Department of Health Government of Nunavut	NURSING POLICY, PROCEDURE AND PROTOCOLS		
	Community Health Nursing		
TITLE:		**SECTION:**	**POLICY NUMBER:**
Measuring Intra-Ocular Pressures		Clinical Procedures	11-013-00
EFFECTIVE DATE:	**REVIEW DUE:**	**REPLACES NUMBER:**	**NUMBER OF PAGES:**
February 10, 2018	February 2021		5
APPLIES TO:			
Community Health Nurses			

POLICY:

The Registered Nurse, who has received additional training in tonometry, shall be authorized to measure intraocular pressures when clinically indicated. The nurse shall use the Tono-pen to measure intraocular pressures for the following clinical incidences:

1. **Confirmation of a clinical diagnosis of acute angle-closure glaucoma;**
2. **Determination of a baseline ocular pressure after blunt ocular injury;**
3. **Determination of a baseline ocular pressure in a patient with iritis;**
4. **Documentation of ocular pressure in the client at risk for open-angle glaucoma**

Tonometry shall not be performed in the following clinical incidences:

1. **When the cornea cannot be completely anesthetised (e.g. client allergy to the local anesthesia).**

2. **With a suspected penetrating ocular injury.**

3. **The presence of corneal defects represents a relative contraindication to tonometry and requires physician consultation.**
   - **For example, the use of a tonometer on an abraded cornea may lead to further injury.**

4. **Clients who cannot maintain a relaxed position.**
   - **For example, significant apprehension, blepharospasm, uncontrolled coughing, nystagmus, or uncontrolled hiccups**

DEFINITIONS:

Tonometry is the estimation of intraocular pressure. It is obtained by measuring the resistance of the eyeball to indentation by an applied force.

Tono-pen is a pocket-size tonometer that uses the Mackay-Marg principle. The Tono-pen calculates an average intraocular pressure after four valid measurements.

PRINCIPLES:

- Early detection of elevated intraocular pressures is essential to preserving eye sight.
  - Prolonged elevated intraocular pressure is associated with visual field loss and blindness.
  - Sudden elevation of intraocular pressures can result from trauma or primary angle-closure glaucoma.
- The Tono-pen is a useful screening tool. If an elevated intraocular pressure is measured, the client requires additional testing by applanation tonomety in a designated referral site.

RELATED POLICIES, GUIDELINES AND LEGISLATION:

Procedure 11-013-01 Measuring Intra-Ocular Pressures: Tono-pen

REFERENCES:

Thomsen, TW and Setnik, GS (2009). *Measurement of Intraocular Pressure: Tono-pen technique*.

PROCEDURE 11-013-01

NURSING CONSIDERATIONS:

Follow the manufacturer's specific instructions for Tono-pen use. This procedure is an addendum to the manufacturer's instructions.

1. Tonometry is the estimation of intraocular pressure (IOP). It is obtained by measuring the resistance of the eyeball to indentation by an applied force.

2. Prolonged elevated IOP is associated with visual field loss and blindness.

3. Sudden elevation of IOP can result from trauma or primary angle-closure glaucoma.
    a. Suspect glaucoma in clients with the following symptoms: acute aching pain in one eye, blurred vision (including "halos" around lights), a red eye with a smoky cornea, and a fixed mid-position pupil.
    b. Sometimes the presentation of acute angle-closure glaucoma is less dramatic with systemic complaints, including nausea, vomiting, and headache. On occasion, these clients may even deny complaints of pain in or about the eye.

4. There are a variety of techniques used to measure intraocular pressure. Devices used for tonometry include the Goldmann tonometer, the pneumatic applanation tonometer, the Schiøtz tonometer, and the Mackay-Marg tonometer (permits a continuous tonographic recording).

    The Tono-pen and Schiotz tonometer are both available in the community health centre setting.

5. The Tono-Pen and Tono-Pen XL are pocket-size tonometers which use the Mackay-Marg tonometer principle.
    a. A transducer tip sits on the cornea to measure resistance to the movement of the plunger in the transducer tip.
    b. The Tono-Pen XL calculates an average intraocular pressure after four valid measurements.
    c. It is a portable, lightweight, relatively accurate with built-in provisions for calibration.

