Epidural Analgesia in Ferrets

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Epidural administration of opioid analgesics results in longer duration of action than intramuscular or subcutaneous administration, with minimal systemic side effects such as motor impairment, sedation and cardiopulmonary depression. Epidural analgesia is indicated for any abdominal, hind-limb or perineal surgery as an alternative to systemic analgesics. Elective spays, neuters, and particularly anal sac surgeries fall into this category.

Early spays, neuters and anal saculectomies of juvenile ferrets by major ferret breeding facilities prior to sale in the pet trade have led to the common impression that these procedures are rarely performed in private practice. In a 1998 telephone survey of 74 North Carolina private practices that see ferrets regularly, 93% reported that 76-100% of their ferret patients had in fact already been sterilized and had anal sacs surgically removed. However, they also indicated that sterilization and anal saculectomies, alone or combined, were the surgeries they most commonly performed on ferrets (33% of practices), followed by adrenal tumor removal (23%). Percentage of practices reported performing anal saculectomies was 45%, neuters 47%, and spays 50%, even if these were not their most common procedures.

These results indicate that depending on the location of a private practice, the patient base may include ferrets produced by small scale breeders not performing early spays, neuters and anal saculectomies, and that these procedures are still being requested.

The practices were further queried about their use of analgesics for post operative pain, and 80% of respondents indicated they were as likely or more likely to use analgesics in ferrets as in dogs or cats. The most common response to a question if they had ever administered an epidural analgesic to a ferret, however, was laughter; 0% had actually done so.

Although epidurals are often regarded with some trepidation,
particular in an animal with a spinal canal as small as a ferret’s, the technique is easy to learn, safe and effective. In a study evaluating epidural morphine for postoperative analgesia in ferrets, those receiving morphine had significantly lower pain scores, had an earlier return to normal interactive and consumptive behaviors, and yet had no difference in sedation scores as compared with control ferrets receiving saline. Beneficial effects were observed for at least 24 hours.

**Locating Landmarks**

To locate the site for epidural administration of analgesics, palpate the cranial aspects of the wings of the ilea and visualize an imaginary transverse line connecting the two points. The lumbosacral junction lies very near this line, on the midline (Fig 2a,b). Ferrets may have 5, 6 or 7 lumbar vertebrae. In one dissection the spinal cord terminated just before the caudal end of the last lumbar vertebra. The height of the dorsal spinous process of the last lumbar vertebra varies among individuals and may or may not be palpable (Fig 3a,b). (This partially contradicts an earlier description, which stated that the dorsal spinous process of the last lumbar vertebra is taller than that of S1, which is true in some ferrets.) The sacrum has 3 dorsal spinous processes, and the first is usually easily palpable. The space between dorsal spinous processes of S1 and S2 is greater than that between S2 and S3.

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**Figs 2a,b** Landmarks for administering epidural analgesics in a ferret (shown on a cadaver). The hips are flexed to open the lumbosacral space. The space lies at the intersection of lines (red) drawn between the cranial aspects of the wings of the ilea, and between the dorsal spinous processes of the last lumbar vertebra and S1, all marked in black.

**Figs 3a,b** Ferret skeleton showing the location of the lumbosacral space. The skeleton of this ferret has an insignificant dorsal spinous process of the last lumbar vertebra. The relative spacing of the dorsal spinous processes of S1-S3 is evident. The reconstruction of this skeletal preparation has the ilea placed slightly caudal of their position in life relative to the sacrum.
Procedure

For epidural administration, place the ferret in sternal recumbency with the hips flexed to open the lumbosacral space. Clip the hair in a 4 x 5 cm rectangle over the lumbosacral spine for the epidural. (The cosmetic blemish of a partial dorsal clip is the one drawback of applying this procedure routinely in clinical practice.) Perform a standard surgical preparation with pre-warmed surgical scrub and sterile saline rinses.

Using sterile technique, place a 25-ga needle exactly on the midline at the lumbosacral junction with the bevel facing craniad and advance the needle perpendicular to the plane of the skin (Figs 2b, 4a,b). Attach an empty 1 ml syringe to the needle and slowly inject 0.1 ml of air. Correct placement is confirmed by lack of blood in the needle hub and by lack of resistance to air injection. If there is resistance or if injection of air causes the skin to bulge, advance the needle until it fully penetrates the ligamentum flavum and repeat the check for resistance. A distinctive “popping” sensation generally is not felt. A tail twitch may occur, which also helps confirm correct needle placement. When positioning is verified, replace the empty syringe with one containing preservative-free morphine and slowly administer into the epidural space. This is a two-person procedure to keep the needle stabilized while switching syringes.

The morphine epidural dosage is 0.1 mg/kg, or approximately 0.1 ml of 1 mg/ml morphine for a typical ferret. A comparable dose administered subcutaneously commonly induces vomiting in ferrets, and in fact morphine at 0.3 mg/kg SC is used as a model for testing efficacy of antiemetic drugs. No signs of nausea have been observed in over 40 ferrets receiving epidural morphine at 0.1 mg/kg, and no neurologic anomalies have resulted from the procedure.

References

5. Stoskopf & Harms, unpublished data

Figs 4a,b Two views of epidural administration of 0.1 ml of 1 mg/ml morphine in a ferret.