Brief Clinical Communication

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Coccygeal epidural with local anesthetic for catheterization and pain management in the treatment of feline urethral obstruction

Angela K. O'Hearn, DVM and Bonnie D. Wright, DVM, DACVA

Abstract

Objective – To describe the technique for performing a coccygeal epidural injection of local anesthetic to facilitate catheterization in male cats with urethral obstructions using low-dose sedation.
Significance – Prompt diagnosis and relief of urethral obstructions is important as many cats may have developed marked metabolic abnormalities at the time of presentation. General anesthesia in these patients may be associated with significant risk for complications. Pain management is also an essential treatment goal, and this technique relieves urethral and penile pain during the unblocking process.
Conclusion – Coccygeal epidurals can be used safely to provide analgesia to the penis and urethra and to the authors' knowledge, is a novel treatment modality to aid in the relief of urethral obstructions in male cats.

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Introduction

Urethral obstruction in male cats is a common presentation in the emergency setting. The major goal of treatment is rapid relief of the obstruction without traumatizing the urethra. Urethral trauma or rupture can occur during the unblocking process, making general anesthesia or heavy sedation often necessary, except in the most critical patients.[1,2] Drobatz[3] recently reported that 12% of cats presenting for urethral obstruction had electrolyte and acid-base disturbances, which is often complicated by dehydration.[3] These metabolic abnormalities can increase the risk for complications, including cardiopulmonary arrest, if anesthetized. In a retrospective study of 223 cats, 12% of cats presenting for urethral obstruction had a potassium concentration between 6 and 8 mmol/L and 12% had concentrations between 8 and 10 mmol/L.[4]

A coccygeal epidural block is a relatively simple and quick procedure to perform that is widely used in large animals to perform procedures involving the penis, tail, or vulva.[5] This technique can also be used to facilitate passage of a urinary catheter in cats with urethral blockage. A coccygeal epidural block produces anesthesia to the perineum, penis, urethra, colon, and anus by blocking the pudendal, pelvic, and caudal nerves without loss of motor function to the hind limbs.[6] Lidocaine,[a] after injection into the epidural space, results in anesthesia within 5 minutes and lasts up to 60 minutes. Ideally, preservative free lidocaine[b] should be used for any injections near nerves as preservatives have been associated with nerve damage. The block as described is applied caudally, has a low injection volume, and can be achieved with a single dose. In light of these features, some clinicians may elect to use preservative-containing lidocaine. However, a sterile dedicated vial should be kept for epidurals or a new vial should be opened each time a new epidural injection is performed to reduce the risk of infection. Risk of complications are relatively low with a coccygeal epidural as the spinal cord ends around S1 in the cat and risk of puncturing the cord or penetrating the subarachnoid space is unlikely.[7] Possible complications include: infection or abscess at the site of injection, failure of technique to provide analgesia, and the possibility of systemic absorption of lidocaine, although the doses described for this procedure are far below the recommended dose for IV administration of lidocaine.

From the Fort Collins Veterinary Emergency Hospital, Fort Collins, CO 80524.

Address correspondence and reprint requests to
Dr. Angela O'Hearn, Fort Collins Veterinary Emergency Hospital, 816 S Lemay Ave Fort Collins, CO 80524, USA.
E-mail: aohearndvm@gmail.com
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Contraindications have been reported for lumbosacral epidural blocks and include: coagulation disorders, septicemia, pyoderma at the site of injection, severe hypovolemia or hypotension, and anatomic abnormalities.[7] For a sacrococcygeal block, many of these contraindications are less concerning due to the injection location which is caudal to the spinal cord. Therefore, exacerbating hypovolemia, spreading infection to the spinal cord, and bleeding into the spinal cord are far less likely to occur. Local pyoderma could still be considered a contraindication. A relative contraindication would be anatomic differences, such as a Manx cat, that make identification of the landmarks difficult. This technique is relatively safe and allows catheterization using minimal sedation in the majority of cats. If the cat is obtunded, the epidural block alone may be sufficient to allow successful catheterization.