EQUIPMENT
✓ Tono-Pen or Tono-Pen XL ✓ Disposable latex cover for the tip of the Tono-pen ✓ Topical ocular anesthetic (e.g., tetracaine, proparacaine) ✓ Non sterile gloves 

PROCEDURE:

1. Place the client in a comfortable position for both the client and the nurse. With the use of the Tono-pen, the client can be positioned in any tolerated position as long as the device can be applied perpendicular to the corneal surface.

2. Explain the procedure, perform hand hygiene and put on gloves.

3. Instil a local ocular anaesthetic to the cornea and wait about 30 seconds.

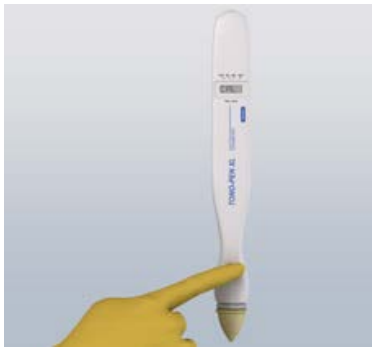
4. Ask the client to look at a fixed object (the client's own thumb or finger held directly in front of his or her eyes may work) and to keep absolutely still.

5. With the thumb and index finger of one hand, gently hold open the client's eyelids, taking care not to put any pressure on the eye.

6. Apply the latex cover snugly over the probe tip of the Tono-pen.

7. Perform calibration before use at least once daily.

    a. Hold the probe vertically with the tip pointing straight down.
    b. Press and release the activation switch twice in rapid succession. Two beeps will then sound, and "CAL" will appear (on LCD).
    c. Hold the probe in this position (up to 20 seconds) until a beep sounds and "-UP-" appears (on LCD). Immediately turn the probe 180 degrees so that the tip points straight up. In a few seconds, another beep occurs, and the LCD changes.
    d. If the LCD reads "Good," the calibration was successful. If the LCD reads "bAd," the calibration was unsuccessful.
    e. With an unsuccessful calibration, repeat the calibration steps just described until two consecutive "Good" readings are obtained.
    f. If further attempts at calibration are unsuccessful, loosen the Ocu-Film tip cover and repeat the calibration process.
    g. If attempts are still unsuccessful, press the RESET button and repeat the process.
    h. If still unsuccessful, use compressed air to clean the probe tip and repeat the process.
    i. If still unsuccessful, the battery should be replaced and the process repeated.
    j. Continued failure warrants a call to the designated biomedical technician.

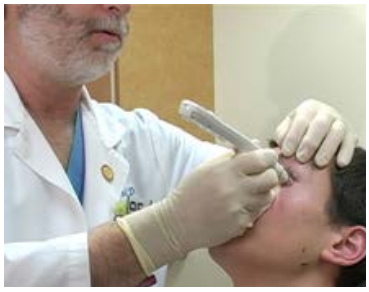


8. Proceed to measurement once the device is calibrated and the client is prepared as previously outlined

9. Depress and release the activation switch to obtain "====" (on LCD screen).

    a. A beep will occur when ready.
    b. If the switch is not depressed long enough, the LCD will be blank.
    c. If a blank screen is seen, press and release the activation switch again to obtain "====" (on LCD).

10. Hold the probe like a pen, and rest the heel of your hand against the patient's cheek.



11. Quickly and lightly touch the cornea at least four times until four valid readings are obtained.

12. A click will sound and a reading will appear on the LCD each time a valid reading is obtained.

13. After four valid readings, a final beep will sound and the averaged measurement will appear on the LCD.

    a. The number represents the IOP in millimeters of mercury (mm Hg).
    b. The associated bar reflects the statistical reliability (a reading of >20% reflects an unreliable measurement and should be repeated).

14. If four dashes ("----") appear on the LCD after the final beep, too few valid readings were obtained.

    a. In such a case, reactivate the probe (without recalibration) and repeat the measurement procedure.
    b. If the probe is not reactivated within 20 seconds, the LCD will clear, but the device can be activated as noted previously without recalibration.

15. Discuss the tonometer readings with the physician and arrange follow-up care as appropriate.

16. Store the device with an unused Ocu-Film cover protecting the probe tip.

REFERENCES:

Thomsen, TW and Setnik, GS. (2008). *Measurement of Intraocular Pressure: Tono-pen technique.*

Approved by:	Effective Date:
11 FEB 2011 **Chief Nursing Officer** **Date**	April 1, 2011
February 11, 2011 **Deputy Minister of Health and Social Services** **Date**	