**Upper Respiratory Tract Disease in the Horse**

Horses are obligate nasal breathers, meaning that they can only breathe through their noses. On inspiration air passes up through the nostrils, through the nasal passages and into the nasopharynx, through the larynx and into the trachea (or windpipe) to the lungs.

The horse has a large lung capacity and during fast work airflow can increase by up to 20 times resting values. If you consider that a normal horse at rest breathes 15 times per minute and moves approximately 5 litres of air each time they breathe, the respiratory tract at rest moves approximately 75 litres of air per minute. This means a horse can move up to 1,500 litres per air per minute through its respiratory tract during fast work. For this to be possible the entire respiratory tract must produce as little obstruction or turbulence to airflow as possible and any reduction in airway diameter (especially at the level of the larynx, which is the narrowest section) can cause dramatic reduction in airflow and subsequent reduction in the horse’s performance.

Upper respiratory tract disease in the horse can present with a wide range of symptoms. Some horses may be normal at rest and during light work, and horses that are never asked to work hard may have underlying respiratory tract abnormalities or disease that is not recognized or significant. Possible symptoms:

* Nasal discharge, from one or both nostrils
* Nose bleeds
* Nostril flaring
* Increased respiratory rate (normal 8-15 breaths/min)
* Facial swelling • Bad breath
* Rapid or shallow breathing
* Unusual sounds at rest or while working
* Coughing
* Exercise Intolerance

If a horse is showing one or more of the symptoms above it may be due to disease or an abnormality within the upper or lower respiratory tract. For a definitive diagnosis to be reached a full clinical exam often along with several other tests will be needed.

Firstly a thorough clinical exam on the horse will be completed, particularly an inspection of the head to detect any facial swellings or masses as well checking the lymph nodes beneath the jaw. Listening to the airways and the lungs with a stethoscope may detect abnormal respiratory noises. In cases of laryngeal paralysis (roaring) palpation of the muscles on either side of the larynx is performed to try to detect muscle wastage.

Sometimes it may be necessary for the horse to be examined whilst working. The most common conditions of the larynx and soft palate rarely present or cause a problem whilst the horse is at rest and therefore the horse will need to be examined for abnormal noise whilst working.

Endoscopy is a useful tool to help identify the location of the horse’s problem. This is a long scope attached to either a video screen or hand held eyepiece which is then introduced to the horses nostril and into the larynx and trachea. Samples can be taken from the trachea if this is deemed necessary, often by introducing sterile saline down the endoscope and then retrieving it and sending it for culture and sensitivity or cytology.

Further examination may be required in the form of x-rays. This is particularly useful to identify problems within the sinuses in the head. X-rays of the head can detect sinusitis, nasal masses or foreign bodies and cheek teeth abscessation.

To further investigate sinuses in the horse a hole can be drilled into the skull and the endoscope inserted directly into the sinus, as entering them from the nasal cavity is not possible. This allows the entire sinus to be viewed and the mucosal lining assessed and a possible cause and treatment decided upon.

**Nasal Discharge**

This can be caused by a wide range of conditions and can be from one or both nostrils. The discharge can range from a mild serous, clear discharge, to mucoid and thick pus, or blood.

Discharge from a single nostril often implies (but not always) that the pathology is from that side of the nasal cavity or sinuses. Conditions such as sinusitis, nasal foreign bodies, tumours, ethmoid haematomas can present with a one sided discharge.

Sinusitis can be due to an infected cheek tooth root within the sinus, maxillary sinus cyst, fungal infection or tumour growth. Very often fluid can be detected within the skull by percussion of the sinuses (lightly tapping the horses head) and not getting a normal, hollow sound. Discharge may be detected during endoscopy coming from one of the sinus drainage tracts or fluid lines within the sinuses are easily seen on x-ray. Either of these signs indicates that a hole needs to be drilled into the sinus to allow a thorough inspection and to flush the sinus. If a tooth root is involved the tooth is often extracted in order to resolve the sinusitis.

Masses or tumours within the nasal cavity can grow to be quite large before they are detected. Many will cause a nasal discharge, a reduction of airflow through that nasal cavity and may even result in external facial swelling. Endoscopy and or x-rays are used to detect the masses and determine their full extent. A biopsy may be needed to determine what type of mass is present and to help determine the treatment and prognosis.

