

## F10 USED IN THE PROCESS OF ENUCLEATION AND EXENTERATION IN EXOTIC ANIMALS

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### Introduction

Enucleation is the process of removing the globe when there is pathology strictly limited to the globe itself. Exenteration is the process of removing the globe and the orbital contents when these tissues are also involved. Both procedures are reserved for serious ocular conditions which are untreatable, or where the globe and its surrounding tissues are non-viable. The typical mammalian eye has seven ocular muscles grouped into the rectus, oblique and the retrobulbar muscles. The upper eyelid is the larger and more mobile of the two eyelids. In birds and reptiles there are many individual variations to the musculature of the eye and the presence and function of the eyelids. In contrast to mammals, birds and reptiles have a larger and more mobile lower eyelid. In birds the eye socket is dramatically enlarged with a very large posterior segment to the eye. Especially in small species of birds care should be taken not to damage the contralateral optic nerve through the thin interorbital septum. In mammals the eyelids are sutured to one another after removing the globe in a process called tarsorrhaphy. This isn't always possible in reptiles as only certain species have functional eyelids with a normal palpebral fissure. The process of enucleation involves retracting the eyelids, clamping the optic nerve, taking care not to twist it, and then severing the optic musculature to allow removal of the globe. In some smaller exotic species it is necessary to collapse the globe through aspiration of its contents to allow proper visualization of the posterior segment of the globe. Great care must be taken not to damage the medial vascular plexus along the wall of the globe as profuse bleeding may occur.

### Case 1

A 23g, adult female blue-crowned hanging parrot (*Loriculus galgulu*) presented with a corneal opacity of the right eye that did not stain with fluorescein. There was considerable exophthalmos but minimal involvement of the surrounding soft tissue. It was treated for three days with intramuscular carprofen injections at 5mg/kg once daily and for six days with topical chloramphenicol ointment applied three times daily. At the end of the treatment regimen however, there was no response and it was elected to remove the eye. The

eye removal was deemed appropriate as it was established that there was very limited vision in the eye and the exophthalmos was progressing irrespective of treatment. No further diagnostic modalities were employed to determine the extent or exact origin of the exophthalmos. The palpebral fissure was enlarged surgically and the vitreous aspirated from the globe. After following the standard surgical procedure for removal of the globe, F10 barrier ointment (kept at a cool temperature to maintain it as a semi-firm gel), was aspirated in a sterile syringe and instilled into the empty socket. This allows for the elimination of dead space in the socket with the delivery of locally acting antimicrobials. In this case it may also have assisted with stopping the mild seepage of blood from the medial vascular plexus. The eyelid margins were removed and a tarsorrhaphy performed. The bird was placed onto oral clindamycin at 100mg/kg, twice daily for five days post surgery and carprofen at 5mg/kg intra-muscularly once daily for three days. It recovered uneventfully. Post surgery a large dark mass was located within the iris and posterior chamber of the eye. Cytology revealed round cells that resembled melanoma cells. A month after surgery there was no sign of any recurrence and the bird was doing well.

### Case 2

A geriatric adult female white-faced whistling duck (*Dendrocygna viduata*) presented with severe, sub-acute trauma to the right eye socket with the globe absent at the time of presentation. It was anaesthetized with isoflurane and the socket was curetted carefully to avoid damaging the contralateral optic nerve and all foreign material and devitalized tissue removed. The remnants of the third eyelid were removed and the socket was filled with F10 barrier ointment. The wound was treated as an open wound for two weeks with twice daily topical F10 barrier ointment. The bird was also placed onto seven days of amoxicillin/clavulanic acid as an intramuscular injection at a dose of 35mg/kg once daily and carprofen at 5mg/kg once daily for three days. The cause of the trauma is unknown. Once the socket had shown considerable granulation, the tissue



Removing a neoplastic globe from a blue-crowned hanging parrot.



Sterile aspiration of F10 barrier ointment for placement into the open eye socket.

surrounding the injury was bluntly dissected and sutured over. The defect was filled with F10 barrier ointment in a sterile fashion prior to closure. Due to this species being aquatic, it had to be hospitalized throughout the granulation process until the closed wound was water tight. Four months after treatment it was still doing well.

