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Local anaesthesia – Part 3: regional anaesthesia of the pelvic limb

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ABSTRACT: Regional anaesthesia is more commonly used on the pelvic limb than on the thoracic limb. It has potential complications and side effects but can allow us to provide the most effective form of analgesia for many patients for whom it might otherwise be difficult to manage their pain. Part three of this series reviews the local anaesthesia techniques available for the pelvic limb, including epidurals, and the postoperative nursing care these patients will require.

Previous articles in this series discussed how local anaesthesia works within the body to block the transmission of sensory pain impulses. Often patients undergoing procedures on the pelvic limbs have chronic conditions and are, therefore, already in pain. These techniques will support the patient through the peri-operative period and other analgesia plans will be devised to manage pain at other times.

The pelvic limbs are innervated by two nervous plexuses – the lumbar and sacral nerves.

Which techniques are available?

There are five different types of regional block which can be used to provide analgesia to various parts of the pelvic limbs.

These techniques include;

- digital block
- Bier's block
- intra-articular
- femoral & sciatic
- epidural

The Bier's block and digital block were discussed in the previous article [VNJ Feb 2014, 29: pp47-50], so will not be reviewed here.

Intra-articular block

This technique may be used for joint surgery, such as that of the stifle. It is

quicker and technically easier to perform than an epidural, but still requires sterile technique to be practised. All drugs injected should be preservative-free.

Unlike other techniques, the intra-articular block is not usually performed during the preparation stages. Often the veterinary surgeon does it at the start of surgery and waits for a few minutes for the analgesic drugs to take effect; however, it can be done prior to the surgery, at the end of surgery, or both.

Morphine can be used to provide up to 24 hours of analgesia and it is not uncommon for a short-acting local anaesthetic, such as lidocaine, to be administered prior to the operation. This will provide total anaesthesia of the joint for the duration of the procedure and then morphine or ropivacaine are administered at the end to help manage postoperative pain.

If a local anaesthetic is administered prior to surgery, then only a few minutes are required for the onset of action. However, when morphine is used it should be administered 30 minutes prior to the start of surgery.

Femoral and sciatic nerves

The blockade of these nerves requires the use of either a nerve stimulator or an ultrasound machine to guide the position of the needle and administration of the local anaesthetic, particularly as the femoral artery is adjacent to the femoral nerve (**Figures 1 & 2**).

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The two nerves are blocked individually and it should be noted that the accessory nerves are not blocked; so some additional analgesia may be required during the anaesthetic procedure.

This block is suitable for procedures involving the knee, such as cranial cruciate repair. It does mean that the patient should be able to walk postoperatively, once recovered from general anaesthesia; whereas they may have not been able to if they had received an epidural block.

Epidural anaesthesia

This involves the administration of local anaesthetics and/or opioids into the epidural space (**Figure 3**). An epidural

is occasionally confused with intrathecal injection – in which drugs are introduced into the cerebrospinal fluid (CSF).

When administered correctly, it provides very effective analgesia. In the human patient, it has been shown to inhibit surgically induced signs of stress (Covino & Scott, 1985).

Epidural anaesthesia produces segmental blockade of the lumbar and sacral nerve roots. Any spread of the blockade cranial to this is dependent on the volume of local anaesthetic administered; whereas cranial spread of morphine is not dependent on the volume administered, but on the diffusion of it from the epidural space into the cerebrospinal fluid.

Often both preservative-free morphine and a local anaesthetic are administered together. The morphine will provide pain relief and the local anaesthetic will provide regional anaesthesia (complete block) for the pelvic limbs.

In small animals, such as cats and toy breeds of dogs, the calculated volume of a drug may be very small and insufficient to provide effective analgesia. In this case, sterile saline (0.9%) can be used to dilute the solution to an appropriate volume so that the technique can be performed.

At the opposite end of the spectrum, the calculated dose for large breed dogs may be too great as no more than six millilitres should ever be injected into the epidural space. If the anaesthetist is injecting intrathecally, the calculated volume of up to a total of six millilitres should be halved. (NB. This technique is not commonly used, but it can be employed where the administrator accidentally finds that they have entered this space and if they wish to continue they just inject half the volume).

The spinal cord in dogs ends at the levels of the sixth lumbar vertebra and the epidural space surrounds the spinal cord and meninges. Epidural injections are, therefore, usually made at the lumbosacral junction between L7-S1.

To prepare for this, the patient should be placed in either sternal recumbency with its hind limbs pulled forward; or in lateral recumbency with the legs similarly positioned, depending upon the anaesthetist's preference.

Then one hand palpates the wings of the ileum, while the other locates the spinal process (**Figure 4**). It should be possible to palpate the dip between the L7 and S1 vertebrae just below the wings of the ileum. The site should be clipped and prepared aseptically.

The equipment required is as follows; (Otero & Campoy, 2013)

- spinal needle
1.5 inch 22G for cats and small dogs
2.5 inch 22G for large dogs
3.5 inch 22-20G for giant or obese dogs
- needles
- syringes – one for saline, one for morphine, one for local anaesthetic
- sterile gloves

Figure 1. Sciatic nerve block using a nerve stimulator



Figure 2. Femoral nerve block using a nerve stimulator





Figure 3. Administering an epidural anaesthetic

- sterile saline
- local anaesthetic and/or preservative-free morphine.

The spinal needle is inserted over the lumbosacral space. It is carefully advanced until it passes through the ligamentum flavum and enters the epidural space. The anaesthetist will experience a loss of resistance as it enters the space, and the drugs will almost be 'drawn in' with barely any force.

Pain assessment

Pain scoring is a validated method which enables assessment of pain levels and which provides guidance on the use of analgesics and the care provided.

As nurses, we should be assessing our patient's pain levels regularly in the

postoperative period, particularly if they have received a local block. Pain assessment should be a comprehensive evaluation including the location, intensity and any aggravating and relieving factors, as well as identifying the effects it has on the patient's normal activities.

The objective is to ensure that patients are pain-free and, when nursing patients recovering from regional anaesthesia, to avoid the over use of opioids and to facilitate observation of whether or not the local block is still effective. This in turn should help to decrease the side effects, such as dysphoria and sedation, which accompany systemically administered analgesics.

Currently the only validated pain scoring system in the UK for dogs is the

Glasgow pain scale. For cats there is not a validated system; although the UNESP-Botucatu multi-dimensional pain scale has undergone its first validation in the UK and there is also the Colorado State University pain scale for cats.

Whichever pain scale is used, any form of pain assessment is better than none and will make a big difference to the well-being of our patients.

Conclusion

Regional anaesthesia techniques can have significant anaesthetic-sparing effects; meaning the amount of volatile agents required during surgery can be reduced and their unwanted side effects, such as respiratory depression and hypotension are lessened.

Regional anaesthetic techniques are not designed to replace the administration of systemic analgesics, but rather intended to complement general anaesthesia.

Caution must be taken to avoid tissue damage or toxicity of the patient with these techniques. However, they can produce good, long-lasting pain relief during the peri-operative period. [v](#)

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Figure 4. Landmarks for giving an epidural injection

