural space and subsequently the epidural catheter. Ideally the patient should be on a flat table with the edge of the patients back very close to the edge of the table. Once the patient is at an appropriate plane of sedation/anesthesia the epidural site over L6-7 or L7-S1 is clipped to ensure hairless margins laterally to the aspects of the ilial wings, cranially to L3-4 and caudally to S3-Co1. With the patient in lateral recumbency (right or left depending on the operator's preference) the skin is prepared aseptically with standard pre-surgical fashion. If the patient is not anesthetized then prior to final skin preparation, a local anesthetic (2% lidocaine) is placed into the soft tissues above the intended epidural space for catheter placement. A spinal needle of appropriate length and size is placed into the soft tissues overlying the intended site of the epidural catheter without penetrating into the epidural space. The stylet is withdrawn, the syringe is attached gently to the needle, and local anesthetic is deposited slowly as the needle is withdrawn ensuring a generous bleb of anesthetic is deposited under the skin. Final skin preparation is then completed.

Catheter Placement Technique: Strict aseptic technique should be followed throughout catheter placement technique.

1. The epidural catheter kit is opened and the sterile gloves are put on.
2. A small pie shaped corner is cut from the sterile drape such that a circular opening is formed in the center of the drape when it is opened up.
3. The opening of the drape is placed over the intended catheter placement site.
4. The length of epidural catheter to be placed inside the patient is then pre-measured by carefully placing the catheter over the sterile drape against the patient. For severe cranial abdominal pain the tip of the catheter should be advanced to the level of L1-2 or L2-3. For pelvic origin pain, the catheter is advanced only to the level of L5-6. Remember to include the distance from the skin surface to the epidural space in the estimation of catheter length needed. Mark the catheter with the sterile pen included.
5. The mark just created will not be visible during placement, so to assist in accurate placement a second mark exactly the same length of the Tuohy spinal needle is placed on the catheter. The tip of Tuohy spinal needle is placed at the mark created above and a second mark is placed on the catheter at the level of the catheter hub.
6. The epidural space that has been chosen for insertion is then carefully palpated again and the thumb of the non-needle placing hand is firmly embedded into the depression between L7-S1 or L6-7. (See Illustration A/B)

7. An assistant should gently bring both hind feet slightly cranially to the level of the mid-lumbar region. The Tuohy spinal needle is then inserted into the desired epidural space. It is vital to ensure that the needle is parallel to the floor/table and is being advanced perpendicularly to the patient's spine exactly on the patient's midline and that the open bevel of the needle tip is facing cranially.

8. The needle should be advanced until contact with bone is made. Several 'pops' may be felt as the needle passes through various tissue planes. If you remove your hand and the needle is left unsupported it should remain in position. If it 'sags' and begins to point towards the floor, then the needle placement is likely not deep enough. The needle is then withdrawn very slightly off of the bony surface contacted and placement is verified.

9. The stylet of the Tuohy needle is then removed and carefully wiped on a sterile portion of the gloved hand to ensure no cerebrospinal fluid is visible. If present, the needle tip may be in the subarachnoid space. The catheter may still be placed here (and often is in cats), but the drug dosages should be lowered.

10. Placement of the needle into the epidural/subarachnoid space is then verified using the loss of resistance (LOR) syringe included in the catheter kit. Room air is drawn into the LOR syringe until it is 1/2 to 2/3 full of air. The LOR syringe is then carefully attached to the Tuohy needle hub with the luer lock syringe tip and the plunger is gently depressed to determine the response.

11. If the tip of the needle is in the correct location there will be minimal resistance felt with advancement of the LOR syringe plunger. Attempt to inject a few milliliters of air. After removing your thumb from the plunger no movement of the plunger should be detected. If resistance is met and the LOR syringe plunger 'bounces' back to its original location after removing your thumb from the LOR syringe plunger then position is not ideal. The needle and syringe can be carefully withdrawn a few millimeters and the site can be tested again.

12. If after 2-3 successive sites have tested negatively the LOR syringe should be removed, the stylet replaced in the Tuohy needle and the needle placement verified again by advancing to contact bone then repeating steps 9-11. If a positive site can still not be detected then the needle should be withdrawn and placement attempted again.

13. Once a positive site is found then the LOR syringe is removed from the Tuohy needle. Ensure the catheter guide is placed on the epidural catheter and the appropriate tip is inserted into the Tuohy needle hub. The catheter guide is then gently seated into the Tuohy needle hub and the catheter is gently advanced to the tip of the needle. Be careful from this point forward to not disrupt the placement of the tip of the Tuohy needle.

14. Gentle resistance should be felt as the catheter tip makes the turn at the tip of the Tuohy needle on its way cranially. After this the catheter should advance smoothly with minimal resistance. If difficulty is encountered in attempting to advance the catheter past the tip of the needle, then withdraw the catheter to ensure the tip is within the barrel of the Tuohy needle once again. Then gently put cranial pressure on the hub of the Tuohy needle and move it cranially 5 to 25mm (depending on the patient's size) and attempt to advance the catheter once again. If resistance is encountered again, then the needle placement is likely incorrect. The catheter should be withdrawn, and needle placement rechecked with the LOR syringe (see number 11 above).

15. If a positive site for advancement of the catheter with minimal resistance is not found after 2-3 successive attempts then needle placement should take place with fluoroscopic guidance. This may be necessary with large and/or obese dogs.

16. Once a positive site is detected and the catheter advances with minimal resistance then the catheter should be advanced until the second mark on the catheter is entering the catheter hub. Advance the catheter 10-25mm further and then gently withdraw the Tuohy needle, the catheter guidewire, and the catheter guide over the catheter and completely remove them from the catheter.

