Veterinary Health Center
MANHATTAN, KANSAS

OFFICIAL PROTOCOL

OPHTHALMOLOGY SERVICE

Goals of the rotation

The emphasis of this rotation is to teach students how to recognize and treat the common eye problems seen in practice, and to understand when to refer patients to a specialist. Techniques or skills to master during this rotation include performing an ophthalmic examination, fluorescein staining, Schirmer Tear Test, and tonometry. It is also important to recognize when certain diagnostic tests are contraindicated (i.e., Schirmer Tear Test or tonometry in an eye with a deep corneal ulcer).

You are expected to be familiar with common ophthalmic medications prior to beginning the rotation (tropicamide, atropine, proparacaine, anti-inflammatory medications, anti-glaucoma medications, and topical antibiotic medications; please refer to your Clinical Pharmacology notes for a complete list). **You are expected to review your ophthalmology lecture notes from third year and view the ophthalmic examination videos (small animal and equine) posted to the Canvas VCS 906 Ophthalmology Rotation Course prior to the beginning of the rotation.** We give two ophthalmology content quizzes during the course of the rotation: a pre-quiz and an end-of-rotation (i.e., final) quiz; there is also short quiz over orientation materials that you will complete at the same time as the pre-quiz. The end-of-rotation quiz will be administered at 8am on the last Friday of the rotation. A passing score of 70% or better is necessary in order to pass the rotation. A second opportunity to take the final quiz will be available on the last weekend of the rotation for any student who scored below 70%. A detailed rubric explaining our method of grading each student is posted on Canvas; please familiarize yourself with our expectations for the clinical rotation prior to orientation on your first day. You are expected to arrive no later than 8am each day unless otherwise specified by the faculty member. If you have a hospitalized patient, you are expected to arrive prior to 7am in order to complete your examination and treatments by 7am.

Rounds

As our schedule allows, rounds will begin in room E102A between 8:00 and 8:30am Monday through Thursday. Resident rounds are from 8:00-9:30 year-round on Friday mornings (no student rounds on Friday mornings).

Receiving Days

We receive cases on Monday, Wednesday, and Friday. Our first case on the Monday of a new rotation is at 10:00am **so be prepared to perform a complete ophthalmic exam.** You are expected to wear appropriate business casual professional clothes (and a clean lab coat) on receiving days.

One of the ophthalmology clinicians or staff members will briefly assess each animal as you get started with your examination and we will discuss with you if there are any diagnostic tests that should NOT be performed in that patient. Some diagnostic tests are contraindicated in certain situations (i.e., dilating a patient with a history of glaucoma, pupillary abnormalities, iris abnormalities, or a sub/luxated lens). If you are concerned about whether or not to perform a diagnostic test on a patient, please ask one of the clinicians before getting started.

You are expected to take a history, perform an ophthalmic examination, and present the case to the clinician. Please get a weight on your patient before you bring them from the lobby to our exam rooms. When presenting the case, the signalment, presenting complaint, history, ophthalmic findings, differential diagnoses, diagnostic plan, and treatment recommendations should be discussed. A complete physical examination is performed on any patient that is undergoing sedation or general anesthesia, is hospitalized, or has signs of possible systemic illness (for example, animals with uveitis).

The clinicians complete the majority of the discharge instructions for outpatient appointments, while students are expected to work on a draft of discharges for hospitalized patients (see 'Hospitalized Patients' section below).

