

HiSPECT allows recognition of specific anatomical areas affected in canine elbow pathology

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Canine orthopedic problems in the forelimb are frequently originating from the elbow. Planar bone scintigraphy is included in the diagnostic frame work when clinical/radiographic examination is inconclusive or non-localizing. However, determination of the exact localization of pathology within the elbow is usually not possible due to resolution limits of the conventional gamma camera systems. The HiSPECT system consists of multipinhole collimators for conventional triple head gamma camera's. This system allows adjustment of the space between the camera heads and thus investigation of larger structures.

The aim of the study was to investigate the value of HiSPECT in the evaluation of elbow pathology in the dog.

Material and Methods

15 dogs were included (30 elbows) with suspected elbow disease. Radiographic examination was negative (N= 2) or inconclusive (N=13). HDP (mean 22 MBq/kg) was injected 2-3 hours prior to acquisition. Micro-SPECT was performed with a conventional triple head gamma camera (Triad, Trionix USA), adapted with 3 multi-pinhole collimators (6 holes, 3 mm Ø, resolution 2.4mm) (Bioscan, USA). Data were acquired for 20 minutes in step-and-shoot mode (10 steps, 36° angular step, 120 sec per step, matrix 256 x 256). Images were reconstructed using a dedicated ordered subset-expectation maximisation (OSEM) algorithm (Scivis, Göttingen, Germany). CT/MRI and/or arthroscopy were performed to confirm pathology.

Results

On the HiSPECT images, pathology could be confined to specific anatomical regions. Twelve elbows showed high focal uptake in typical predilection sites for pathology: the medial humeral epicondyle (flexor tendon insertion)(N=4), the medial coronoid process of the ulna (fragmentation of the coronoid process)(N=7) and the anconeal process of the ulna (N=1). In 4 elbows focal uptake was noted in the medial coronoid region as well as in the medial humeral epicondyle identified on CT/MRI as fragmented coronoid processes and insertion desmitis of flexor tendons. In 14 elbow, focal uptake in the aforementioned predilection sites (medial humeral epicondyle: N = 9; medial coronoid process: N = 5) was accompanied by several areas of mild increased uptake in the articular region of the humerus and radius representing articular changes (cartilage and subchondral erosion, and synovitis) on arthroscopy.

Conclusion

With the HiSPECT system increased uptake was discernible in specific elbow areas correlating well with pathology found on CT/MRI and/or arthroscopy. This modality may allow a more accurate choice of subsequent targeted structural imaging modalities and more specific therapeutic interventions in cases with questionable clinical and radiographic findings.