

OCULAR Outlook

A QUARTERLY PUBLICATION FOR THE VETERINARY COMMUNITY FROM EYE CARE FOR ANIMALS

TONOMETRY



Lynsey Smith, DVM, DACVO

Tonometry is the indirect measurement or estimation of intraocular pressure (IOP). It is an essential diagnostic procedure during the eye examination in animals. Indications for tonometry include any red or painful eye, corneal edema, mydriasis, trauma, lens luxation, or a history of glaucoma in the fellow eye.

Tonometers

In order to diagnose or rule out glaucoma you will need a tonometer. Tonometers are found in an increasing number of general practices each year and are close to becoming standard of care in veterinary medicine. There are two main types of tonometers, rebound and applanation. Previously, an indentation tonometer was used (Schiotz). The Schiotz tonometer is



Figure 1: Tonometry using the TonoPen

no longer standard of care as it is less accurate, difficult to use, and unsuitable for large animal use. Though there are many available tonometers, the two most widely used tonometers are the TonoPen and the TonoVet due to their ease of use and portability.

The TonoPen is an applanation tonometer (Figure 1). Using the Imbert-Fick law (the force required to flatten a given area of a sphere is equal to the pressure within the sphere), the instrument measures the force required to flatten a constant area of cornea. The stainless steel probe contains a strain gauge which converts IOP to an electrical signal. A microprocessor in the body of the instrument analyzes the waveform. Each single valid IOP reading is

digitally displayed on the LCD screen. Four valid readings are obtained and the instrument displays the mean IOP and the standard deviation for those readings on the LCD screen. Recently, the TonoPen was found to be accurate when measuring IOP through a contact lens. In that study, the TonoPen gave less variable readings than the TonoVet.

(CONTINUED ON PAGE 2)

INSIDE THIS ISSUE

Upcoming Events	Pg3
Article Spotlight	Pg3
Message from the President	Pg4

OCULAR *Outlook*

Editor: Keith Collins, DVM, MS, DACVO
 Managing Editor: Julie Gamarano

Eye Care for Animals welcomes your comments on the Ocular Outlook. Please e-mail your feedback to jgamarano@eyecareforanimals.com or call Julie at (480) 682-6911.

For electronic subscription please visit www.eyecareforanimals.com

Eye Care for Animals
LOCATIONS

- Avondale, Arizona
- Gilbert, Arizona
- Phoenix, Arizona
- Scottsdale, Arizona
- Tucson, Arizona
- Chula Vista, California
- Corte Madera, California
- Culver City, California
- Palm Desert, California
- Pasadena, California
- San Diego, California
- Santa Rosa, California
- Torrance, California
- Tustin, California
- Upland, California
- Chicago, Illinois
- St. Charles, Illinois
- Wheeling, Illinois
- Overland Park, Kansas
- Wichita, Kansas
- Lexington, Kentucky
- Louisville, Kentucky
- Annapolis, Maryland
- Towson, Maryland
- Lee's Summit, Missouri
- Springfield, Missouri
- Las Vegas, Nevada
- Reno, Nevada
- Albuquerque, New Mexico
- Santa Fe, New Mexico
- Akron, Ohio
- Austin, Texas
- El Paso, Texas
- Houston, Texas
- Round Rock, Texas
- Orem, Utah
- Salt Lake City, Utah
- Sunset, Utah
- Leesburg, Virginia
- Pewaukee, Wisconsin

TONOMETRY

(CONTINUED FROM PAGE 1)

The second tonometer available is the TonoVet (Figure 2). This is a fairly new tonometer introduced in 2004. The TonoVet is a rebound tonometer and functions via ejection of a 1mm diameter magnetic probe. The instrument assesses the motion of the probe as it strikes the cornea and rebounds. The TonoVet has been found to be accurate and is calibrated for the dog/cat and the horse. The operator does not apply any force to the cornea when using the TonoVet. Rather, the user only has to press a button to send the probe towards the cornea. This eliminates user error when compared to the TonoPen. The TonoVet does not require use of topical anesthesia. Tonometry is rapidly performed by deploying the probe 6 times in rapid succession while holding the hand still. The instrument will average these readings for you. Potential benefits of the TonoVet include: it is much easier to use on very small eyes when compared to the TonoPen, it does not require calibration, and in the author's experience, patients are more accepting of the TonoVet than the TonoPen. In a study of normotensive dog eyes, the TonoVet consistently provided lower IOP determinations than the TonoPen; however the difference was only 1 - 2 mmHg. The