Hospitalized Patients

Our surgery days are Tuesdays and Thursdays. Please wear clean scrubs and a white coat. Small animal ophthalmology patients are admitted to Ward 2. Each animal that will stay overnight must be fitted with a patient ID band. All treatments and SOAPs are to be completed in Instinct prior the beginning of morning rounds and you are expected to arrive prior to 7 am if you have a hospitalized patient. If you have a patient in the

hospital over the weekend, you will be responsible for SOAP-ing the patient daily and meeting with the attending clinician on the case. Small animal cases in the ward should be SOAP-ed once daily. ICU small animal cases should be SOAP-ed twice daily. **If you have a small animal inpatient, you are in charge of treatments in the evening if they are in the ward. All small animal ward and equine patient daytime treatments (7am to 7 pm) are the responsibility of the student on the case.** Equine cases should be SOAP-ed twice a day. An equine medicine student will be assigned to our patients but we are ultimately responsible for their care. We can ask the medicine student to help with treatments, but it is the responsibility of the ophthalmology student to ensure that the treatments are administered and that the medical record is kept updated. **Please update discharges for inpatients daily. If your patient will be here during a rotation change please have everything up to date and organized for the incoming student. Surgery reports are due within 24 hours of the surgery.**

You are responsible for submitting all blood, urine, cytology, and histopathology samples on your cases. Please ask the clinicians if you have questions regarding which tests to request on the appropriate forms. The clinicians will also review the histopathology request forms prior to submission. Clinicians will be responsible for submitting anesthesia requests, and the Ophthalmology Service does not complete separate surgery request forms. You are responsible for calling owners and giving them an update for all hospitalized patients once daily in the evening (this will be confirmed with the clinicians when a patient is hospitalized). All communications need to be logged in Instinct. Owners should also be called when we receive any laboratory results (you should consult with one of the clinicians before you call the owner).

Discharge Procedure for Inpatients

Before the client arrives, make sure that prescriptions have been written and medications to go home are ready. All patients that are discharged from the hospital should be clean (please consult with a clinician before bathing a patient) and the patient ID band should be removed before the patient goes home. Also, be sure any Vetwrap bandage is removed from prior IV catheter sites. A clinician must always speak with a client before you allow them to leave the hospital (including drop-offs and discharges).

Emergency Duty

Emergency shifts are from 5:00pm-8:00am on the weekdays, and from 8:00am-8:00am on the weekends.

The ophthalmology rotation is a total of 14 days; there are two 5-day work weeks and two weekends. All students are expected to be present for the *entire* rotation, including weekends, unless arrangements are made with the faculty member on clinics in writing (email) *at least two weeks in advance of the requested day(s) off*. While the

ophthalmology rotation is not typically an inpatient-heavy rotation, there are times when several small animal and/or equine patients are hospitalized over the weekend. The student assigned to the case is expected to continue providing patient care with the 7 am/7pm treatments and SOAPs throughout the weekend. **Arranging the on-call/emergency schedule so that you are free of call for a weekend *does not* guarantee that you won't have patient care responsibilities**, so as a rule you should expect to be in town and available for the entire two weeks**.**

Ophthalmic Examination

Please view videos on Canvas prior to beginning the rotation

- A thorough history of the animal's eye and general health problems should be taken including all medications the animal is receiving (including dosage/frequency/and response to therapy).
- Vision assessment is accomplished by observing the animal as it walks to the exam room. If there is a concern regarding vision, an obstacle course or maze can be set up to assess vision with the lights on and with the lights off.
- With the animal on the examination table, a menace response should be elicited, being careful not to stimulate the cornea with air currents or touch facial hairs.
- Examine the animal at eye level with an assistant gently presenting the head and restraining the patient.

Restraint of the patient

- Prior to restraining the patient the head should be carefully evaluated looking for symmetry, blepharospasm, ocular discharge and masses.
- The patient should be gently restrained by an assistant by placing one hand under the mandible and one hand behind the head. If the patient appears to be aggressive, please place a muzzle or notify someone on the ophthalmology team.

Retrobulbar palpation

- Retropulsion of the globes is only performed in cases of suspected orbital disease (exophthalmia).
- Place hands over both upper eyelids and gently push the globes into the orbit, feeling for pressure preventing the globes from moving deeper into the orbit or asymmetry.

Transilluminator – This bright light source allows you to examine the eyelids, conjunctiva, cornea, anterior chamber, iris, pupil, and lens . A magnification loupe or glasses aids in visualization of the anterior segment of the eye.

