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The guttural pouches can be the site of significant abnormalities of the upper respiratory tract and should be evaluated based on any suspicion of a problem within them. Empyema, mycosis, tympany, and temporohyoid osteopathy are the more common reasons to assess the guttural pouch. A resting endoscopic examination can reveal the presence of blood or purulent material at a guttural pouch opening, but this is not conclusive evidence that the discharge is emanating from the pouch. Since the pouches open passively during swallowing it is possible that material in the nasopharynx can be pushed into the opening during a swallow and thus give the appearance that it is originating from the pouch. Only looking into the pouch can provide direct evidence that the discharge is originating from the pouch.

Examination of the guttural pouch can be most easily be achieved with a smaller diameter endoscope (9mm or less) and using a “stylet” passed through the biopsy channel of the endoscope. With experience, both pouches can be accessed easily from one nostril. To do so the endoscope is positioned just in front of the pouch opening. The scope should be rotated as needed to have the biopsy channel medial, thus prying open the pouch ostium and facilitating passage of the endoscope. The biopsy instrument is slowly withdrawn as the endoscope is passed forward into the pouch to limit the push back from the biopsy instrument if it is wedged in the pouch. While watching the video it should always appear that the scope is moving forward toward an open space.

Familiarity with normal anatomy of the guttural pouch is critical to making valid judgments about any abnormalities. The lining of the pouch is thin and fairly translucent allowing easy identification of underlying structures. The presence of lymphoid hyperplasia is infrequent, but not unusual. The stylohyoid bone divides the pouch into a fairly large medial compartment and a smaller lateral compartment. The external carotid and maxillary arteries are the larger vessels in the lateral compartment. In the medial compartment the internal carotid artery and multiple nerve branches (glossopharyngeal, vagus, accessory, and hypoglossal) can be identified. Infrequently bulging on the medial floor of the pouch will occur with retropharyngeal lymph node swelling.

While we typically think of the guttural pouches as a potential source when the horse has evidence of purulent nasal discharge, the clinical signs of guttural pouch disease are not just nasal discharge. Severe epistaxis as discussed in an earlier presentation can be the result of guttural pouch mycosis and purulent discharge can be associated with empyema. Yet, guttural pouch tympany will have external signs of soft swelling without nasal dis-
charge, and temporohyoid osteopathy will cause neurologic deficits without nasal discharge. Implicating the guttural pouch as a source of disease should always be made by a combination of the physical exam findings as well as resting endoscopic evaluation of the guttural pouch.

Purulent material from the guttural pouch defines some degree of guttural pouch empyema. Guttural pouch empyema can be a primary infection, or secondary to ruptured lymph nodes into the pouch (possibly secondary to *Streptococcus equi*). If it is secondary to lymph node rupture, there may be some degree of blood, and typically large bulges on the ventral floor of the medial compartment are seen endoscopically. Resolution of the problem can likely be obtained if the purulent material is lavaged with a balanced electrolyte solution from the guttural pouch in the early stages of the disorder. Caution should be exercised about adding anything remotely caustic to lavage solutions since neurologic dysfunction (dysphagia) has been caused by such treatments. Culture for appropriate antimicrobial treatment can be beneficial but is not always necessary. The chronic cases become more difficult to resolve and often require surgical intervention.

Chronic empyema can result in chondroid formation or in the more severe cases, complete filling of the pouch with purulent material. It is easy to identify the chondroids endoscopically as multiple rounded masses on the floor of the guttural pouch and can also be seen on lateral radiographs of the head. The presence of chondroids will prevent resolution of the infection until they are removed but the chondroids do not typically cause any other abnormalities. When the pouch becomes completely filled with inspissated purulent material the dorsal pharyngeal roof will be deviated over the front of the larynx and may cause obstruction of the respiratory tract (Figure 1). It can be difficult to pass the endoscope into the guttural pouch since there is not any available air space in front of the tip of the endoscope to allow visualization. Passing the endoscope by feel and then slowly backing up the tip of the endoscope a small distance will create enough space to allow visualization of the material. Typically there is no space to see anything else but inspissated purulent material. Lateral radiographs will have a homogenous radiodensity filling the guttural pouch without any identifiable air space dorsally.

Resolution of the infection in either situation by flushing alone is impossible. Evacuating all the purulent material and keeping the pouch empty is the goal. With a small number of chondroids, the endoscope can be used with a snare or basket to grab the individual chondroids and remove them. With a large number of chondroids or chondroids of large size, creating an alternative opening has great advantages. With transendoscopic laser surgery a salpingopharyngeal fistula can be created (Figure 2). Not only does this allow easier evacuation of the material from the pouch at the time the opening is created, but it also allows continued passive drainage/evacuation postoperatively when the horse is feeding from the ground. A modified Whitehouse approach under general anesthesia is reserved for the most severe cases.

Tympany is another pouch abnormality, but this is most common in very young foals. It is observed more in fillies than colts and Arabians appear to be overrepresented. The foals will have a soft air filled swelling behind the vertical ramus of the mandible. The disorder
is most commonly unilateral despite both sides of the foal’s head will have swelling. On close observation it becomes clear that there is a larger affected side. The foal will also have a history of abnormal respiratory noise or possibly milk at the nares after nursing. Endoscopically there is dynamic collapse of the roof of the pharynx. Frequently there will be some fluid in the affected pouch, which is thought to be a secondary change. To obtain resolution of tympany, a patent air passage needs to be created from the affected guttural pouch to the pharynx. There are two ways to obtain this. Traditionally the septum between the two pouches has been cut to allow airflow from the abnormal to normal pouch which then allows normal airflow into the pharynx. More recently we prefer to use a salpingopharyngeal fistula to obtain the same goal. The fistula is easier to create, is done in the standing, sedated animal, and seems less likely to stricture and lead to recurrence.

The final guttural pouch disease to address is temporohyoid disease. This disease affects the joint between the stylohyoid and the base of the skull as well as the stylohyoid itself. Horses will show evidence of vestibular disease and possibly facial nerve deficits. Radiographs can be helpful in making the diagnosis but direct visualization of the stylohyoid itself via endoscopy of the guttural pouch is most sensitive. Large proliferative density is seen around the temporohyoid joint, the bulla, and the stylohyoid bone. Whether the origin of the disease is infectious or primarily just inflammatory is unclear. Regardless, most horses are treated with antimicrobials and anti-inflammatory. Since the temporohyoid joint becomes fused to the base of the skull, the significant “normal” movement of the stylohyoid can cause fracture at the base of the skull and death. The surgical goal for the disease is to disengage the proximal stylohyoid from the rest of the hyoid apparatus, thus removing the risk of skull fracture and potentially decreasing the proliferative change around the joint which compresses the facial nerve. The earlier surgeries describe resecting a central portion of the affected stylohyoid. This is a difficult procedure and there are reports of these tissues bridging back together over time. The most recent approach describes removing the ceratohyoid. While these surgeries should prevent fatal fracture, the resolution of the neurologic signs is slow and the amount of resolution is extremely variable.

Figure 2. Salpingopharyngeal fistula to the right guttural pouch.