Potential Pitfalls of Select Intrasynovial Blocks

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Take Home Message—Being able to perform intrasynovial anesthesia is a very useful skill when evaluating lameness in horses. It is considered to be more specific for localizing the cause of lameness than perineural anesthesia. However, not all synovial cavities are easy to inject, and some blocks are more specific than others. Knowing some of the pitfalls of these injections can help with both performing the procedure and accurately interpreting the results.

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I. ANESTHETICS

The three commonly used local anesthetics differ in their time of onset of anesthesia and their duration of action. Lidocaine and carbocaine typically have an onset of less than 10 minutes, while bupivacaine is generally greater than 10 minutes. Carbocaine has a longer duration of analgesia (2 to 3 hours) compared with lidocaine (1-1½ hours). Bupivacaine lasts the longest, anywhere from 3-8 hours. Carbocaine is the local anesthetic preferred by most clinicians because it is said to be less irritating and have a more rapid onset than lidocaine.

II. SKIN PREPARATION

Techniques for preparing the skin for intrasynovial injections will vary among clinicians. Many will clip the hair over the injection site although this has been shown to be unnecessary if an adequate sterile preparation of the site is performed. Regardless if you clip the hair or not, a minimum 5-minute sterile scrub of the site using an antiseptic (povidone-iodine or chlorhexidine) and alcohol or saline should be performed. Sterile gloves are recommended.

III. RESTRAINT

The type of physical restraint depends on the disposition of the horse and the skill of the veterinarian. I perform almost all intrasynovial blocks with the horse twitched to minimize any movement of the limb. Most blocks are performed out of the stocks, but in selected instances stocks can be helpful such as when injecting the coxofemoral or sacroiliac joints.

IV. ASSESSMENT OF RESPONSE TO BLOCKS

Most intrasynovial blocks take effect quickly and their effects wear off quickly. The response to the block should be assessed no later than 10 minutes after performing the block and then again at 20-30 minutes if no improvement in the lameness is observed. A positive response to an intrasynovial block should be observed within 30 minutes. In general, at least a 50% improvement in lameness should be observed to suggest that the synovial structure is involved in the lameness. Not all intrasynovial blocks are specific for the joint, tendon sheath or bursae, but they are typically more specific than most perineural nerve blocks.

1. Distal Interphalangeal Joint

Quantity of Local Anesthetic: 4-6 mL
Needle size: 1-1½”, 20 or 22 gauge

Injection Techniques: The coffin joint block is performed with the horse standing. Several different techniques are available including the dorsal lateral 45° angle approach, dorsal parallel approach and the palmar/plantar approach. All approaches to the distal interphalangeal (DIP) joint are performed with the horse standing. The site of injection for the dorsolateral approach is 0.5” above the coronary band and ¼ - 1” lateral (or medial) to midline. The needle is inserted from a vertical position and directed distally and medially toward the center of the foot at approximately a 45° angle. The needle should enter the DIP joint capsule at the edge of the extensor process.

The injection site for the dorsal parallel approach is just above the coronary band 0.25 – 0.5” (8-12 mm) above the edge of the hoof wall on the dorsal midline of the foot. The needle is directed parallel or slightly downward (hub of the needle is moved proximally) to the ground to a depth of approximately 0.5” (12-15 mm).

Pitfalls:

1. Use of excessive anesthetic and block of the palmar/plantar digital nerve
2. Interpreting a positive coffin joint block as only a coffin joint problem
3. Directing the needle too superficially with the dorsolateral approach
4. Placing the needle too proximally with the dorsal parallel approach
5. Enter the digital tendon sheath when using the palmar/plantar approach
2. Proximal Interphalangeal Joint

**Quantity of Local Anesthetic:** 3-5 mL

**Needle size:** 1-1½", 20 or 22 gauge

**Injection Techniques:** The two most commonly used techniques are either the dorsal or palmar/plantar approaches. The dorsal approach to the pastern joint is usually performed with the horse standing while the palmar/plantar approach is performed with the limb un-weighted to permit access to the palmar/plantar pouch. The palmaro/plantaroproximal approach is best performed with the distal limb in a flexed position. The needle is inserted perpendicular to the limb into the palpable V-depression formed by the palmar aspect of P1 dorsally, the distal eminence of P1 distally and the lateral branch of the superficial digital flexor tendon (SDFT) as it inserts on the eminence of P2 palmarodistally. This corresponds to the transverse bony prominence on the proximopalmal/plantar border of P2 that is usually easily palpable. The author prefers to angle the needle slightly dorsally to contact P1, and then direct the needle along the palmar/plantar aspect of the bone.

**Pitfalls:**
1. No easily palpable joint pouches because of extensor tendon dorsally and the ligaments/tendons on the palmar/plantar aspect
2. Difficult to “feel” the needle penetrate the joint space dorsally
3. Placing the needle too distally when using the palmar/plantar approach
4. Injecting the digital tendon sheath when using the palmar/plantar approach

3. Elbow Joint

**Quantity of Local Anesthetic:** 10-20 mL

**Needle size:** 1½", 20 gauge

**Injection Techniques:** The elbow joint can be injected either cranial or caudal to the palpable lateral collateral ligament of the joint (radial tuberosity) or caudal to the humeral epicondyle in the acroneal notch. All three approaches are performed with the horse standing. The author prefers the more proximal approach to the joint behind the humeral epicondyle within the acroneal notch.

