**Fistulation of the auditory tube diverticulum (guttural pouch) with a neodymium:yttrium-aluminum-garnet laser for treatment of chronic empyema in two horses**

Jan F. Hawkins, DVM, DACVS; Nicholas Frank, DVM, DACVIM; Janice E. Sojka, VMD, DACVIM; Michel Levy, DVM, DACVIM

4-year-old Quarter Horse mare used for pleasure riding was admitted for evaluation of unilateral nasal discharge of 2 weeks’ duration. The horse had been treated with gentamicin sulfate (3.3 mg/kg [1.5 mg/lb] of body weight, IM, q 12 h) and trimethoprim-sulfamethoxazole (20 mg/kg [9.1 mg/lb], PO, q 12 h) by the referring veterinarian for 10 days. Abnormal physical examination findings at referral included bilateral nasal discharge and palpable enlargement of the mandibular and retropharyngeal lymph nodes. The discharge was yellow-green and had a foul smell. Videendoscopic examination of the upper portion of the respiratory tract was performed. Abnormal endoscopic findings included moderate to severe thickening and yellow discoloration of the mucosa of the cartilage of the right pharyngeal orifice of the auditory tube diverticulum (guttural pouch), purulent exudate on the floor of the medial and lateral compartments, and hyperplasia of the mucosal lining of the guttural pouch. The cartilage of the left pharyngeal orifice of the guttural pouch was mildly thickened and the interior of the left pouch was normal in appearance. The mucosa of the cartilage of the left pharyngeal orifice of the guttural pouch was biopsied by use of endoscopic grasping forceps. Harvested tissue specimens were submitted for histologic examination; the histologic diagnosis was lymphocytic inflammation. On the basis of clinical and histologic findings, a diagnosis of moderate to severe pharyngeal lymphoid hyperplasia involving the dorsal aspect of the nasopharynx and the tissues of the right pharyngeal orifice of the guttural pouch was made. It was hypothesized that the pharyngeal orifice of the guttural pouch was not opening normally, secondary to the moderate to severe inflammation that involved the mucosa of the cartilage of the pharyngeal orifice, and prevented drainage of exudate from the pouch.

Successful treatment of chronic empyema may be difficult to resolve with conventional medical treatment in some horses.

Chronic empyema of the auditory tube diverticulum (guttural pouch) may be accomplished by use of a neodymium:yttrium-aluminum-garnet laser to create a fistula in the guttural pouch.

From the Department of Veterinary Clinical Sciences, School of Veterinary Medicine, Purdue University, West Lafayette, IN 47907-1248.

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The fistula, an endoscopic exam was performed. The cartilage of the right pharyngeal orifice had formed a C shape, with loss of the ventral half of the cartilage. The endoscope could be easily placed into the interior of the guttural pouch without the use of a stylet. The interior of the guttural pouch was free of exudate, and there was no evidence of nasal discharge. The indwelling catheter was removed, and the horse was discharged. Telephone follow-up with the owner was obtained 3 years after surgery. There had been no reoccurrence of nasal discharge, and no problems had been observed that were related to the guttural pouch. The owner was satisfied with the surgical procedure.

A 21-year-old castrated male Pony of the Americas that was used as a child's riding pony was admitted for evaluation of chronic bilateral guttural pouch empyema. The pony had been admitted to the hospital 16 times during a 4-year period. Previous treatments had included surgical drainage of the guttural pouches by use of a modified Whitehouse approach on 2 occasions, indwelling bilateral catheter placement for guttural pouch lavage, and orally and intravenously administered antimicrobials. Despite intensive medical and surgical management, guttural pouch empyema would not resolve. Bilateral fistulation of the guttural pouches by use of the Nd:YAG laser was recommended to the owner.

Fistulation of the guttural pouches was performed, as described. The right guttural pouch fistula was created first, followed by fistulation of the left guttural pouch. A 26-F Foley catheter was placed into each guttural pouch via the fistulae. Potassium penicillin G (22,000 U/kg, IV, q 12 h), gentamicin sulfate (6.6 mg/kg [3 mg/lb], IV, q 24 h), flunixin meglumine (1.1 mg/kg [0.5 mg/lb], IV, q 12 h), and dexamethasone (0.04 mg/kg, IV) were administered. Both guttural pouches were flushed with 1 to 2 L of sterile saline (0.9% NaCl) solution once daily for 5 days. By the eighth day after surgery, tissues surrounding the right pharyngeal orifice of the guttural pouch had undergone latent thermal necrosis. The remaining portion of the pharyngeal orifice had formed a C shape, similar to the first horse reported here. The Foley catheter in the right guttural pouch was removed. The Foley catheter in the left guttural pouch was left in place until 14 days after surgery. A single round fistula was detected within the cartilage of the pharyngeal orifice of the left guttural pouch, and minimal exudate had accumulated within both guttural pouches. The horse was discharged 17 days after surgery.

