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IMAGING SESSION

HOW TO DO ULTRASOUND-GUIDED INJECTION OF THE SACROILIAC REGION IN HORSES

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Introduction
Several techniques have been described for local infiltration of sacroiliac (SI) area [1-5]. However, these techniques are all based on external landmarks which can vary according to horse shape, pelvis pathology and chronic hindlimb lameness. It is also possible to inadvertently place the needle over iliac wing because of SI joint depth. For all these reasons, ultrasonography had been advocated to perform SI injections [3, 6].

An ultrasound-guided (UG) injection technique of the SI region (4 approaches) was developed on cadavers.

Materials and methods
Ultrasound examination was performed with a 3.5MHz curvilinear probe. A 18-gauge 20cm spinal needle was manually bent (40°).

Four approaches were used. To orientate and position the probe correctly, indications for each approach are given from a reference position corresponding to a transverse scan over both tuber sacrale.
- Cranial approach (Cr): the probe was moved laterally and cranially in order to visualize in a longitudinal scan the cranial border of the iliac wing and the transverse process of the 5th lumbar vertebrae just cranial to it. The needle was guided just under the cranial border of iliac wing until bone contact occurred.
- CranioMedial approach (CrM): the probe was slightly moved cranially and rotated 45° in a craniomedical to caudolateral direction in order to visualize the dorsal process of the 6th lumbar vertebra and the cranial border of the tuber sacrale. The needle was guided just under the cranial border of the tuber sacrale until bone contact occurred.
- Medial approach (M): the probe was slightly moved caudally in order to visualize the caudal border of both tuber sacrale. The needle was guided under the caudal border of the ipsilateral tuber sacrale until bone contact occurred.
- Caudal approach (Ca): the probe was moved laterally and caudally in order to visualize and in a longitudinal scan the triangular space between caudal border of the iliac wing and lateral crest of the sacrum. The movement was pursued laterally until the lateral crest of the sacrum disappeared medially and the ilium wing and shaft junction appeared laterally. The needle was guided just under the caudal border of the iliac wing. The needle insertion was stopped once the needle has advanced only one additional centimeter when lost under bone to avoid retroperitoneal injection.

Pelvis from fourteen horses of various breed (weight: 443,6±140,3kg) euthanized for unrelated reasons to pelvic pain were isolated. The skin was clipped and cleaned. Once the needle was positioned, 2ml of colored latex was injected. After elevation of the iliac wing, fine dissection was performed to identify each spot of latex. Success to identify latex, distance from each colored spot to the closest sacral articular margin, erratic injections and proximity between latex and neurovascular structures (sciatic nerve and cranial gluteal artery, vein and nerve) or interosseous SI ligament (IOSIL) were recorded. Data were analyzed through linear or logistic regression models or Khi-square test (significance p<0.05).

Results
Latex was identified under iliac wing in all injections. The mean distance ±SD from latex to closest sacral articular margin was significantly shorter (p=0.02) for Ca
(1.1±1.0cm(n=17)) compared to other approaches (1.7±1.1cm for Cr(n=22); 2.4±1.3cm for CrM(n=25); 2.3±1.1cm for M(n=26)). No effect of manipulator or experience detected.

Chances to have latex injected in IOSIL were 12.3 times more important (p=0.01) with the combined Cr(11/22), CrM(13/25) and M(14/26) compared to Ca(0/17). The proportion of latex in direct contact with the neurovascular structures was significantly lower (p=0.005) for combined Cr(0/22) and CrM(0/25) compared to combined Ca(3/17) and M(1/26).

Discussion
UG technique for SI injection is extremely reliable to place the needle under the iliac wing and to inject very close to SI articular margins. In our study, latex was never identified in joint space but extremely close to it, resulting in periarticular injections. Latex marked precisely the injection site but diffusion of medical substances in the joint is likely to occur in live horses.

With the caudal approach on live horses, it is not rare to identify by transcutaneous ultrasonography the rectum or descending colon contracting just below the caudal edge of the SI area. Consequently, there is a potential risk of gut puncture. On cadavers, retroperitoneal injection was never observed. However, it is of tremendous importance to engage the needle just one centimeter under the caudal edge of the iliac wing without looking for bone contact to avoid such problems.

UG cranial and caudal approaches are easy to perform compared to craniomedial and medial approaches. Latex was observed to be closer from SI articular margins with caudal approach. This could make a difference in horses affected by SI osteoarthritis/pain because better articular diffusion/concentration of injected substances would potentially occur.

Compared to other approaches, the caudal and medial approaches led to injection of latex close to neurovascular structures emerging from the sciatic foramen with sometimes direct contact with them. Vessel or nerve puncture may occur on clinical cases and lead to hematoma formation or horse reaction. In addition, injection of local anesthetics with those approaches should be avoided to prevent transient sciatic nerve paresis. However, these approaches may be interesting for treatment of sciatic neuritis.

Latex was identified in the IOSIL with cranial, craniomedial and medial approaches in 52% of the cases. These approaches should be favored to treat SI desmitis problems.

These UG approaches described here are currently used on clinical cases in both hospitals. Technically, the horse is sedated, placed in stocks with a nose twitch. The skin is clipped and prepared. Appropriate combinations of the 4 approaches are used. Dexamethasone +/- Sarapin or iodine in almond oil suspension are injected. The procedure is usually well tolerated. Exercise is resumed in a few days.

Conclusion
UG techniques for injection of SI region allow to place the needle under the iliac wing and to administrate liquid extremely close to SI joint. The use of one or an appropriate combination of UG approaches should be useful to address more specifically the different SI diseases in horses.

References