**Pitfalls:**
1. Difficulty in palpating the radial tuberosity or the lateral humeral epicondyle
2. Hitting bone when advancing the needle between the radius and humerus
3. Radial nerve paralysis from injecting anesthetic outside the joint. Only seen when using the approach cranial to the radial tuberosity

4. Shoulder Joint

**Quantity of Local Anesthetic:** 20-30 mL

**Needle size:** 3½”, 20 gauge spinal needle

**Injection Techniques:** The craniolateral approach cranial and proximal to the lateral humeral condyle and above the infraspinatus tendon is used almost exclusively for the shoulder joint. The needle is placed parallel to the ground and directed toward the opposite elbow. The shoulder block is performed with the horse standing.

**Pitfalls:**
1. Needle directed too proximal and hits the glenoid of scapula
2. Needle directed perpendicular to the long axis of the limb and skims across the humeral tuberosity cranial to the joint pouch
3. Inadvertent anesthesia of the bicipital bursa which communicates in some horses
4. Anesthesia of the suprascapular nerve if angle the needle too proximally

5. Distal Intertarsal Joint

**Quantity of Local Anesthetic:** 3-5 mL

**Needle size:** 5/8 - 1”, 22-25 gauge

**Injection Techniques:** The medial approach to the distal intertarsal (DIT) joint is used most often. However, a craniolateral approach to the DIT is used in Europe. The landmarks for the medial approach are midway between the plantar and dorsal aspect of the distal tarsus, just below the palpable distal border of the cunean tendon in a notch between the first and second tarsal (T1+2), third tarsal (T3) and central tarsal (Tc) bones. The needle is directed parallel to the ground and slightly caudally. The block is nearly always performed in the standing horse.

**Pitfalls:**
1. Inability to advance the needle – joint space is difficult to hit
2. Excessive pressure when injecting – usually not within the joint space
3. Injecting the proximal intertarsal joint by placing needle too proximally
4. Placing the needle too far caudally and missing the notch between the tarsal bones

6. Digital Flexor Tendon Sheath (DFTS)

**Quantity of Local Anesthetic:** 10-15 mL

**Needle size:** 1-1.5”, 20-22 gauge

**Injection Techniques:**
Proximal approach - The site for injection of the proximal pouch of the DFTS is 1 cm proximal to the palmar/plantar annular ligament and 1 cm palmar/plantar to the lateral branch of the suspensory ligament. A 1-1.5 inch 20 gauge needle is directed slightly distally until the sheath is penetrated.

Distal approach - The distal outpouching of the DFTS in the pastern region is often palpable as a distinct “bubble” when effusion is present. It is located between the proximal and distal digital annular ligaments and between the diverging branches of the SDFT where the deep digital flexor tendon (DDFT) lies close to the skin. A 20-gauge 1” needle is directed in a lateral to medial direction just beneath the skin so as not to penetrate the DDFT.

Axial sesamoidean approach - The axial sesamoidean approach at the level of the fetlock and the medial or lateral approach between the annular ligament and proximal digital annular ligament can be performed in the distended and non-distended DFTS. Both approaches are best performed with the limb held with the fetlock slightly flexed. The axial sesamoidean approach is performed 3 mm axial to the palpable border of the midbody of the lateral proximal sesamoid bone using a 1-1.5” 20 gauge needle. The needle is directed at a 45° angle to the sagittal plane to a depth of approximately 1.5-2cm. Alternatively, the needle can be inserted into the outpouching of the DFTS abaxial and distal to the sesamoid bones between the annular and proximal digital annular ligaments. The needle is inserted in a distal to proximal direction at approximately a 45° angle to the sagittal plane.

Pitfalls:
1. Difficult to palpate proximal pouch of DFTS when non-distended
2. Inability to aspirate fluid – needle against tendons
3. Contacting bone with axial sesamoidean approach – needle inserted too far abaxially

7. Medial Femorotibial (MFT) Joint

Quantity of Local Anesthetic: 20-30 mL

Needle size: 1.5”, 20 gauge

Injection Technique:

Medial approach - The site for injection of the MFT joint is located in the space between the medial patellar and medial collateral ligaments just above the palpable proximomedial edge of the tibia in the weight-bearing limb. The needle is inserted just caudal to the medial patellar ligament, 1 cm proximal to the tibia and directed perpendicular to the long axis of the limb. The needle may need to be repositioned slightly cranially or caudally to help obtain synovial fluid. This approach may be performed from the same side (facing the stifle) or from the opposite side reaching under the horse’s belly.

Sartorius muscle approach - Another approach to the MFT joint is located 0.5-1” proximal to the medial tibial plateau in the depression between the medial patella ligament and the tendon of insertion of the sartorius muscle. The needle is directed in a cranial to caudal direction parallel to the ground and parallel to a plane that bisects the limb. The needle enters a medial outpouching of the MFT joint and avoids inadvertent penetration of the medial meniscus and the medial femoral condyle.

Pitfalls:
1. Hitting bone – needle inserted too low (tibia) or too high (medial condyle)
2. Inability to obtain synovial fluid – needle may be entering meniscus
3. Contacting the medial meniscus if the needle is inserted too far caudally or too close to the proximal tibia
4. Difficulty in finding the medial outpouching of the MFT joint using the sartorius muscle approach

8. Navicular Bursa

Quantity of Local Anesthetic: 2-3 mL

Needle size: 3¼”, 18-20 gauge spinal needle

Injection Techniques: The navicular bursa is approached from between the heel bulbs and the needle is directed to a point approximately 1 cm below the coronary band. Radiographs or ultrasound are used to confirm accurate needle placement. The limb should be unweighted during the injection.

Pitfalls:
1. Needle directed too proximal and enters the coffin joint
2. Excessive pressure when injecting
3. Anesthesia of palmar soft tissues of foot due to extravasation of anesthetic

SUGGESTED READING


