COMMUNICATION

BACTERIAL AND FUNGAL DISEASES OF EQUINE GUTTURAL POUCH:
RECENT SURGICAL ADVANCES

LES AFFECTIONS BACTÉRIENNES ET MYCOSIQUES
DES POCHES GUTTURALES DU CHEVAL:
DÉVELOPPEMENTS CHIRURGICAUX RÉCENTS

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SUMMARY
Fungal and bacterial pathogens can cause very serious diseases of the guttural pouches in horses. Guttural pouch mycosis may cause severe and unpredictable epistaxis, which sometimes requires emergency measures. Transarterial embolization of the affected arteries is the most effective treatment to date. In severe or chronic bacterial infection, it is important to drain the empyema or the pus concretions as best as possible. The modified Garm technique has been shown recently to provide good drainage of the whole pouch, and specifically of its lateral compartment. This technique is performed in tranquilized horses under endoscopic guidance.

Keywords: horse, guttural pouch, transarterial embolization, mycosis, empyema, modified Garm technique.

RÉSUMÉ
Des agents mycosiques ou bactériens sont parfois responsables de pathologies très graves des poches gutturales chez le cheval. Dans le premier cas, l’épistaxis en rapport avec la mycose est imprévisible et peut nécessiter, du fait de son intensité, une intervention d’urgence. Actuellement, le traitement le plus efficace de cette affection est l’embolisation trans-artérielle des artères impliquées. Lors d’une affection bactérienne sévère ou chronique, il est important d’obtenir le meilleur drainage possible de l’empyème ou des concrétions. Il a été récemment montré que la technique modifiée de Garm permet un bon drainage de toute la poche, et plus spécifiquement du compartiment latéral. Cette technique est effectuée chez le cheval tranquillisé et sous contrôle endoscopique.

Mots-clés : cheval, poche gutturale, embolisation transartérielle, mycose, empyème, technique modifiée de Garm.

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INTRODUCTION

For the anatomist, the guttural pouches of the horse are two outpouchings of the Eustachian tube located in the parotid region under the base of the skull and the atlas bone (Barone & Tagand, 1964). They are in contact with each other by a thin membrane in the median plane for the rostra portion, and through the longus capitis and rectus capitis ventralis muscles for the caudal portion. Guttural pouches have important anatomical relationships with other neighbouring structures, particularly the retropharyngeal lymph nodes, vascular structures and nerves. Clinicians need to observe the normal appearance of the adjacent anatomic structures when scoring the guttural pouches (Lepage 1994). Some advances in understanding of the functional anatomy and the physiological role of the guttural pouches have been made (Baptiste et al. 2000), however their implication in a number of pathological conditions, including mycotic and bacterial development still raises more questions than answers (Lepage et al. 2004).

It is suggested that guttural pouches contribute to regulation of the temperature of arterial blood (Baptiste 1998), cooling the circulation to the brain, thereby protecting this sensitive organ from thermal shock and keeping it below body temperature. Baptiste proposes that the guttural pouches act in conjunction with the intracranial cavernous venous sinuses to cool the blood supply to the brain, particularly during exercise.

Several microbiological investigations of the normal flora of the guttural pouches cavities have been published and in particular a retrospective study performed at the Veterinary School of Lyon (France) based on 18 horses hospitalized for treatment of guttural pouch mycosis and in which direct microscopic examination and culture were performed on samples obtained from mycotic lesions during endoscopy examination. The study revealed Aspergillus fumigatus, Aspergillus niger, and Aspergillus versicolor (Ludwig et al. 2005). Opportunistic fungi, such as Aspergillus spp is present in normal equine airway and exist as an organism in soil, decaying vegetation or animal matter and tissues but they usually require a host that is debilitated or immune-suppressed to establish infection which is usually not the case with horses affected with guttural pouch mycosis. Diagnosis of Aspergillosis in the early stages of the disease is also very difficult. At the moment only endoscopy helps the veterinarian in the diagnosis and it is usually only performed, when clinical signs are present which often means a well established lesion in one or both guttural pouch (Lepage 2007).

Parallel to an increase understanding of guttural pouch fungal or bacterial infection, new therapeutic options are proposed. We resume here two options recently developed at the Equine Department of the National Veterinary School of Lyon in collaboration with colleagues from the Universities of Ohio and Copenhagen. Discussion and description of other therapeutic approaches are discussed elsewhere by the author (Lepage, 2004; Piccot-Crezollet & Lepage, 2006) and is not the main focus of this paper.

RECENT SURGICAL OPTION FOR FUNGAL INFECTION OF THE GUTTURAL POUCH

A transarterial coil embolization (TCE) technique for occlusion of the internal carotid (ICA), external carotid (ECA) and maxillary arteries (MA) in ten normal horses (Léveillé et al. 1999) has been developed and evaluated with the goal to prevent haemorrhage in horses affected with guttural pouch mycosis (GPM). The pretreatment angiography of these normal horses confirmed complete occlusion of all vessels and coils that were positioned as intended. Histologically, all horses had partially maturing to mature, continuous thrombi filling at the site of the coils. Ophthalmic complications were not observed. It was concluded that transarterial coil embolization provided a safe, rapid and effective method for ICA, ECA and MA occlusion technique in normal horses. These results were confirmed a year later in affected horses (Léveillé et al. 2000).