Description of Technique

1. With the cat in sternal recumbency, palpate the space between the sacrum and first coccygeal vertebra or the space between the first and second coccygeal vertebrae. Unlike the sacral crest, which is immobile, the coccygeal vertebra will have mobility when the tail is moved.
2. Clip approximately a $4 \times 4\,cm^2$ over the area and aseptically prepare the skin. After surgical scrub, sterile gloves should be used for the remaining steps. Surgical drapes are optional and are not well tolerated by an alert cat.
3. Wearing sterile gloves, reestablish the location of the most mobile joint caudal to the sacrum. At this point an assistant should mobilize the tail to avoid breaking sterility. The nondominant index finger is used to identify this space, while the dominant hand is kept sterile for handling the needle (Figure 1). The space entered may be sacrococcygeal or between the first 2 coccygeal vertebrae, either is acceptable (Figure 2).
4. Once the space has been identified, a 25-G 1 in. needle is used to penetrate the skin at midline. The index finger may remain near the injection site as a guide for needle placement. The needle is directed at a 30–45° angle and advanced through the interarcuate ligament/ligamentum flavum (Figure 3). A palpable 'pop' may be encountered when the ligament is penetrated. As the needle is advanced, there should be little resistance upon entering the epidural space. If bone is encountered, one should establish if the needle is superficial to the spinal canal or if it has simply been advanced through the epidural space to the floor of the vertebral canal. If the needle is determined to be superficial, it should be kept underneath the skin, angled slightly cranially or caudally, and walked off the bone until the space is entered. The needle should feel more firmly seated once the ligament is penetrated than it does in the SC tissues. If the bone that is encountered is deep, one should back out slightly and continue with the injection as described below.
5. Once the needle is correctly placed, a syringe should be attached and aspirated to confirm the absence of blood. If blood is encountered, the needle should be removed and replaced with another sterile needle. If no blood is aspirated, infuse 0.1–0.2 mL/kg of 2% lidocaine without epinephrine (average volume 0.5 mL/cat) into the epidural space. There should be minimal resistance to injection. Air is not injected at this site as the potential space is small and air bubbles in the region may result in an incomplete block. If resistance is encountered toward the end of the injection, a SC injection may have resulted and the block may not be efficacious (see step #7).
6. Once the injection is completed, the needle is withdrawn and the rectum and tail are observed for relaxation. Relaxation does not need to be complete but some relaxation should be observed before attempting catheterization. If further confirmation of

Figure 1: Palpation of the sacrococcygeal joint while mobilizing the tail.

Figure 2: Radiograph of the placement of the needle in the sacrococcygeal space.

Figure 3: Needle placement before injection of the local anesthetic.

block is required, pinching the tail or peri-anal region can be used to elicit a response from the patient.
7. If relaxation is not observed within 5 minutes, the block may have been injected outside of the epidural space. A second dose may be attempted using the same technique. It is not recommended to attempt more than 2 injections due to excessive cranial spread of the local anesthetic, which may result in paralysis of necessary spinal structures. In cases where a higher dose or repeat injections are administered, some hind limb weakness may be appreciated.
8. Urethral catheterization may be attempted following confirmation of block.

The technique described above has been implemented in an emergency room setting during the last 12 months in over 15 cats. Cats that presented with urinary obstruction were immediately administered an opioid agonist, for example, hydromorphone,[c] buprenorphine,[d] or methadone.[e] Often the opioid was combined with a sedative (eg, acepromazine[f] or dexmedetomidine[g]) or a muscle relaxant such as midazolam.[h] In the majority of cases, further anesthesia or sedation was not necessary and only 1 attempt was required to place the epidural block. Successful placement of the block may result in easier and more rapid unobstruction and placement of a urinary catheter. Relaxation of the urethra may contribute to this observation. Cats that underwent the described procedure did not appear to respond or struggle during catheterization, flushing of the bladder, or suturing of the catheter. Additional observations include that cats appear less painful post catheter placement. Licking at the urethral catheter is generally not observed, and therefore cats may not require an e-collar, and are alert enough to eat soon after catheter placement.

In conclusion, using a sacrococcygeal block can be a valuable adjunct to the management of feline urinary obstruction in the emergency room setting. Limited experience with this technique leads the authors to believe that the sacrococcygeal block results in excellent patient comfort and increased ease of catheter placement. Additional applications in the cat may include: vaginal delivery of kittens during dystocia, tail amputations or degloving injuries, and other perineal procedures.

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Footnotes

[a] Lidocaine Hydrochloride, Vedco Inc, St. Joseph, MO.
[b] Xylocaine, APP Pharmaceuticals LCC, Schaumburg, IL.
[c] Hydromorphone Hydrochloride, Baxter Healthcare Co, Deerfield, IL.
[d] Buprenorphine Hydrochloride, Reckitt Benckiser Pharmaceuticals Inc, Richmond, VA.
[e] Methadone Hydrochloride, Xanodyne Pharmaceuticals Inc, Newport, KY.
[f] Acepromazine Maleate, Vedco Inc.
[g] Dexmedetomidine Hydrochloride, Pfizer Animal Health, New York, NY.
[h] Midazolam Hydrochloride, Hospira Inc, Lake Forrest, IL.

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