The Pharma Innovation Journal 2023; SP-12(11): 344-346

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(11): 344-346

www.thepharmajournal.com
Received: 02-09-2023
Accepted: 07-10-2023

P Jain
Assistant Professor, Department of Veterinary Anatomy, Co.V.Sc & A.H., NDVSU, Jabalpur, Madhya Pradesh, India

R Vaish
Professor and Head, Department of Veterinary Anatomy, Co.V.Sc & A.H., NDVSU, Jabalpur, Madhya Pradesh, India

N Gupta
Assistant Professor, Department of Veterinary Anatomy, Co.V.Sc & A.H., NDVSU, Jabalpur, Madhya Pradesh, India

S Tekam
Assistant Professor, Department of Veterinary Anatomy, Co.V.Sc & A.H., NDVSU, Jabalpur, Madhya Pradesh, India

P Washnik
M.V.Sc Student, Department of Veterinary Anatomy, Co.V.Sc & A.H., NDVSU, Jabalpur, Madhya Pradesh, India

Corresponding Author:
P Jain
Assistant Professor, Department of Veterinary Anatomy, Co.V.Sc & A.H., NDVSU, Jabalpur, Madhya Pradesh, India

Anatomy and diagnostic imaging of guttural pouch in equine

P Jain, R Vaish, N Gupta, S Tekam and P Washnik

Abstract
In equine a unique structure guttural pouches are present as a diverticula of auditory tube with debatable function, however its infection like empyema or tympany may leads to discomfort to the animal with production loss. Early diagnosis of these conditions with different diagnostic module can help to identify the disease and its early cure. Endoscopy is most convenient mode for the diagnosis, however required a detailed knowledge of anatomy. Diagnosis with radiography can also be performed in severe condition where intubation is quite difficult to do endoscopy. Other diagnostic modalities like CT, MRI can also be used randomly. In the present review anatomy and different diagnostic imaging technique can be used are discussed.

Keywords: Anatomy, diagnostic imaging, guttural pouch, equine

Introduction
In equine a unique structure guttural pouches are present as a diverticula of auditory tube with debatable function. As per one study the size of the equine guttural pouches is largest among several species studied [1]. The function of these pouches has been not clear although a current hypothesis is that they play a role in cooling blood to the brain [2] but their purpose is still under debate [3]. Occurrence of diseases of guttural pouches is comparatively low however it may lead to fatal consequences like dysphagia, fatal hemorrhage with mycotic infection so it is important to become able to diagnose and treat them.

Relevant Anatomy
The equine guttural pouches are paired diverticula of the eustachian tubes, having the capacity to contain about 300 ml of air [4]. Each guttural pouch is situated surrounding the stylohyoid bone having medial and lateral pouches. Many important neurovascular structures are situated in relation to the guttural pouches and contribute to the clinical signs of guttural pouch disorders. Bilateral or unilateral mucopurulent nasal discharge can be seen with guttural pouch empyema. Endoscopic examination provides the most diagnostic information for guttural pouch diseases, although radiography can be helpful.
The capacity of the medial pouch is twice than the lateral pouch. The pseudostratified ciliated epithelium is abundant in mucous glands, lymph nodules, and goblet cells. The guttural pouches stretch rostrally to the level of the pharyngeal aperture of the eustachian tube and caudally to the level of the atlantoaxial joint. They are located beneath the cranium and atlas, dorsal and lateral to the pharynx. The longus capitis and rectus capitis ventralis muscles partially separate them [4].
The guttural pouches are in indirect touch with one another below the longus capitis, with only a thin medial septum standing between them. The pharyngeal aperture of the eustachian tube, which is protected by a thin fibrocartilage plate, is the conduit via which each guttural pouch communicates with the pharynx. The vestibule, which has the shape of a funnel and is wider rostrally than caudally, connects the pharyngeal aperture of the eustachian tube to the guttural pouch. The constriction and continuous ventral connection between the medial lamina of the eustachian tube and the lateral wall of the pharynx are caused by a mucosal fold at the caudal aspect of the tube known as the plica salpingopharyngeus [4]. Sometimes the plica salpingopharyngeus is unnecessary and functions as a one-way valve, trapping air in the guttural pouch result in to guttural pouch tympany [4, 5].
When treating guttural pouch disease medically or surgically, many significant anatomical structures that are connected to the guttural pouch must be taken into account.