Direct illumination – view the eye from the same direction as the light

- Diffuse light- light source is held far from the eye
- Focal light- light source is held close (1cm) to the eye

- Transillumination - shine the light across the eye and view from a 90° angle
- Retroillumination - reflecting light off the fundus to illuminate intraocular structures. Ocular lesions may appear dark (e.g. cataracts). Slit beam of ophthalmoscope highlights changes in shape, depth or location of structures or lesions.

Pupillary light reflexes (PLR)

- Note the size and symmetry of the pupils with the lights on and off. If there is anisocoria determine which pupil is abnormal.
- Direct - shine the light in one eye and watch that eye for pupillary constriction. This tests cranial nerves II and III, as well as the retina, optic nerve, and optic tracts.
- Indirect (consensual) - shine light in one eye and watch the opposite eye for constriction.
- Remember it is possible to have a PLR and no vision, as well as vision and no PLR.

Schirmer tear test - measures aqueous tear production (normal is >15 mm/min)

- The test is completed by bending the strip at the notched mark, placing it in the lower conjunctival fornix and holding it gently in place for 1 minute. A STT is not performed if there is a deep ulcer or a corneal perforation present.

Fluorescein stain - stains the corneal stroma

- Fluorescein dye is used to detect corneal ulceration and the patency of the nasolacrimal system.
- Wet the fluorescein strip with sterile eye wash solution and touch the strip to the bulbar conjunctival surface. Do not touch the corneal surface. Gently rinse the eye well with eye wash solution. Hold cotton balls or gauze under the eye to catch the excess stain. Excess stain may be picked up by mucus strands and misinterpreted as a positive ulcer.
- Stain can be mixed with eye wash in a 1 ml syringe and sprayed on the corneal surface (mainly for equine patients). Do not store this solution long-term due to possible bacterial contamination.
- The stain can be viewed with a normal light source or a cobalt blue filter which aids in fluorescence; a positive stain is green.

Intraocular pressure (IOP) measurement - normal IOP is 15-25 mmHg

- The IOP should be measured in all cases of suspected glaucoma, uveitis, lens position shift, or any “red eye”.
- Do not restrain the dog too tightly, inadvertently press on the eye through the lids, or hold off the jugular vein with neck restraint as this will result in a falsely elevated pressure.

Tonopen: measures by applanation

- Measures the pressure required to flatten, or applanate, a specific area of the cornea.
- Apply topical anesthetic to the eyes.
- Animal’s head is held in a normal forward position. The instrument is gently touched to the corneal surface. The instrument will beep as readings are taken. Light touch is extremely important for accurate readings.
- Value is reported in mmHg with a % error (ideally < 5% error).

Tono-Vet: measures by rebound

- This instrument measures the return force of a small pin bounced on the corneal surface. There is a setting for a dog/cat, horse, an "other" species.
- The animal's head is held in a normal forward position. The instrument is held approximately 5 mm in front of the eye in a horizontal position; a button is pushed to release the pin. The button is pushed 6 times to allow for an average to be calculated. Error readings indicate the pin is too close, too far, or not perpendicular to the corneal surface.
- The result is reported in mmHg with no line or a low dash indicating an acceptable reading.

Ophthalmoscopy - examination of the fundus

It is very helpful to dilate the eye with tropicamide prior to examination in order to view the entire fundus. The optic nerve should be evaluated for its size, shape and color, as compared to normal for the species. Next identify the blood vessels for their caliber, color and degree of branching. In dogs and cats there are commonly 3-4 blood venules arising from the optic nerve head. The tapetal color varies with the coat color of the animal ranging from blue-green-yellow-orange.

