

## **Pitfalls in IOP measurements in Pediatric patients**

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Many factors can affect the IOP measurements in pediatric glaucoma; generally speaking we can say that these factors concern:

- The patient
  - The instruments used for IOP measurement
  - The experience of the medical practitioner
  - The procedure used for measurement whether with or without general anaesthesia or sedation.
1. Factors related to the patient include:
    - His age since the age of the patient determines the state of his cooperation during the IOP measurement.
    - Associated outer coat disease such as corneal scarring or extreme thinning of the sclera, which will influence in terms of the scleral rigidity factor, the latter should be taken into consideration being different from the adult values.
  2. **Instruments used for IOP measurement:** are either Schiottz tonometer, hand held applanation tonometer or recently introduced Tonopen; each if these instruments is constructed according to a different principle that should be known by the medical practitioner.
  3. **The practitioner:** The degree of the experience of the medical doctor performing the IOP measurement is an important contributing factor to the accuracy of measurement since dealing with infants requires a certain degree of experience with the pediatric population.
  4. **The procedure:**
    - a) **Measurement of IOP in children who are awake:** Cooperation of the child is very important since squeezing or moving the eyes will definitely give false results and hence, only neonates or school age children (above 5 years) can be measured without anaesthesia.
    - b) **Measurement of IOP under general anesthesia**  
The anesthetic used should be chosen carefully so as not to lower the IOP in excess (e.g. muscle relaxant); also the child should not be put into deep anesthesia since these levels of anesthesia falsely lower the IOP.
    - c) The lid should be separated gently and carefully since excessive lid traction will result in increased orbital pressure that can be transmitted to the eye giving false high results.

d) The instrument used should not be applied to the globe except when the cornea is central in position, as peripheral application of applanation tonometer or Schiøtz tonometer definitely yield false results. In case of using applanation tonometer, one should be careful in putting excess fluorescein eye drops, since an excess in the dye will distort the mires of the instrument because of the shallow fornices, which render the excessive tear film. It is also important to know that the instrument used should be well calibrated, familiar to the practitioner and last, but not least, well known for its accuracy.

**The** newly introduced Tonopen has more advantages in pediatric IOP measurement, since it can be applied to the periphery of the cornea thus overcoming the difficulty of unstable eyes or central corneal opacities, bearing in mind that it gives an average measurement of three readings.

**The** upper limit of normal IOP in children is much lower than adult levels; previous statistical investigations confirmed that the IOP in infants and children till school age should not exceed 15 to 17mmHg; these values are of course lower by 2 to 3 mmHg if they are measured under general anesthesia.