Ultrasound-guided injections of the back

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Introduction

Problems of the back are an increasing issue for the last decennia. There are several reasons for that. Besides the fact that modern horses (especially in the dressage discipline) are more sensitive and therefore more responsive to pain or increasing difficulty during their career the challenges for the body are bigger due to changes in discipline. For dressage the movements have a bigger range of motion but also horses need to have powerful musculature. Also, in other disciplines a winner needs more power, strengths and flexibility. Besides the fact that the knowledge of anatomy and biomechanics have improved tremendously for the last decades. One of the reasons for that is the possibility to have a much better image quality of radiographs (digital) and ultrasound. To come to a good and responsible diagnose anatomy is the base of all orthopaedic knowledge. To treat affected tissue in the spine is not easy because of all the overlaying muscles and lack of good palpability of the deeper structures. Therefore, ultrasound guided injections are the golden standard to reach those structures.

In this paper and lecture we focus on the anatomical structures that are visible in diagnostic imaging and how to perform an injection that reach the right spot.

Radiology

Although the ALARA (as low as reasonably achievable) principle is important for radiation safety there is a need to use high KV and mAs for a high-quality image of especially the deeper structures of the back. Beside skirts and throat protectors the use of a lead screen can help to reduce the received radiation dose. Evaluating the spinous processes, it is important to have a good view of the top but also of the deeper parts.

There are several gradation lists, and they can help to classify the abnormal findings but, in my opinion, you have to describe what is seen on the images. What can be seen concerning the spinous processes are, from mild to severe, narrowing, remodelling (sometimes confused with scleroses), lysis and overriding. The direction of the beam can, because of the diverging, alter the assumed severity of the condition. Only the middle of the image gives a correct reproduction of what is real at that level of the spine (assuming that the back has a 90-degrees angle with the beam).

In the facet joints a 90-degree angle is even more important. A grid and collimation as much as possible are necessary to produce good quality images by reducing the scattering in the muscle. The vertebral bodies should also be visualised because of disk problems, spondylosis and other anomalies. Because the ventral abdominal muscles are playing an important role in the biomechanics of the back the sternum can also be a part of the diagnostic imaging in back problems and should not be forgotten.

Ultrasound

In the ultrasound the knowledge of the anatomy is even more important. A linear 7.5–12 MHz can be used for the more superficial structures as the supra- and interspinous ligaments. The facet joints, costovertebral joints and transverse processes can be evaluated by a Macroconvex 2.5–5 MHz probe. Clipping is necessary for longhaired individuals but in sporthorses using alcohol can be suitable. For the supraspinous ligament using a pad can be beneficial for swellings can be more easily detected.

The supraspinous ligament is broad over the withers getting smaller over the thoracal region and is increasing in size in the lumbar region. Asymmetrical appearance in the lumbar region is not uncommon. By pushing the probe flat horizontally lateral parallel with the spine into the muscles the interspinous ligament can be evaluated. In case of kissing spines, the remodelling of the bone can be easily seen and can give more information about the severity and the clinical relevance of the radiological findings.

Abnormal findings in the lumbar facet joints can easily be seen on a transverse view and have considerable clinical relevance. The facet joints in the thoracal region are more sloping while those in the lumbar region are more perpendicular (horizontal) and broader in shape.

Scintigraphy

Because a lot of bony structures are not easily to access a scintigraphic exam can be useful as a screening when bony activity is a part of the disease. Spondylosis, facet joint arthrosis, SI remodelling, fissures/fractures and to a lesser extent kissing spines can be seen.

Computed tomography

A recently developed possibility is the pelvis and lumbar spine CT. Because of the bigger bore of the gantry a lot of new systems can evaluate the lumbar spine and pelvis. A few papers are already published. It can reveal problems in more hidden structures such as facet joints and SI region.

Ultrasound guided injections

In many cases a 'blind' method to block or treat the supra- and interspinous ligament is appropriate but when there is a focal lesion the ultrasound guided technique can be used. To treat the deeper structures such as facet joints an ultrasound guided technique is necessary.

The spot should be clipped to prevent contamination and the skin properly washed for disinfection. A sterile glove can be used to cover the probe. There are two approaches for injection the facet joint.

During the medial approach the 18–21G spinal needle is places just lateral of the spinous process and goes vertical until it reaches the bone. With the probe the needle can be followed until it is placed in the right spot 1/3 from the most outside part of the mamillary process. Sometimes, depending on the image quality, the joint can be seen on ultrasound, but the tip of the needle is always bigger than the joint space so most of the fluid will be placed outside the joint. In the lateral approach the needle is placed lateral to the probe and is guided in an oblique direction towards the joint. The mammillary process should be avoided.

Triamcinolone is mostly used for treatment of facet joints but also IRAP can be considered. If there is a lesion in a ligament PRP or stem cells can be used.

In my clinic mesotherapy is a standard additional treatment in a horse with back pain. Do not use long-acting steroids in the solution for everlasting white spots can occur.

Figure 1. Kissing spines and spondylosis.







Figures 3 and 4. Normal variation lumbar SSL



Figure 5. Remodelling lumbar facet joint (US).







Figure 7. KS lateral view.



References

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