The caudal lateral wall of the medial compartment is home to the internal carotid artery, cranial cervical ganglion, glossopharyngeal nerve (cranial nerve IX), hypoglossal nerve (cranial nerve XII), accessory nerve (cranial nerve XI), sympathetic nerves, and vagus nerve (cranial nerve X). The pharyngeal branch of the vagus nerve, the cranial laryngeal nerve, and the retropharyngeal lymph nodes are located on the ventral wall of the medial compartment. The ventral portion of the lateral compartment [4] contains the chorda tympani nerve, maxillary vein, external carotid artery, and facial nerve (cranial nerve VII). The mandibular digastricus muscle and the parotid salivary glands encircle the lateral wall of the lateral compartment. The paired sternocephalicus and omohyoideus muscles, which are located ventral to the guttural pouches, are just dorsolateral to the jugular and linguofacial veins, which run ventral and lateral to the pouches.

Diagnostic Imaging

Different diagnostic imaging techniques are available for diagnosis of suspected guttural pouch diseases [6].

Endoscopy

To advance the endoscope, a crucial tool for identifying upper airway and guttural pouch diseases, one must adduct or raise the fibrocartilage flap covering the pharyngeal aperture of the guttural pouch. The following methods usually need sufficient stock confinement and/or a nose or neck twitch. It is advised to sedate patients using detomidine hydrochloride (0.02 mg/kg IV), xylazine hydrochloride (0.4 mg/kg IV), or a combination of these drugs plus butorphanol tartrate (0.01-0.02 mg/kg).

For endoscopy, it is necessary to send a flexible biopsy instrument or a Chamber's catheter into the endoscope's biopsy channel. The dorsal aspect of the ipsilateral guttural pouch is targeted with the endoscope as it is passed nasally (ventral and medial); it is required that the the flexible biopsy instrument advanced through the biopsy channel and should remain under the fibrocartilage flap til it is well seated in the guttural pouch.

During its passage some problems can arise as if biopsy instrument is too far ventral and does not pass fully into the pouch or when the instrument has entered the nasal cavity too dorsally. Once the biopsy instrument is well seated, the rotation of endoscope is done clockwise for the left guttural pouch and counterclockwise for the right guttural pouch and advanced slowly into the guttural pouch. Due to the eccentric position of the biopsy channel in the endoscope it help to rotate the flap away from the wall of the pharynx and help for the movement of endoscope in the guttural pouch. The same process has to be repeated in the opposite nasal passage to view the opposite pouch [6].

A chamber’s catheter can also be use to help in the advancement of the endoscope. The guttural pouch is thoroughly examined by the clinician, who methodically looks at the medial and lateral compartments, dorsally and ventrally, for evidence of mycosis, empyema, Temporohyoid osteopathy and less common conditions, such as chondroids, cysts, and neoplasia [6].

Radiography

Guttural pouch diseases can also be diagnosed with the radiography in those condition where endoscopy advancement is not possible due to severity of the disease. Technically speaking, radiography processes are simple and can be handled by most x-ray machines. In order to minimise exposure to workers and maximise patient safety, appropriate technique and cassette holders are needed. But lesions found on radiographs are rarely pathognomonic, necessitating additional diagnostic procedures (such as endoscopic or surgical exploration) [11]. The guttural pouch can be clearly seen on a lateral radiograph of the larynx. It has been suggested that a ventrodorsal radiograph be used to distinguish between unilateral and bilateral disease [7, 8]. To obtain this perspective on the radiograph, general anaesthesia is necessary, which raises the expense and danger. Heavy sedation can be needed to lower the horse's head and prevent damage when using portable radiograph machines to acquire dorsoventral views because the tube (placed dorsally) cannot be moved away quickly if the horse raises its head abruptly [7, 8].

