TITLE: A problem-based approach to the 'red eye'

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Editorial

A Problem-Based Approach to the 'Red Eye'

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Trying to reduce panic – what tools do you have?

No matter in what type of equine practise you work, it is important to know what equipment you have available to you and how to use it. From prepurchase examination (Matthews 2016) to being able to reach a diagnosis in a clinical patient, examination in the field has its challenges and you need to know how to get the most out of your surroundings. Ideally it is best to be able to watch the patient a little in its environment first. This will help you to gain an appreciation of vision, comfort levels and general behaviour/husbandry information before starting a hands-on examination (Seruca and Lowe 2016). You will gain the most out of your examination by being in a darkened environment (a stable or examination room for example), if possible. Being able to see the eye close up (sedation and peripheral nerve blocks in un-cooperative patients will aid this), from different angles and having a light source will help the examiner to gain the most amount of information. Lastly, being able to take photographs to track clinical progress or to ask for help is also very handy when those complex cases come up.

Prioritised problem list

Having a scheme to follow when presented with a 'Red Eye' is helpful (Figure 1). It reminds the practitioner to perform all aspects of the ophthalmic examination. It also helps to identify where the redness is, what structures are red and to theorise how they became red, e.g. bleeding vs inflamed (Where? What? How?).

Clinical Reasoning

Working out where exactly the redness is, what structures are in close proximity and if this is normal or abnormal can really help with narrowing down causes and treatments for common eye conditions. Once you have identified what is red, trying to work out if this is a primary redness of that structure or if it is secondarily red due to being in contact with the

affected tissue will narrow the differentials further. For example, differentiating conjunctival hyperaemia (vessels are short and branching over the sclera) from episcleral congestion (long, thick and meandering vessels over the sclera) will focus the practitioner's choice of diagnostic tests (Figure 2). If conjunctival hyperaemia is present, this is more consistent with an ocular surface disease, conjunctivitis/corneal ulceration/eyelid abnormality and diagnostic tests such as Schirmer tear testing and fluorescein staining may be more helpful. If episcleral congestion is more evident, then intraocular disease may be more likely, meaning tonometry could be more helpful for these cases. Similar distinctions with iris hyperaemia or hyphema can be made, is it unilateral or bilateral? A history of trauma? Is this a primary ocular problem or secondary to an underlying systemic disease?

Prioritised Differentials

Eyelid/third eyelid: Redness of the eyelids and third eyelid can result from blepharitis (traumatic, bacteria, fungal, immune mediated, etc.), neoplasia (Montgomery 2014), orbital disease leading to exophthalmos and eyelid swelling (Pucket 2017). It has also been seen with trauma and traumatic lacerations of the eyelids. Additionally, traumatic orbital disease has been reported with brain injury leading to optic neuropathy and blindness (Brooks et al 2014).

Subconjunctival haemorrhage: Overt haemorrhage underneath the conjunctiva, obscuring visualisation of the underlying sclera is not common, however in horses is mostly seen in association with trauma. It has also been linked to underlying systemic disease processes for example, clotting abnormalities.

Conjunctival hyperaemia: Redness of the conjunctiva is a common and non-specific ocular sign. However, when not in combination with episcleral congestion, it is more likely linked to ocular surface diseases. For example, conjunctivitis (Brooks 2010), keratomycosis (Brooks

2009, Henriksen et al 2013, Utter et al 2010), corneal ulcerative disease (Gilger 2012 Gonzalez-Medina 2015, Greenberg 2019, Ledbetter 2019), and eosinophilic keratitis (Gonzalez-Medina 2018). The conjunctiva is also a location for administration of drugs for the treatment of ophthalmic diseases (Martins and Brooks 2012).

Episcleral congestion: Engorgement of the episcleral vessels is also a common and non-specific ocular sign. However, when this sign is more obvious than the frequently concurrent conjunctival hyperaemia, it is more likely linked to intraocular diseases. For example, cataracts (Townsend 2016), and glaucoma (Ollivier et al 2009, Thomasy and Lassaline 2015).

Iris hyperaemia: Is seen commonly in uveitis. Uveitis can be a single one off event in horses, or more frequently encountered is Equine Recurrent Uveitis (Allbaugh 2017, Gilger 2018, Malalana 2018).

Hyphema: Intraocular haemorrhage can occur for many different reasons. However, in horses is mostly seen in association with trauma, sever uveitis, corneal perforation/globe rupture and retinal detachment. It has also been linked to underlying systemic disease processes for example clotting abnormalities. With such severe ocular pathology and the amount of trauma often associated with these cases, enucleation is a treatment option if the eye is blind and painful (Brooks 2009 Simoens 1996).

Initial diagnostic plan or treatment

By following the problem-based approach and being able to clinically reason as to which part of the eye is red; along with theorising why that structure is red, will stand the practitioner in a good position to be able to implement an appropriate diagnostic and treatment plan for that patient.

Conclusion

It is key for the veterinary clinician to follow a logical approach to equine ophthalmic cases. This starts with a systematic and detailed examination, remembering anatomy and physiology to help locate where the abnormality is within the eye. Understanding the principals of examination and pathophysiology will help the practitioner to arrive to a prioritised problem list, likely differential diagnoses, and therefore a diagnostic and therapeutic approach to the case in front of them.

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