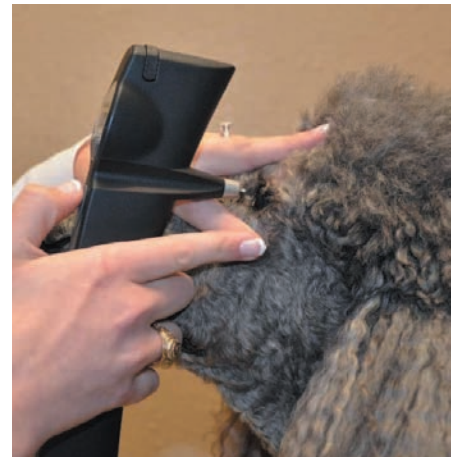


Figure 3: Tonometry using the TonoVet

accuracy and reliability of the rebound tonometer has not been assessed in diseased corneas.

Tips for using the TonoPen: Use proparacaine as this will diminish patient resistance and the patient's blink reflex. Have an assistant gently restrain the animal using the patient's mandible. Rather than tapping the cornea, attempt to gently "kiss" the surface of the cornea. Too much force on your part can falsely increase the IOP reading. Brace your wrist or hand on the patient for more fine control over the instrument. Ensure the tip's flat surface is parallel to the corneal surface. Watch the display as it takes each reading to ensure the readings are reasonably close to one another. If corneal disease is present, attempt to obtain your measurement from a non-affected area of the cornea. Always measure both eyes - this will give you a baseline measurement on the "good" eye and measuring the "good" eye helps you feel confident that you are performing tonometry correctly. You will want to replace the cover between patients to prevent cross contamination. Take time to train your staff and above all use the TonoPen as much as possible. Practice on anesthetized patients at first so that everyone can feel confident with the instrument while the patient is still. Once proficient at tonometry you can feel confident in interpretation of the intraocular pressures of your patients.



Figure 2: The display screen for the TonoVet. The letter h on the left of the screen indicates the horse setting.

TONOMETRY

(CONTINUED FROM PAGE 2)

Tips for using the TonoVet (in addition to those listed under the TonoPen): Steady your hand on the patient. Only move your thumb - this is the steepest part of the learning curve as users will naturally move their whole hand. Keep the instrument tip perpendicular to the central cornea rather than tilting it (Figure 3).

Why do I always obtain different IOP readings than my local ophthalmologist?

A few mistakes we often see in regards to performing tonometry:

1) Applying any pressure on the jugular veins will falsely elevate IOP. Have your staff hold the patients by the mandible and ensure collars are

loose.

2) Applying pressure to the eyeball when trying to open the eyelids. Use the orbital rim instead (this is especially important in brachycephalic breeds).

3) Tapping or hitting the cornea when taking measurements. Stabilize your wrist on the patient so that you are only moving your fingers to take the pressure (not your shoulder, elbow, and wrist).

4) Taking consecutive readings and averaging them. IOP decreases with each reading and the machine is already averaging for you. If you believe your first reading there is no reason to repeat the test.

5) Forgetting to measure the other eye.

ARTICLE SPOTLIGHT

Editor's note: The spotlight is intended to provide practitioners with clinically relevant information from journals not available to most veterinarians. Old and new articles will be included and are selected by the reviewer. This month's article was selected by Dr. Mark Bobofchak in Akron, Ohio.

Title: Orbital abscess bacterial isolates and in vitro antimicrobial susceptibility patterns in dogs and cats. *Vet Ophthalmol* 2009;12:91-96.