Direct Ophthalmoscopy

- Place the brow rest of the instrument on your own eyebrow, hold the instrument a few inches from the animal's eye, and look directly into the eye. The instrument can be used to evaluate all levels of the eye. Dialing the central wheel of the instrument changes diopter setting. Red numbers are negative with white or green numbers being positive, a 0 has no diopter correction.
- The various diopter settings allow examination of the different structures of the eye: +20 focuses on the cornea conjunctiva and lids, +12 focuses on the anterior lens capsule, +8 focuses posterior lens capsule, and 0 to -2 focuses on the fundus. If you wear corrective glasses and remove them prior to using the ophthalmoscope you will need to make your own corrections to these numbers.
- The front of the instrument has variable aperture settings to allow different types of illumination, small spot, large spot, slit beam, and variable color filters.
- The advantage of direct ophthalmoscopy is simplicity; disadvantages are the very small visible area and the closeness to uncooperative or fractious animals.

Panoptic Direct Ophthalmoscopy

- Allows for a greater viewing field (5 times larger) when compared to direct ophthalmoscopy.
- The instrument also allows for aperture and diopter setting changes. To view the fundus set the aperture setting (horizontal dial on instrument) to the green bar. Hold the instrument to your eye and with the room lights on view an object at approximately 5 feet. Use the diopter setting (the vertical, thumb operated dial) to focus on the object.
- Turn off room lights and place instrument 2 cm from the patient's eye (fill the pupil with light), and view the animal's fundus. Modify diopter setting slightly as needed to focus.

Indirect Ophthalmoscopy - viewing a virtual image of the fundus.

- This requires a focused light source and a lens (20D or 28D are recommended).
- Start at a comfortable arm's length distance from the animal. Hold the transilluminator at eye level; create a line of light from your eye to the animal, place the lens perpendicular to the line of light approximately 2 to 4 cm from the eye. Move the lens closer or further as needed to make the fundus image fill the lens.
- Advantages are visualization of a large area of the fundus and placement of the examiner at a

distance from the animal. Disadvantage is that it requires a slight degree of experience to use the technique.
- The images viewed using indirect ophthalmoscopy are upside down and backwards.

Lacrimal duct flush*

- Tests the patency of the nasolacrimal system. This test should be performed when epiphora is present without concurrent signs of ocular irritation.
- Topical anesthetic is applied to the ocular surface.
- The puncta are located approximately 5 mm from the medial canthus (at the pigmented, non-pigmented junction) just inside the margin of the superior and inferior lids.
- A lacrimal cannula or soft and flexible IV catheter (23ga or smaller) may be used. A 3ml syringe filled with eye wash solution is attached to the cannula/catheter. It may be helpful to add a fluorescein strip to the syringe as the dye will aid in visualization of fluid emerging from the distal nasolacrimal system. The cannula/catheter is slid along the inner lid edge until it slides into the puncta. Fluid is injected into the duct until it is seen exiting the other puncta. Gentle pressure is then placed over the other puncta and the fluid should then exit the nostril (or the oral cavity) if the nasolacrimal duct is patent.

Bacterial culture*

- Use microtip swabs to collect samples for bacterial culture. To improve results the swab should be pre-moistened by breaking the ampule prior to sample collection. Topical anesthetic should be applied prior to obtaining a sample for culture.
- Samples may be taken from eyelid, conjunctiva or cornea and processed in a routine manner. The longer the swab is held at room temperature after sample collection the lower the bacterial viability, thus the lower the test results.
- Samples for Chlamydia and Mycoplasma require special media because they are obligate intracellular organisms.

Cytology or PCR/IFA*

- Samples may be collected from the eyelids, conjunctiva or cornea.
- A topical ophthalmic anesthetic is applied to the eye.
- A cytobrush allows for the best sample collection, but a small blunt instrument of any kind may be used, including a Kimura spatula or the back (blunt) end of a scalpel blade.
- The area to be sampled is lightly abraded and then smeared on a glass slide.
- Routine staining procedures are then followed for cytology. Samples for PCR or IFA are submitted following the instructions of the testing laboratory.

*Indicates testing generally performed by the attending clinician with student observation.