Evaluation of Technetium-99m Labeled Biotin for Detecting Soft Tissue Inflammation in Horses

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99mTc-EB1 appears to provide a safe and effective method for imaging soft tissue inflammation in horses. This agent has the advantage of having immediate uptake in soft tissues without concurrent uptake in bone while providing a four hour imaging window. 99mTc-EB1 is most useful when performed as a complement to the traditional bone scan. Authors’ addresses: Department of Clinical Science (Kleine, Kirker-Head) and Department of Diagnostic Imaging (Solano, Hunt, Johnson), Cummings School of Veterinary Medicine, Tufts University, 200 Westboro Road, Grafton, MA 01536; and Department of Radiology, University of Massachusetts, 55 Lake Avenue North, Worcester, MA 01655 (Rusckowski); e-mail: lauren.kleine@tufts.edu (Kleine). © 2006 AAEP.

99mTc-EB1 has been used successfully as an inflammation seeking agent in mice and humans. We hypothesized that 99mTc-EB1 would also have enhanced uptake in areas of inflamed soft tissues in horses. In phase 1, six normal horses were used to determine safety, blood/tissue clearance, and imaging protocol. A dose of 1.4 GBq of 99mTc-EB1 was injected IV followed by the acquisition of time-based scintigrams of the head, thorax, abdomen, spine, and limbs. The imaging sequence was repeated 1, 2, 4, and 24 h after initial injection. In phase 2, the imaging protocol developed in phase 1 was applied to five clinical cases. Phase 1 data indicated that there were no alterations in physical exam parameters or complete blood count (CBC)/serum chemistry values after injection of the radiopharmaceutical. 99mTc-EB1 was rapidly cleared from blood with an alpha phase of 2.2 min and a beta phase of 58 min. Soft tissue uptake was rapid and uniform up to 4 h after radiopharmaceutical injection. Kidneys and bladder had high immediate accumulation of 99mTc-EB1. Radioactivity was barely detectable at 24 h. In the phase 2 evaluation of clinical cases, 99mTc-EB1 correctly identified the suspected lesions but also found other foci of inflammation that were previously undetected by radiography or ultrasound. Unlike ultrasound, 99mTc-EB1 screens the entire body for sites of inflammation. It also detects active soft tissue lesions that are not visible with bone scintigraphy or radiographs. For horses, 99mTc-EB1 is more feasible than computed tomography or magnetic resonance imaging. 99mTc-EB1 is less radioactive and easier to prepare than radiolabeled white blood cells. In conclusion, 99mTc-EB1 represents a complementary technique to traditional bone imaging agents.