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Corneal Ulcers

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Despite its relatively small size, the equine eye is a complex organ, which can go very seriously wrong, very quickly when injured. If your horse comes in from the pasture with his eye swollen shut, take no chances- have your vet take a look as soon as possible. These clinical signs could be due to anything from a bump, to a foreign body, to a disease process within the eye. One of the more common problems we see are corneal ulcers. In order to understand this problem, let's first think about the anatomy of the eye.

In its most simple conception, the eye is a round structure divided into two compartments: the anterior ("forward") chamber and the posterior ("behind") chamber. The two compartments are separated from one another by a divider made up of the iris and lens. The anterior chamber lies between the cornea and the iris/lens, while the posterior chamber lies behind the iris/lens and the back of the eye. The cornea is the clear "window" at the front of the eye through which light enters and we can see. It is made up of different layers of cells like layers of a sandwich. The bread is formed by epithelial layers and the contents by the stromal layers, which form the majority of the corneal thickness. In total, the thickness of the equine cornea is only about 1 mm. The cornea is by necessity a very specialized tissue (it's clear!) and contains various mechanisms through which water is excluded from the stroma and transparency is maintained. The remainder of the outside of the eye is covered with a fibrous layer of white tissue (the "whites of the eye"), which is called the sclera.

Corneal ulcers are injuries, abrasions or erosions, to the cornea. While superficial corneal ulcers only involve the outermost epithelial layer (the 'top slice' of bread), deeper ulcers may include loss of the stromal layers and even expose the inner endothelial layer. Any depth of ulcer is painful, and horses may display squinting, tearing or rubbing at the offending eye. You may also see redness, swelling of the eyelids or thick, abnormal discharge from the eye.

When examining an eye, your vet will begin with a careful ocular exam. This will include looking for causes of the ulcer, such as a foreign body stuck in the eye, decreased tear production or the inability to blink. Corneal ulcers can then be definitively diagnosed by staining the eye with a colored dye called fluorescein. Fluorescein stain is not taken up by the normal corneal epithelium, but does stick to the inner stromal layers of the cornea (the filling of the sandwich) in places where the epithelium has been scraped away. While the stain appears yellow/green to the naked eye, it fluoresces green when viewed under a blue light. Ulcers appear as areas of intense green on the cornea. It is important to note

that deep corneal ulcers, ones which have gone through all of the stromal layers, will only show a thin ring of stain uptake on the edges of the ulcer. This is because the endothelial layer which forms the bottom of the ulcer does not adhere to the stain but the sides of the ulcer, where the stroma is exposed, do. Other stains may also be used to evaluate the eye, such as rose bengal and lissamine green, to look for viral or fungal infection.

Management of corneal ulcers involves both systemic (oral or intravenous) treatment and treatments applied directly to the eye. Pain from the corneal ulcer is managed with systemic banamine, a non-steroidal anti-inflammatory medication similar to ibuprofen, along with topical atropine. Atropine is an anticholinergic agent which stops the spasmotic contraction of muscles within the eye secondary to pain, allowing the pupil to dilate.

Corneas, like your skin, are constantly exposed to the environment. Once there is a breech in the epithelial barrier, there is an opportunity for infection to occur. Bacterial or fungal infection may cause significant corneal damage and even corneal melting (keratomalacia) as the body tries to respond. Topical antibiotic therapy is therefore an essential part of treatment for corneal ulcers. There are a wide variety of antibiotic choices available, the most common of which is triple antibiotic ointment, composed of three antibiotics (Neomycin, Polymixin B, Bacitracin). This product has a broad spectrum of activity against many of the probable bacterial contaminants and is a good choice for an uncomplicated ulcer. It is essential to remember that this product is composed of *only* antibiotics and is often referred to as NeoPolyBac. There is a very similar product known as NeoPolyDex, which contains a steroid in addition to antibiotics. Steroids should never be applied to a corneal ulcer, as they inhibit healing. In cases of more complicated or non-healing ulcers, corneal scrapings can be taken to sample the cells and bacteria/fungi within the cornea and to guide antibiotic choice. In addition to an antibiotic, an antifungal is often added to the treatment regime in more complicated cases.

In the case of an uncomplicated corneal ulcer, healing should be complete within 7 to 10 days. If the ulcer does not heal or worsens, more intensive treatments or diagnostics are warranted.

References:

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