Equine Sinus Endoscopy Using a Flexible Endoscope: Diagnosis and Treatment of Sinus Disease in the Standing Sedated Horse

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1. Introduction
Diagnostic techniques commonly used to evaluate paranasal sinus diseases in horses include radiography, computed tomography, sinus centesis, surgical exploration and more recently sinoscopy. Sinoscopy is a valuable diagnostic tool providing direct assessment of mucosal surfaces and internal sinus structures that cannot be appreciated well radiographically or via flap sinusotomy. In addition to inspection, transendoscopic procedures for diagnosis (culture, biopsy) and treatment (formalin injection, laser therapy) are possible as well. Sinoscopy using an arthroscope has been described previously1,2; however, this procedure has not been adopted widely because of equipment availability and limited field of view. The purpose of this report is to describe a technique for diagnostic and therapeutic sinoscopy using a flexible endoscope in standing sedated horses and to review pertinent sinus anatomy. Knowledge of normal sinus anatomy is essential for adequate sinus exploration and diagnosis.

2. Methods
Horses are placed in a stocks and sedated with detomidine (0.01–0.02 mg/kg IV).a Trephination sites are clipped and, after standard surgical preparation, infiltrated with 10 ml of mepivicaine.b Trephination sites for the frontal, caudal maxillary and rostral maxillary sinus have been described previously.1,3 The frontal sinus is trephined 0.5 cm caudal to a line between the medial canthi of the eyes and 60% of the distance from the midline to the medial canthus. The caudal maxillary sinus is trephined 0.5 cm rostral and 1 cm ventral to the medial canthus of the eye. The rostral maxillary sinus is trephined 50% of the distance from the medial canthus of the eye to the rostral extent of the facial crest and 1 cm below the infraorbital canal. In younger horses, the cheek teeth fill the floor of the sinus, and portals should be placed closer to the infraorbital canal. Radiography can help determine portal placement in younger horses.

A 2.5-cm linear incision is made over the proposed trephine site. Subcutaneous tissue and periosteum are reflected, and a 14-mm Michele trephinec is used to create an osseous portal. If necessary, the sinus may be lavaged to remove purulent material before the endoscope is inserted. A 9- or 10-mm flexible endoscope is inserted after cold sterilization with glutaraldehyde.d After an exploratory sinoscopy,
biopsy or treatment may be performed through an endoscope. The trephination site is closed using 2-0 polypropylene in a simple interrupted pattern to oppose skin. Alternatively, a Foley catheter is placed through the portal and secured with a purse string suture of 0 polypropylene for further lavage of the sinus.

3. Results

Sinoscopy through the frontal or caudal maxillary portals allowed visualization of the frontal, dorsal conchal, caudal maxillary and sphenopalatine sinuses. The ethmoid turbinites, frontomaxillary opening (Fig. 1), infraorbital canal (Fig. 2), ventral conchal bulla, nasomaxillary aperture (Fig. 3) and cheek teeth roots were visualized consistently. The shorter roots of the cheek teeth were easier to inspect in older horses. Molar 1 was generally located in the rostral maxillary sinus, and molar 2 was inconsistently located between the rostral and caudal maxillary sinus. A complete bony septum was normally present between the caudal and rostral maxillary sinuses; therefore, endoscopy through the rostral maxillary site would allow visualization of only the rostral maxillary and the ventral conchal sinuses.

Sinoscopy was performed in nine clinical cases between August 1997 and March 1999. In each case, diagnosis was uncertain based on physical examination, nasal endoscopy and radiography. Sinoscopic examination resulted in a diagnosis in each case (4 horses had fungal [Aspergillus] sinusitis [Fig. 4]; 1 had a fibrosarcoma; 1 had an orbital floor fracture [Fig. 5]; 2 had Streptococcus zooepidemicus infection; and 1 had an ethmoid hematoma [Fig. 6]). In four horses, both the frontal and the caudal maxillary sinuses were trephined for exploration. A single portal in the caudal maxillary sinus was used in five horses. Complications were limited to a periosteal reaction over one of the trephination sites in one horse, which resolved over a 3-month period. This complication has been described previously. No long-term complications were encountered.

4. Discussion

Sinoscopy using a flexible endoscope is safe and effective for the diagnosis and concurrent treatment of sinus disease. Flexible endoscopes are readily available to practitioners and provide better visualization of the entire sinus than rigid arthoscopes. Biopsy or treatment through the endoscope may be performed. Anatomical knowledge of the equine paranasal sinus is essential for accurate sinus exploration. Frontal sinus trephination was the most useful for access to both the frontal and caudal maxillary sinuses. The caudal maxillary sinus was used to view the sphenopalatine sinus.

In conclusion, sinoscopy using a flexible endoscope should be considered for diagnosis of sinus disease. In selected cases, both diagnosis and treatment can be performed via sinoscopy, precluding the risk, morbidity and expense of conventional surgery.

References and Footnotes

4. Dormosedan, Pfizer, West Chester, PA, 19380.
5. Mepivacaine (2%), Steris Laboratories Inc., Phoenix, AZ 85043.
7. Cidex, Johnson and Johnson, Medical Inc., Arlington, TX 76004.