Summary: This is a retrospective study that examined bacterial isolates obtained from 34 dogs and 7 cats with orbital infections (or abscess). The most common sources of orbital infection were from adjacent structures or tissues, penetrating wounds, and foreign bodies.

Comments: There is limited information regarding orbital bacterial infections in dogs and cats, and this study is the most comprehensive to date. Mixed aerobic and anaerobic bacterial infections were common. The most common canine isolates were *Staphylococcus*, *Escherichia*, *Bacteroides*, *Clostridium*, and *Pasteurella*. The most common feline isolates were *Pasteurella* and



Mark Bobofchak, DVM, DACVO

Bacteroides. Based on in vitro susceptibility testing of these isolates, cephalosporins, extended-spectrum penicillins, potentiated penicillins, and carbapenems are recommended for initial treatment of orbital infections.

Conclusion: Prompt treatment of orbital infection is required to prevent blindness and scarring of orbital tissues. Bacterial culture may not be practical, or culture results immediately available. The author has commonly used amoxicillin-clavulanic acid or cephalexin as first choice drugs, and such treatment is supported by this study. Animals with recurrent orbital infection may benefit from combined treatment with one of the aforementioned antibiotics and metronidazole, with the latter antibiotic effective for *Bacteroides* species.

Spotlight on NEW LOCATIONS

COMING SOON

MISSION PRACTICE

5914 Johnson Drive
Mission, KS 66202
(913) 381-EYES (3937)

DURANGO PRACTICE

670 South Camino Del Rio
Durango, CO 81301
(866) 697-EYES (3937)

Upcoming EVENTS

June 25, 2012 – Phoenix, AZ
*Ophthalmic Diagnostic Testing and
Tonometry for the Technician*

August 17-19, 2012 - Albuquerque, NM
Weekend with the Specialists

August 29, 2012 - Culver City, CA
Neuro-Ophthalmology: The Basics

September 29, 2012 – Tempe, AZ
Gilbert Day with the Specialists

For more information please
contact Julie Gamarano at
jgamarano@eyecareforanimals.com

WHY HAVE A DRUG & ALCOHOL-FREE WORKPLACE?

Employers who have implemented drug & alcohol-free workplace programs reported decreases in absenteeism, accidents, turnover, and theft, and in return saw increases in productivity and positive morale. Employers who tracked their long standing drug & alcohol-free programs reported fewer health claims and some qualified for decreases in workers compensation insurance premiums. Employers have a general duty to take reasonable measures that ensure the safety and welfare of their employees, clients and patients.

The DOL reports of the 17.4 million illegal drug users age 18 and older, 13.1 million (or 75%) were employed. And, of 55 million alcohol binge drinkers, 44 million (or 80%) were employed. These statistics help us

realize the importance of creating a Policy that helps promote a drug & alcohol-free workplace. A Drug & Alcohol Policy should address the use, sale, possession or distribution of drugs and alcohol and reference that the employer will test for (1) pre-employment, (2) post-accident, (3) random testing (may vary by State), and (4) reasonable suspicion. Every employee should be required as a condition of employment to read and abide by the Policy.

In the event a drug or alcohol issue needs to be addressed it can be an uncomfortable situation. Approach the employee and state that because of the smell of drug or alcohol, or because behavior is such that it appears he/she may be under the influence, that he/she will be relieved of their work responsibilities and



Karen Webster, MBA
President & CEO, Eye Care for Animals

sent to a collection site for testing. Call a taxi to take the employee to the site and then on to home. Let the employee know he/she will be contacted at home with the results. Make it known that the employer is not judging or making any determination that he/she is under the influence, but that there is reasonable suspicion to be tested. If there is no Policy in place, work with legal counsel or an HR professional to draft the Policy. Have a safe work environment!

A QUARTERLY PUBLICATION FOR THE VETERINARY COMMUNITY FROM EYE CARE FOR ANIMALS

OCULAR *Outlook*

PRESORTED
STANDARD
U.S. POSTAGE
PAID
TUCSON, AZ
PERMIT NO. 414

