ULTRASONOGRAPHIC IMAGING OF EPIPHYSEAL GROWTH PLATES IN CALVES — PRELIMINARY FINDINGS

H. Nikl-Zinner[1], K. Schieder[2], E. Ludewig[2], J. Huber[3], J. Kofler[1]
Johann.Kofler@vetmeduni.ac.at

[1]University of Veterinary Medicine Vienna, Department of Farm Animals and Veterinary Public Health, University Clinic for Ruminants, Vienna, Austria
[2]University of Veterinary Medicine Vienna, Clinic for Diagnostic Imaging, Vienna, Austria
[3] University of Veterinary Medicine Vienna, Vet-Farm, Vienna, Austria

Calves suffer frequently from septic haematogenous arthritis, oftentimes associated with a concurrent osteomyelitis of the epiphyseal growth platesor of the subchondral articular bone. An accurate and early diagnosis is the key for a successful treatment. Radiography is the diagnostic imaging method of choice for the evaluation of bones and joints, however it is inadequate for detecting early stages of septic arthritis and even of early stages of osteomyelitis. Furthermore, many bovine practitioners are not equipped with a radiographic unit, therefore making an accurate diagnosis of disorders of the epiphyseal growth plates difficult or impossible. In contrary, many bovine practitioners are equipped with 5–8 MHz linear rectal probes.

The objective of this study was to describe the ultrasonographic appearance of the epiphyseal and apophyseal growth plates of the front and the rear limbs in young calves from the age of 1 week to 3 months, and to establish an examination protocol which can be applied as a reference for their ultrasonographic examination in calves with suspected pathology.

An ultrasonographic examination of the epiphyseal growth plates of the distal metacarpus/metatarsus, distal radius/ulna, proximal radius, distal and proximal humerus, distal and proximal tibia, distal and proximal femur, of the apophyses of olecranon tuber, major tuberculum, tuber calcis, tibial tuberosity and of the major trochanter was carried out in 12 Simmental calves at 5 time-points from the first and 12th week of life. The calves were examined in a standing position using a 7.5 MHz (5–8 MHz) linear probe. All growth plates were scanned in longitudinal planes from all sides by moving the probe always from dorsal/cranial in a circumferential 360 ° course over the lateral, caudal to the medial aspect, if possible in the particular anatomical situation. At each time point, all these growth plates were imaged and ultrasonographic measurements of their proximo-distal width were taken.

The indicated cartilaginous growth plates were imaged in all calves at the subsequent time-points appearing as short anechoic interruptions (a few millimeters to less than 1 mm in older calves) of the adjoining hyperechoic bone surface in longitudinal planes. The indicated cartilaginous apophyses in these calves were depicted as large heterogeneous hypoechoic 5 to about 17 mm thick structures bordered distally by the hyperechoic contour of the ossified bone. The time needed for ultrasonography of one particular epiphyseal growth plate was about 7 minutes for a trained operator.

It can be concluded that ultrasonography enables good imaging of the cartilaginous growth plates of all long bones in the front and rear limbs of calves. Therefore, this non-invasive diagnostic imaging technique is well suited for examination of these particular areas in young calves with swollen joint regions, suspected septic arthritis and the history of haematogenous spread leading to a possible concurrent infection of the adjoining epiphyseal growth plate, in particular when a radiographic unit is not available.

Keywords: DIAGNOSTIC ULTRASOUND, RECTAL PROBE, EPIPHYSEAL GROWTH PLATE, HAEMATOGENOUS OSTEOMYELITIS, CALF