CLINICAL GUIDELINE

Tonometer Probes

This Guideline provides information and guidance to members about the use of tonometry probes in optometric practise. It should not be used as a substitute for statutory responsibilities and optometrists must ensure that they comply with relevant laws.

Tonometer probes are the most common item in the consulting room to regularly come into contact with mucous membranes and tears of patients. In some instances the performance of tonometry has been implicated as a possible factor in the spread of epidemic kerato-conjunctivitis. Optometrists should be familiar with infectious conditions that carry a higher risk of transfer when performing tonometry and always manage individual patients in order to reduce these risks.¹

Single use tonometer probes

Single use probes such as those available for Goldmann, Perkins¹ and Icare² tonometers are aimed at minimising the risk of the spread of infection and reduce the risk of accidental contact of hydrogen peroxide with the cornea as they do not require disinfection of the probe.

There are also tonometers that can be fitted with a disposable tip that may be used for one patient and then discarded eg. Tono-Pen.³

The manufacturers of the Icare single-use probes state that the probes should not be cleaned, sterilised or reused, other than measuring pressures in the same patient within a reasonably short time period. The manufacturers advise that if the same probe is used to measure both eyes of one patient, if there is any possibility of transferring an infection from one eye to the other eye, the user must ensure that the healthy eye is measured first. If there is any doubt a new probe should be used for each eye.

In applying single-use tonometer probes (or shields) to the tonometer the optometrist must ensure that they do not touch the applanating face of the prism (or the portion of the disposable tip) that will come into contact with the eye.

Multiple use tonometer probes

Optometrists must ensure that multiple use tonometer probes are cleaned and disinfected before and after use and that the probes are maintained appropriately.

There is controversy about the most suitable method to disinfect tonometers. Common practice is to wash the tonometer prism with tap water, wipe with an alcohol swab and allow to air dry. There are, however, some problems associated with this method:

- In one study, the greatest reduction in Hepatitis C virus RNA occurred with a five-minute soak in 3% hydrogen peroxide or 70% alcohol, followed by a wash in cold water (in comparison to use of dry gauze wipes, isopropyl alcohol 5-second wipes, cold water wash or povidone iodine 10% 5-second wipes).⁴

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• Hepatitis B virus is not removed with alcohol wipes, so alcohol wiping must be followed by rinsing with soap and water.5

• HIV is totally eliminated with a 70% alcohol wipe or a five-minute soak in 3% hydrogen peroxide, 70% alcohol or 1:10 bleach.6

One study showed that Adenovirus 8 (a common cause of epidemic keratoconjunctivitis) is removed with alcohol, iodophor or hydrogen peroxide wipe or a five-minute soak in these disinfectants or bleach.7,8 However another paper reported that 3% hydrogen peroxide and 70% isopropyl alcohol were not effective against adenovirus capable of causing epidemic keratoconjunctivitis, raising concerns about the use of a tonometer probe that has been used previously on an affected individual.9

• Infectious prions are highly resistant to inactivation by many current disinfection techniques such as alcohol and chlorhexidine (for CJD and vCJD) and autoclaving (for vCJD).10 If a patient is at risk of having CJD, noncontact tonometry or disposable tonometer tips/shields/prisms/probes should be used and disposed of immediately.

• Alcohol swabbing and long-term (four days) continuous soaking with alcohol have been reported to cause damage to tonometer prisms, such as surface scratching and dissolving of the glue holding the tonometer prism together.11,12

• Sterile water/saline is suggested for rinsing because of the potential for Acanthamoeba contamination of water supplies.

The recommended method to disinfect tonometer prisms is:

• Clean tonometer prism by rubbing with a mild (neutral pH) soap or a non-abrasive contact lens cleaner before debris has dried.

• Rinse off the soap or contact lens cleaner with sterile water/saline before disinfecting.

• Soak the tonometer prism on its side for five to 10 minutes fully immersed in 3% H₂O₂, 70% isopropyl alcohol or 1:10 dilution of bleach.13,14 Alternatively, a set-up that allows the 2 to 3 mm area adjacent to the tonometer tip to be immersed in solution without the tip resting on the bottom of the container may be suitable.15 In the diagram, holes have been drilled in the top of a petri dish to allow the prism surface and surrounding 2 to 3 mm to be soaked in the disinfectant. Similar devices are commercially available.

• Rinse with sterile water/saline and air dry. (Sterile water and saline solutions should be discarded in accordance with the manufacturer’s recommendations. Alternatively unit dose saline may be used.) Store in clean, closed container when not in use.

• Have at least two prisms available for use so that one can be soaking while the other is being used.

• If you have had to remove the tonometer prism by putting your fingers into the solution, the solution needs to be changed each time. If you are able to remove the tonometer tip without contaminating the solution, the solution should be changed twice a day. Any device used for soaking tonometer tips must be cleaned with soap and water each day.

Additional Recommendations

1. Reusable tonometer probes should be replaced on a regular basis or if they are damaged (see the manufacturer’s recommendations).
2. Tonometers should be calibrated in accordance with the manufacturer’s recommendations.

3. Use a disposable tonometer tip, shield, prism, probe or non-contact tonometry in cases of eye infection, hepatitis, HIV or if the patient is at risk of having CJD.

4. Non-contact tonometry may result in ‘splash-back’ and as the tonometer could contact the eye, it is necessary to wipe it with an alcohol swab between patients.

5. If tonometry is not performed record the reason on the patient record. Consider referring the patient to another eye-care practitioner to have tonometry performed if indicated.

References
2. Icare Finland Oy www.icaretonometer.com (accessed August 2011)