**Epistaxis (Nose bleeds or bloody discharge)**

Bleeding from the nostrils can be distressing for both the owner and the horse, and in some cases can be life threatening. The blood can originate from anywhere within the respiratory tract, and careful examination is needed to determine the source of the bleeding.

Trauma to the head or nasal cavity through external trauma (ie a kick) or internal trauma (a nasogastric tube) can cause the extremely vascular nasal mucosa to haemorrhage. Bleeding after passing a nasogastric tube, although may seem distressing, will not result in excessive blood loss and will often stop within a few minutes.

Ethmoid haematomas can develop within the ethmoturbinates of the nasal cavity and these can rupture and cause nasal bleeding. These often present as a low grade, usually one sided epistaxis, and can be diagnosed easily by endoscopy. Treatment usually involves injecting small haematomas using the endoscope with formalin which will cause the haematoma to regress. Large ethmoid haematomas require surgical removal.

Another cause of epistaxis can be due to guttural pouch mycosis. The guttural pouch is a specialized pouch beneath the ear of the horse through which the carotid artery runs, along with other nerves and veins. Fungal infection within these pouches can lead to fungal plaques growing on the surface of the vessels and rupturing them causing substantial bleeding from the nose. The fungal plaques can be seen with an endoscope placed into the pouch from the nasal cavity and can be treated by spraying anti-fungal medication through the scope directly onto the plaques. If the horse has had an episode of severe epistaxis due to guttural pouch mycosis, surgery can be performed to ligate the carotid artery on that side to prevent further potentially life-threatening haemorrhage. Fortunately this disease is very rare in Australia.

It is not uncommon to see a bloody discharge from the nostril from horses after hard work. This is due to EIPH, Exercise Induced Pulmonary Haemorrhage, and can be from either one or both nostrils. During fast work the vessels within the dorsal aspect of the lungs may rupture causing bleeding, which then exits the respiratory tract via the nostrils. There are multiple theories on the actual cause of the vessel rupture during fast work, and several medical treatments can help reduce the incidence of EIPH, but very often once a horse has ‘bled’ it is more likely to bleed again in future. EIPH is a common cause of poor performance in race horses.

**Soft Palate**

The most common condition with regards to the soft palate is dorsal displacement. This is usually seen in horses in fast work and they present with a gurgling noise whilst working and a subsequent decrease in performance level.

Diagnosis is by the history of the noise at fast work and ideally endoscopy whilst on the horse is on a high-speed treadmill. A lot of horses will displace their palate during endoscopy at rest and this does not always correlate with displacement whilst working. Methods to treat this condition range from management to surgical correction. Often a tongue tie or dropped nose band can be enough to prevent the horse from displacing its soft palate. A recent device on the market is the Cornell collar, which attempts to pull the larynx forwards and subsequently has the epiglottis further over the palate, making it harder to displace. Surgery involves placing sutures within the larynx to pull it forwards and over the palate, helping prevent the palate from displacing dorsally.

**Larynx**

Roaring Idiopathic laryngeal hemiplegia or Laryngeal paralysis is a common problem, especially in thoroughbreds and larger horses. As the larynx has the smallest diameter within the respiratory tract this can be an area of air turbulence or resistance. In normal horses at fast work both arytenoid cartilages are pulled up and apart to widen the glottis and allow maximum air intake. With laryngeal paralysis the left (much less commonly the right) arytenoid cartilage is unable to be fully abducted and as a result decreases the diameter of the airway, creating air resistance. This is what causes the “roaring” heard when these horses at in fast work. This condition however is rarely a problem at slower paces. Correction is usually surgical, by placing a suture to permanently pull the cartilage to a more open position. This in itself is not without problems as it can lead to aspiration of food material into the trachea and lungs, which can cause infection with pneumonia, or dorsal displacement of the soft palate. Also the suture itself can sometimes fail resulting in a narrowed airway again. In younger horses with time on their side for rehabilitation, a surgery to re-innervate the muscle that controls the laryngeal cartilage is possible. The horses that undergo this surgery need to be chosen carefully for it to be successful however.