

Nuclear Scintigraphy as a Diagnostic Aid in the Evaluation of Tooth Root Abscessation

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In 3 horses with sinusitis and inconclusive oral, endoscopic, and radiographic examinations, nuclear scintigraphy was used to evaluate the maxillary tooth roots and accurately assess their involvement in abscessation. Authors' address: Equine Hospital, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853. © 1999 AAEP.

1. Introduction

Tooth root abscessation is the most common cause of sinusitis in the horse.¹ Standard techniques of sinus and apical tooth root evaluation have been well described and include physical and oral examinations, endoscopy of the paranasal sinus, nasal passage, and oral cavity, radiography, and flap sinusotomy.² Definitive diagnosis of periapical tooth root abscessation can be difficult with noninvasive techniques. In the horse, nuclear scintigraphy has been used primarily in the diagnostic evaluation of musculoskeletal abnormalities³, and one report supports its potential application in sinusitis.⁴ The objective of this study was to evaluate the clinical usefulness of nuclear scintigraphy as an adjunctive diagnostic tool in the evaluation of alveolar periostitis and tooth root abscessation in horses.

2. Materials and Methods

Medical records, radiographs, videoendoscopic recordings, and scintigrams were reviewed in 3 horses admitted for evaluation of sinusitis to the Equine Hospital between January 1 and December 31, 1997. Nuclear scintigraphy was performed by injecting

120 mCi of ^{99m}Tc-methylene diphosphonate (^{99m}Tc-MDP) IV 2 h before image acquisition. Images were acquired by using a low-energy, all-purpose (LEAP) collimator and a large field-of-view gamma camera set at 100,000 counts per image.

3. Results

A. Case 1

A 3-year-old Thoroughbred filly presented for evaluation of a carpal chip fracture and subsequently developed a unilateral malodorous mucopurulent right-sided nasal discharge while hospitalized. Nasal endoscopy and skull radiography were performed. Fluid was observed in the right maxillary and frontal sinuses and draining from the right nasomaxillary opening. Intraoral endoscopy revealed no additional abnormalities. Nuclear scintigraphy was performed and focal, avid, increased radioactivity was seen at the level of the right first maxillary molar, supporting a diagnosis of apical tooth root abscess. Maxillary flap sinusotomy revealed thickened sinus mucosa, purulent discharge, and feed material in the apical portion of the right

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first maxillary molar, confirming the diagnosis of apical tooth root abscess.

B. Case 2

A 5-year-old mixed-breed gelding presented for evaluation of unilateral malodorous right-sided nasal discharge of 2 weeks' duration. Physical examination revealed increased sensitivity and reduced percussive resonance over the right maxillary sinus. Lingual defects of both maxillary first molars were detected. In skull radiographs, a fluid line in the right maxillary sinus was observed, with questionable involvement of the right maxillary first molar. Nuclear scintigraphy revealed diffuse increased uptake at the level of the right maxillary sinus, with focal, avid, increased activity around the right maxillary first molar root. Diagnosis of apical tooth root abscess and sinusitis was confirmed by maxillary flap sinusotomy, when a fractured upper right first molar with feed material in the pulp cavity was found.

C. Case 3

A 10-year-old Thoroughbred mare presented with a three week history of unilateral mucopurulent nasal discharge, unresponsive to antibiotic therapy. An abscessed maxillary first molar had been removed 6 months prior. No abnormalities were found on physical examination. In skull radiographs, a fluid line was apparent in the left maxillary sinus, with increased, ill-defined opacity around the maxillary tooth roots. To determine possible maxillary fourth premolar involvement, nuclear scintigraphy was performed. Increased activity was observed in the region of the previously-removed left first maxillary molar and surrounding maxillary bone, but no focal increase around the fourth premolar. Subsequent endoscopy of the middle nasal meatus and left maxillary sinus revealed a white caseous material, from which a culture of *Graphium* sp. was obtained, supporting a diagnosis of fungal sinusitis and confirming an uninvolved fourth premolar.

4. Discussion

Nuclear scintigraphy using ^{99m}Tc -MDP has been shown to be very sensitive for detecting active bone remodelling.³ Clinically useful diagnostic information was obtained in all three cases when used in conjunction with conventional diagnostic methods for sinus and dental evaluation. The bone scans in these cases provided specific information regarding the location of tooth root involvement, which was critical for patient treatment. Cases 1 and 2 displayed the ability of nuclear bone scans to detect alveolar periostitis associated with apical tooth root abscessation when radiographic findings were inconclusive. Conversely, case 3 exemplified the importance of negative bone scan results, averting an unnecessary maxillary flap sinusotomy. Instead, sinuscopy, a less-invasive procedure, could be utilized to provide the definitive diagnosis of fungal sinusitis.

In conclusion, we believe that nuclear scintigraphy provided valuable information in the evaluation of sinusitis and alveolar periostitis associated with tooth root abscessation in the horse, and recommend its clinical use.

References and Footnotes

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