Bovine radiology tips/cases

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Abstract

Bovine lameness is an important cause of morbidity in cattle. Bovine digital radiography is a useful diagnostic tool. Review of bovine digital radiographic image acquisition and interpretation is provided.

Key words: Radiographs, Bovine digit, bovine lameness

Bovine lameness isolated to the distal limb is an important cause of morbidity in all cattle production systems. Radiographic analysis of the bovine digit can be an important ancillary diagnostic. The use of radiography of the digit has continued to improve accuracy of diagnosis, prognosis and surgical planning. Improved access, ease of processing, quality of images, current market value of livestock, and pet livestock has increased the use of bovine radiography in clinical practice. In recent years, radiographs of the bovine digit have been useful in characterizing effects of confinement, defining pathologic fractures, confirming septic arthritis, and monitoring response to treatment [2,3,5,7].

Radiographic image acquisition

Each bovine distal limb is comprised of two digits (III and IV). A thorough review of digital anatomy has been recently published[6]. Understanding normal anatomy and conventional anatomic nomenclature is imperative. When pathology of the distal limb is isolated to a single digit, the healthy digit can be used as an internal reference for normal on a radiograph. However,

the presence of two digits results in significant superimposition in standard radiographic views. High quality radiographic image acquisition is dependent upon animal restraint, radiographic technique and limb preparation. Patient and handler safety is of upmost importance. Steps should be taken to minimize radiation exposure of the patient and persons acquiring the images. This is best achieved through appropriate radiation safety training, understanding how to obtain the views, and proper use of radiation safety equipment (lead gowns, lead thyroid shields and lead gloves).

The use of radiographs in bovine orthopedics has recently been reviewed[4]. The authors of that review present the following standard bovine digital radiographic views: dorsal 65° proximo-palmarodistal oblique and lateral 30° proximal-mediodistal oblique. These images provide clear views of the distal phalanx, sesamoid and interphalangeal joint. To obtain these views, the bovine must stand on the cassette (which is protected by a fibroglass tunnel). The standard radiographic views obtained most in recumbent bovine include: dorsopalmar or dorsoplantar (DP), dorso-lateral palmar/plantar medial oblique (DLPMO), dorso-medial palmar/plantar lateral oblique (DMPLO), and latero-medial (LM). In the authors opinion, the LM view is often of little diagnostic value due to significant superimposition of the digits. Acquiring oblique views is easiest with the animal in lateral recumbency. However, the images can be obtained with the animal standing in a chute. The oblique views are particularly useful in assessing pathology of the distal sesamoid, characterizing the location of foreign bodies, identifying pedal osteitis near the flexor tuberosity and defining fracture of the third phalanx.

Radiographic interpretation

Following a standard procedure for interpretation of radiographic images is critical. Use of standard viewing guidelines makes it much easier to understand where the pathology is located and what views should be obtained to best highlight each digit. When viewing radiographs of the digit, the dorsal hoof wall should be toward the left side of the viewer. The proximal portion of the limb should be positioned at the top of the screen. The marker should always be placed on the lateral side of the limb. For example, pathology of the palmar/plantar aspect of the distal phalanx of the lateral claw is best viewed in the DLPMO.

Radiographic findings associated with bovine digital lameness

Bovine radiographic findings are typically characterized as infectious or non-infectious. Infectious pathologies associated with radiographic changes include; soft tissue abscess, septic arthritis, pedal osteitis, osteomyelitis and pathologic fractures [1]. The duration of disease will impact the radiographic findings associated with infectious etiologies. It is important to note that radiographic signs of bone infection lag onset of disease. Osteolysis, sclerosis, widening of joint spaces and periosteal new bone formation are common radiographic findings associated with an infectious cause[1,4]. Radiographic diagnoses with non-infections etiologies include laminitis, degenerative joint disease, traumatic fractures, soft tissue calcification and foreign bodies[1]. The respective radiographic signs associated with such pathologies can include widening of solar foramina, periarticular spur formation, well demarcated fracture line and foreign material[1].

Conclusion

Bovine digital lameness is a common diagnosis in bovine practice. Radiology of the bovine digit can be a very useful ancillary diagnostic. Digital radiography is particularly helpful

in cases where animals have been unresponsive to treatment, definitive diagnosis based on clinical signs is not possible or to confirm suspicion of disease. Understanding the normal anatomy of the distal limb and how to obtain standard radiographic views is important.

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