

THRIVE (Transnasal Humidified Rapid-Insufflation Ventilatory Exchange) during analgosedation for cyclophoto- and cryotherapy

Steck K, Jerney P, Enzler R, Morgenegg R, Lersch F
Department of Anesthesiology, Bern University Hospital, Switzerland

BACKGROUND

Both cyclo-destructive glaucoma procedures as well as laser photocoagulation or cryopexy of retinal breaks are short-time span procedures tied to potentially intensive pain. Traditional ways of providing analgesia in this situation range from retro-peribulbar blocks to laryngeal mask General anaesthesia (GA). A small volume posterior sub-Tenon's block for transcleral cyclo-destructive interventions is suggested by Dr. T. Eke. Locoregional anesthesia (sub-Tenon) for the cited procedures has not taken on at our institution, yet both bag-mask ventilation or laryngeal mask-GA are cumbersome or seem exaggerated for the short time-span. Our institution purchased several THRIVE (Transnasal Humidified Rapid-Insufflation Ventilatory Exchange) machines that we use on a regular basis for short painful ophthalmic procedures.



METHODS

Fasted patients (2 h clear liquids/4-6 h solids) are placed in a bed in the anaesthesiological ante-room and monitored (O₂ saturation, Riva-Rocci-blood pressure and 3 lead ECG). Head and upper body are elevated at 30-50° to further reduce aspiration risk. The nasal prongs are inserted in both narines and an explanation on the character of short deep apneic analgosedation given. High-flow oxygenation and O₂ flow are slowly increased to 20 l/min. Patient is assured that his feeling of "not having to breathe anymore" is a natural part of the method. Once the ophthalmic intervention team is set and ready the patient receives 0.2-0.5 µg/kg BW Fentanyl, 1-3 mg/kg BW Propofol and 0.5-1 mg Alfentanil respectively. During the painful procedures special care must be given to open airways (jaw-thrust) and adequate analgo-sedative "depth". Immediate pain can cause bronchospasm. Given the short duration (5-10 min) we never use transdermal CO₂-monitoring. With transition to spontaneous breathing transnasal O₂-flow is reduced by 10 l increments. With sufficient spontaneous breathing nasal prongs are exchanged for 2-4 l/min nasal oxygen.

DISCUSSION

There are plenty of different methods to provide sufficient analgesia for cyclophoto- and cryotherapy. Application of local anesthesia (sub-conjunctival) is time consuming and doesn't guarantee full cover of pain. Sharp-needle blocks come with grave inherent risks we wish to forego. General anesthesia using laryngeal mask insertion or even intubation requires more manpower and is tied to the known risks.

THRIVE could be an alternative with its own risks and limitations. As mentioned above special care must be given to an open airway to prevent barotrauma. One has to keep in mind that there's no secured airway, associated with a certain risk of aspiration. In case of complication conversion to intubation is feasible in a simple manner.



LITERATURE

- 1) Eke T. Preoperative Preparation and Anesthesia for Trabeculectomy. *Journal of Current Glaucoma Practice*. 2016;10(1):21-35. doi:10.5005/jp-journals-10008-1198.
- 2) Eke T. Anesthesia for glaucoma surgery. *Ophthalmol Clin North Am*. 2006; 19(2):245-55. Review.
- 3) Patel A, Nouraei SAR. Transnasal Humidified Rapid-Insufflation Ventilatory Exchange (THRIVE): a physiological method of increasing apnoea time in patients with difficult airways. *Anaesthesia*. 2015;70(3):323-329. doi:10.1111/anae.12923.
- 4) Pastor SA et al. Cyclophotocoagulation: a report by the American Academy of Ophthalmology. *Ophthalmology* 2001, 108:2130-8
- 5) Conner I., *Cyclodestructive Procedures in Glaucoma*, Ophthalmology 4th edition 2014, p.1125-1128
- 6) Greven C., *Retinal Breaks*, Ophthalmology 4th edition 2014, p.643-645

CORRESPONDENCE

Katharina Steck, katharina.steck@insel.ch
Friedrich Lersch, friedrich.lersch@insel.ch