In 2005, a retrospective study on horses treated with this new technique was performed. The clinical and surgical features of horses with GPM presented at the Veterinary School of Lyon during a 28 months period were studied and evaluate for immediate to long term results of TCE as a treatment. Medical records of all horses with GPM treated with TCE between February 1999 and July 2002 were analyzed. To be included in the study no other surgical or medical treatment for the mycosis could be administered. Subject details, case history, results of initial clinical examination and endoscopy were reviewed. For all individuals, evaluation of long term complications and case evolution was based on owner or trainer interviews between 24 and 41 months after surgery. Thirty one horses were identified with uni- (n = 25) or bilateral (n = 6) GPM affecting only the medial (n = 28), only the lateral (n = 2) or both compartment simultaneously (n = 7). Of the 23 individuals presented with epistaxis, 20 showed complete resolution of the problem. In the 19 horses presented with neurological symptoms, two were subjected to euthanasia for persistence of severe dysphagia. It was concluded that after TCE the prognosis for survival is excellent (84 %) and prognosis for return at the level expected by the owner or trainer is good (71 %). TCE is therefore an effective method of preventing haemorrhage and resolving the majority of mycotic lesions without further specific treatment (Lepage & Piccot-Crezollet, 2005). Based on these results recommendations have been published in the French professional literature (Piccot-Crezollet & Lepage, 2006).

NEW SURGICAL APPROACH FOR BACTERIAL INFECTION OF THE GUTTURAL POUCH

Surgical access to the guttural pouch is often required to treat some complicated cases of bacterial infection causing empyema, of one or both guttural pouches. The principal factor contributing to the chronicity and re-occurrence of guttural pouch empyema is the difficulty of completely removing all material, specifically from the lateral compartment. Currently, the sur-
gical methods used to approach the guttural pouch include hyo-
vertebrotomy, Viborg’s triangle and the two Whitehouse
methods. These approaches have been around for nearly 200
years and mostly successful (Freeman, 1999). But all these tech-
niques gain access to the guttural pouch’s medial compart-ment.
What remains a surgical challenge is to adequately assess and
resolve those cases of guttural pouch disease that involve the
lateral compartment.

A Norwegian veterinarian (Garm 1946) felt drainage would be
much improved if an opening could be made in the rostra part
of the lateral compartment such that a drain could be placed
in a more straight line. However, this approach was never intro-
duced into other language than Norwegian and since not
been discussed and assessed. Collaboration between the Equine
Department of Lyon Veterinary School and Keith Baptiste from
the Kongelige Veterinær- og Landbohøjskole of Copenhague
concretises into a study performed by Juan Munoz as one
objective of his equine surgery residency program. In this
study feasibility, efficacy and complications following lavage and
drainage of the equine guttural pouch lateral compartment
(GPLC) after a modified Garm’s technique (MGT) approach
was assessed (Munoz Moran et al., 2007).

It is a two step prospective study. Study 1 is performed in six
horse cadaver and study 2 in vivo on four adult standing horses.
In study 1 iatrogenic damage was evaluated by dissection of cada-
ver heads after a MGT approach. In study 2 a lavage/drainage
tube was placed during three days into each GPLC after a MGT
in standing horses (figures 1 and 2). Lavage/drainage efficacy
and iatrogenic damage of the guttural pouch was evaluated
endoscopically during the three days post-surgery and two
weeks later. In both studies, the procedure offered access to the
lateral and medial compartments of the GP. In study 1 no
obvious iatrogenic damage to vessels or nerves was recorded.
In study 2, lavage of the entire GP was easily performed and
nearly all lavage solution was collected trough the drainage ope-
ning. The only major complication encountered was the deve-
development in one horse of emphysema of the lateral wall of one
GPLC and secondary collapse of the mucous membrane. Time
for secondary wound healing was approximately 2 weeks with
a small scar remaining. We concluded that the MGT can be per-
formed safely in standing horses for lavage and drainage of the
GP. Therefore the MGT approach can be used to drain and
remove material from the lateral compartment such as in
cases of empyema or guttural pouch concretions (Lepage 2002)
with the limitation of being able to introduce an endoscope into
the affected GP.

Figure 1: Sagital view of a horse head showing (finger) the direction of soft tissue
dissection during a Modified Garm’s technique approach before placing at that
location a drainage-lavage catheter. (Cliché ENVL-DH).

Figure 2: Ventral view of horse head (rostral is at the right) showing a 2 weeks
old skin incision from a left approach with the Modified Garm’s technique and
a new approach on the right side with a drainage-lavage catheter. (Cliché ENVL-
DH).

Sur une vue latérale de la tête d’un cheval, le doigt montre la direction de la dis-
section des tissus mous réalisée pendant l’approche chirurgicale par la technique
de Garm modifiée, avant de placer, à cet endroit, le cathéter de drainage-lavage.

Vue ventrale de la tête d’un cheval (l’avant est à droite de la figure) montrant l’incision de la peau à gauche, deux semaines après l’approche chirurgicale réa-
lisée par la technique de Garm modifiée et la nouvelle approche sur le coté droit
avec la mise en place du cathéter de drainage-lavage.
BIBLIOGRAPHIE