17. The second mark on the catheter should now be visible outside the patient. If the first mark is not visible then withdraw the catheter gently

until the first mark is visible outside the patient.

18. The catheter is then cut to allow 10 to 20cm of catheter to remain outside the patient.

19. The catheter tip is then gently inserted into the tapered end of the injection adapter until resistance is met, withdrawn 1-2mm and then the hub is tightened.

20. The floating luer end of the 0.22 micron filter device is then attached firmly to the hub of the catheter adapter after removing the plastic coverings of both devices.

21. The luer tip catheter injection port is then firmly attached to the other end of the 0.22 micron filter device after removing the plastic coverings of both devices.

22. The catheter placement is then verified by attempting to inject a small quantity of preservative free 0.9% sterile saline through the filter device and into the catheter. Because of the small inside diameter of the catheter, the length of the device, and the filter, the resistance to injection is large and surprising. As long as injectate continues to flow, then catheter placement is confirmed.

23. Gently cut the drape from the hole in the center to an outside edge and gently remove it from around the catheter insertion site.

24. Carefully attach a clean tape butterfly to the catheter near the skin-catheter interface and suture or staple the tape butterfly to the patient in a position that ensures the catheter is unlikely to kink.

25. A second clean tape butterfly is attached to the filter device which is also stapled or sutured to the patient in a position that allows the remaining catheter length to lay flat against the patient.

26. The skin around the catheter-skin interface is wiped again with an antimicrobial skin preparation, allowed to dry and a small amount of sterile antimicrobial ointment (betadine) is placed at the catheter-skin interface.

27. An occlusive plastic skin drape is then placed over the entire area to secure the catheter and prevent accidental removal.

28. Alternatively sterile gauze is placed over the catheter-skin interface and the area is bandaged in a way to prevent accidental catheter removal.

29. If desired, plain radiographs will confirm placement of the catheter tip in the desired location.

30. Analgesic medications may now be administered as slow bolus infusions over 15-20 minutes or as continuous infusions using a syringe pump. Prior to injecting anything, the injection port of the filter device should be carefully swabbed with an antimicrobial solution and allowed to dry.

Illustration A

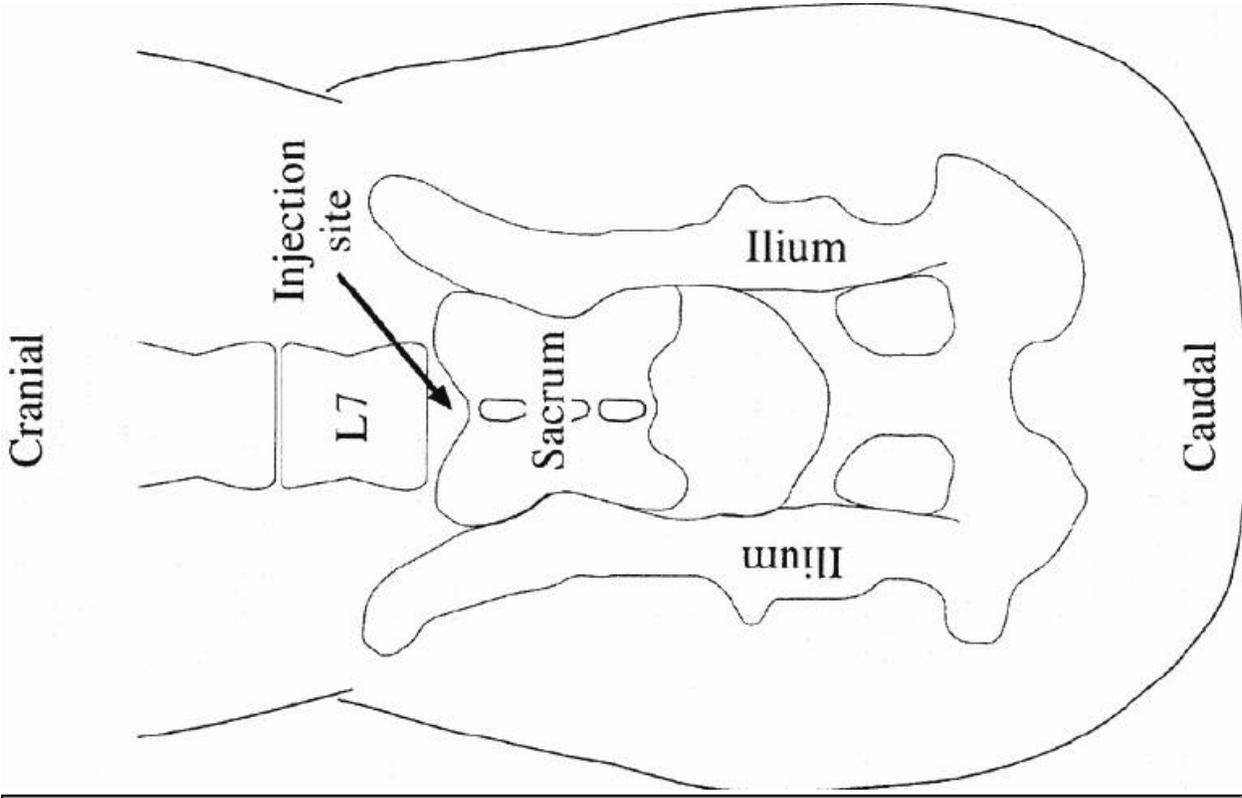


Illustration B