### Case 3

A spayed, four year old, adult female green iguana (*Iguana iguana*) presented with anorexia, serous discharge from the right eye, peri-orbital caking of the right eye with dried exudate and severe blepharospasm. On examination of the eye a large superficial central corneal ulcer was noted that was strongly positive on a fluorescein test. There was a moderate degree of conjunctivitis with markedly visible vasculature. It was treated with chloramphenicol eye ointment twice daily for five days, enrofloxacin injected intramuscularly every other day at a dose of 5.5mg/kg and a single vitamin B-complex injection at a dose of 5mg/kg intramuscularly. The blepharospasm ceased and the fluorescein test came up negative. Three weeks later there was acute exophthalmus with blepharedema and superficial bleeding from the conjunctiva. The fluorescein test was repeated and came up negative. No intra-ocular abnormalities were noted. It was treated with topical eye drops, containing chloramphenicol, neomycin and naphazoline HCL three times daily for six days and once daily injections of carprofen at 4mg/kg for three days. A small central fluorescein positive corneal ulcer appeared again seven days after the retrobulbar swelling was noted.



Fluorescein positive corneal ulcer on an iguana's eye.

Using ultrasonography, no intra-ocular masses, retrobulbar masses, haematomas or abscesses could be found to account for the swelling. A severe retrobulbar cellulitis was diagnosed. The iguana was then treated with moxifloxacin eye drops three times daily and oral meloxicam at a dosage of 0.1mg/kg once daily but failed to respond. It was elected to perform an exenteration due to the unresponsive nature of the lesions. The curetted socket was filled in a sterile fashion with F10 barrier ointment and the iguana placed onto enrofloxacin every other day as before. The wound healed very well over two and a half weeks. However a serosanguinous discharge was then noted. A small catheter was inserted through the discharge opening and it was flushed with F10 SC diluted 1:250. The discharge cleared up and the patient eventually healed.

### Case 4

A nine year old, male black-necked spitting cobra (*Naja nigricollis*) presented with a cloudy opacity of the right eye. It was treated with systemic antibiotics and topical treatment for some time before the decision was made to anaesthetise the snake. It was treated with ceftazidime at a dose of 20mg/kg im once every 72 hours. The snake was induced with propofol IV and maintained on isoflurane anaesthesia via intermittent positive pressure ventilation. A wedge



Black-necked spitting cobra post-spectacle removal with F10 barrier ointment applied to the infected spectacle.

incision was made ventrally on the spectacle in an attempt to flush and drain the sub-spectacular space as there was no response to treatment and a sub-spectacular infection was suspected. A swab of the contents of the sub-spectacular space was submitted for bacterial culture and resulted in the culture of *Staphylococcus epidermis*. The snake was treated with chloramphenicol eye ointment and ceftazidime at 20mg/kg injected intramuscularly every 72 hours for ten days. A soft contact lens was also placed on the cornea. This is not normally performed but by removing the infected material the adherent spectacle was damaged and removed, thus exposing the globe itself. It was changed every three days when the snake was injected. Two weeks later the eye flared up again and was put on a similar treatment regime but without a contact lens this time. It responded to treatment but flared up again approximately a month later. It was decided to perform an enucleation. Anaesthesia was induced and maintained as before and the eye was carefully examined again. Several layered retained spectacles were removed, covered by a mucopurulent discharge. After removal the new spectacle and eye underneath appeared healthy. It was decided not to remove the eye and to treat it with topical F10 barrier ointment once daily for seven days. The spectacle was sent for fungal culture which resulted in the growth of *Paecilomyces* spp. This is a common skin commensal in reptiles but has from time to time been implicated in cutaneous and disseminated mycoses. It was found to be resistant against Nystatin, Clotrimazole, Ketoconazole, Itraconazole and Fluconazole but sensitive to F10, Hibitane, Virkon ® and Microcidal (griseofulvin). Of these products few are safe for use in the eye or available in a suitable formulation. It has shed a new spectacle normally and no abnormalities of the spectacle have been noticed for eight months after, at the time of publishing this article. A new spectacle was shed normally during those eight months. In snakes the majority of retained spectacles associated with fungal infections are the result of poor hygiene and management. The infection very often involves the surrounding tissues as well.

### Conclusion

F10 barrier ointment appears to be an ideal product to use as an adjuvant treatment in the surgical processes of enucleation and exenteration. It acts directly on a wide range of pathogens that might be present prior to or post surgery. Thus far we have seen no side effects from instilling the product into the empty socket. It also facilitates the elimination of surgical dead space.

### Acknowledgements

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References: Reptile medicine and surgery, 2<sup>nd</sup> edition, D.R. Mader, Saunders Elsevier 2006. Avian Medicine, 2<sup>nd</sup> edition, J. Samour, Mosby 2003.

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