The horse was readmitted 2 months after fistulation of the guttural pouches. The owner reported a minimal amount of nasal discharge after discharge from the hospital. An endoscopic examination was performed (Fig 1). Tissues of the pharyngeal orifice of the right guttural pouch had healed into a C shape. The endoscope could be passed directly into the right guttural pouch without the aid of a stylet. Only a minimal amount of exudate had accumulated on the floor of the guttural pouch. At the fistulated opening into the left guttural pouch, a 2-cm round bud of granulation tissue occluded the entrance into the pouch. The granulation tissue was removed with bronchoscopic grasping forceps that were inserted through the left nasal passage. Following removal of the granulation tissue, purulent exudate drained from the pouch. The left pouch was lavaged with sterile saline solution, and the pony was discharged from the hospital. Results of telephone follow-up with the owner 2.5 years after fistulation of the guttural pouches and repeated endoscopic examinations revealed that the pony was free of clinical signs of guttural pouch empyema and had not had complications related to the surgical procedure. The owner was satisfied with the surgical procedure.

Medical treatment of guttural pouch empyema is selected for most affected horses. Medical treatment consists of periodic lavage of the guttural pouch to remove accumulated purulent exudate, parenteral administration of antimicrobials, and use of anti-inflammatory agents. The use of antimicrobials in the treatment of guttural pouch empyema is controversial. Some clinicians feel that parenterally administered antimicrobials are not indicated for treatment of empyema unless the infection is spreading or involves other tissues. In general, we believe that parenteral administration of antimicrobials is a useful adjunct to surgical drainage of the guttural pouch. Medical treatment is usually effective in resolving clinical signs of guttural pouch empyema. Surgical drainage of the guttural pouch is indicated when affected horses are refractory to medical treatment, when scarring of the
pharyngeal orifice has developed and prevents drainage from the guttural pouch, and when chondroid masses form. The 2 horses described in our report were refractory to aggressive medical treatment for guttural pouch empyema.

Previously, Tate et al described the use of a similar technique for successful resolution of guttural pouch tympanites in foals. Technically, the described laser surgical procedure is straightforward and is easily performed under endoscopic guidance. Despite loss of the ventral two thirds of the cartilage of the pharyngeal orifice, secondary to laser-induced latent thermal necrosis, complications were not observed in 2 of the 3 cartilaginous flaps that were fistulated. However, the horses of our report were not racehorses. It is possible, although we believe unlikely, that fistulation of the pharyngeal orifice of the guttural pouch could disturb airway dynamics, guttural pouch function, pharyngeal function, and soft-palate placement during strenuous activity. Likewise, such complications associated with function of the upper portion of the respiratory tract were not detected in foals treated with fistulation of the pharyngeal orifice of the guttural pouch by Tate et al.

In the 2 horses we treated, we hypothesize that guttural pouch empyema did not resolve with traditional medical treatments because the pharyngeal orifices of the guttural pouch were not opening normally to allow drainage. Likewise, it has been speculated by Baptistie that neuromuscular dysfunction of the stylopharyngeus and pterygopharyngeus muscles may inhibit normal opening of the pharyngeal orifice of the guttural pouch. After fistulation of the guttural pouch, exudate may drain unimpeded from the pouch when the horse lowers its head to drink water or eat. Problems associated with fistulation were not observed. We recommend this procedure in selected horses that are unresponsive to medical treatment for chronic guttural pouch empyema. The procedure could be used in horses in place of the traditional surgical techniques used to establish drainage from the guttural pouch. This technique also avoids general anesthesia associated with traditional surgical approaches to the guttural pouch and avoids complications (eg, dysphagia and iatrogenic cranial nerve trauma) associated with open surgical exposure of the guttural pouch. In addition to fistulation of the guttural pouch, adjunct treatments such as guttural pouch lavage and parenteral administration of antimicrobials are useful in treating chronic refractory guttural pouch empyema. Both of the horses reported here were treated by use of guttural pouch lavage and parenteral administration of antimicrobials until the pouches were free of purulent exudate.

References