High radiation exposure and potential motion artefacts from prolonged exposure reduced the benefits of this technique. To avoid general anaesthesia, it has been advised to get opposite lateral radiographs. When near the cassette in a unilateral infection, the fluid line's boundary is sharper [11]. When the guttural pouch is radiographed, the predominant finding is the presence of fluid or soft tissue opacity inside the often gas-filled structure. The soft tissue/fluid opacity's appearance may change depending on the disease process (for example, fluid lines that are unilateral or bilateral in the guttural pouches due to haemorrhage, emphysema, or diverticulitis), or it may take the form of smoothly marginated, irregularly shaped masses. Additionally, pharyngeal lymphoid hyperplasia can cause the pharyngeal wall (i.e., the ventral border of the guttural pouch) to seem thick or asymmetrical [7, 8].

Other Methods

Although they are uncommon, tumours in or encroaching on the guttural pouch can be either primary malignancy (often squamous cell carcinoma or melanomas) or masses of the parotid or retropharyngeal lymph nodes [9]. Additionally, masses emerging from the skull have been described [7]. It is challenging to distinguish between the masses and fluid, and endoscopy or ultrasonography are typically used for this. A sialogram can be done because the parotid salivary gland occasionally results in guttural pouch lesions related to obstruction of the auditory tube or erosion into the guttural pouch[7]. Carotid angiography has been advised prior to surgery for guttural pouch mycosis to aid in determining the structure of the head's vasculature [7, 9]. Its main purpose is to assess the procedure and to evaluate the size and margin, patency of the vessels by using a positive-contrast medium. For common carotid angiography, general anaesthesia and fluoroscopy are advised. However, due to the large volume (100ml), a pressure injector is advised to achieve an appropriate bolus. Any contrast medium can be used. When utilising arterial coil embolisation to treat guttural pouch mycosis, fluoroscopy and angiography give a road map of the vasculature. With the exception of cases of temporohyoid osteoarthropathy, neither computed tomography (CT) nor magnetic resonance imaging (MRI) have been mentioned as tools for identifying guttural pouch illness in horses [10]. This is most likely because radiography and endoscopy are used to diagnose the majority of guttural pouch problems. Bony lesions like a fracture of the stylohyoid bone that may result in subsequent hemorrhage into the guttural pouches may be better defined with CT or MRI. Limited available technology for the equine patient

along with that requirement of general anesthesia, the time required for positioning and the procedure also reduce the probability of use of these techniques.

Conclusion

Use of diagnostic modalities depends upon the guttural pouch affection, however endoscopy and radiography are two very suitable modalities that may be used easily and helpful to provide clear picture of inside of this organ.

References

1. Baptiste KE. Functional anatomy observations of the pharyngeal orifice of the equine guttural pouch (auditory tube diverticulum). Vet J. 1997;153:311-319.
2. Baptiste KE. A preliminary study on the role of the equine gutturalpouches in selective brain cooling. Vet J 1998;155:139-148.
3. Hodgson DR. Guest editorial: What is the function of the guttural pouches: Selective brain cooling? Augmentation of swallowing? Still to be defined? Vet J. 1998;155:115-117.
4. Freeman DE. Diagnosis and treatment of diseases of the guttural pouch (Part I). Compend Contin Educ Pract Vet. 1980;(1):S3-S11.
5. Dyce KM, Sack WO, Wensing CJG. Textbook of Veterinary Anatomy. Philadelphia, WB Saunders. 2002, p. 501.
6. Freeman DE. Guttural pouch, in Auer JA (ed): Equine Surgery. Philadelphia, WB Saunders, 1999, p. 368-376.
7. Cook WR. The auditory tube diverticulum (guttural pouch) in the horse: Its radiographic examination. J Am Radiol Soc. 1973;14:41-71.
8. Butler JA, Colles CM, Dyson SJ, *et al.* Miscellaneous techniques, in Butler JA, Colles CM, Dyson SJ, *et al*. (eds): Clinical Radiology of the Horse, ed 2. London, Blackwell Science, 2000, p. 565-570.
9. Butler JA, Colles CM, Dyson SJ, *et al*. Pharynx, larynx, and eustachian tube diverticulum, in Butler JA, Colles CM, Dyson SJ, *et al*. (eds): Clinical Radiology of the Horse, ed 2. London, Blackwell Science, 2000, p. 384-393.
10. Walker AM, Sellon DD, Cornelisse CJ, *et al*. Temporohyoid osteoarthropathy in 33 horses (1993–2000). J Vet Intern Med. 2002;16:697-703.
11. www.vetfolio.com