ANESTHESIA OPTIMIZATION IN PEDIATRIC OPHTHALMIC SURGERY

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Kurbonov Navruzbek Zayniddinovich
Sharipov Isroil Latibovich
Department of Anesthesiology, Resuscitation and Emergency Medicine of the Samarkand State Medical University Samarkand Uzbekistan

The proposed anesthesia protocols for pediatric ophthalmic surgery enable the administration of adequate anesthesia without significant changes in hemodynamics. The use of propofol with ketamine and fentanyl results in stable hemodynamic parameters throughout the anesthesia and early post-anesthetic period, and induction occurs without signs of agitation.

Keywords: *anesthesia, ophthalmology, children."*

RELEVANCE

Information regarding the level and structure of eye diseases is of significant importance for the provision of ophthalmic care to the population. Eye injuries are one of the primary causes of unilateral blindness, eye loss, and enucleation [1]. According to the literature, the proportion of eye injuries in the general pediatric ophthalmopathology ranges from 35.0% to 46.8%, and among children receiving treatment in a hospital setting, it ranges from 27.3% to 80.7% [2]. Preschool-age children sustain eye injuries four times less frequently than school-age children. A characteristic feature of eye injuries in children is the occurrence of damage in the context of ongoing growth and development of the entire body, often leading to purulent inflammation in the case of penetrating wounds [3].

The importance of performing surgical procedures on the organs of vision under general anesthesia is unquestionable. Moreover, it usually leads to improved surgical treatment quality. However, another question arises concerning the choice of anesthesia method and anesthetics. Unlike other surgical specialties, in ophthalmic surgery, the use of anesthetics and drugs administered during surgery is not indifferent to the functional state of the visual organ. Some anesthetics (such as ketamine, calypsol, and others) and drugs (depolarizing neuromuscular blockers, and others) increase intraocular pressure, which is considered an undesirable side effect of these medications. Therefore, a differentiated approach is necessary in determining the anesthesia technique and anesthetics, aimed at preventing postoperative complications.

Materials and Methods: This scientific research presents the results of ophthalmic surgical operations conducted under general anesthesia in children aged 3 to 14 years from 2017 to 2022 at the Samarkand Regional Multidisciplinary Children's Medical Center. All surgical interventions were planned and performed as urgent procedures under general

anesthesia. After a thorough examination of the patients and preparation for the surgery, the following operations were performed: strabismus correction (20), scleroplasty (30), chalazion removal (50), operations for strengthening the sclera, trabeculectomy (2), hemangioma tumor removal (10), corneal suture removal (30), eyelid ptosis correction (5). Pre-medication was administered based on the upcoming surgery and anesthesia method and was carried out using the standard method, which involved intramuscular administration of a cholinergic agent, analgesic, and antihistamine drug in age-appropriate doses, 30 minutes before the surgery. Among the anticholinergic drugs, atropine and metacin were most frequently used at a dose of 0.01-0.015 mg/kg of body weight. Analgin was used as an analgesic at a dose of 1-1.5 mg/kg of body weight. Diphenhydramine was administered as an antihistamine at a dose of 0.1-0.2 mg/kg of body weight to reduce the risk of possible allergic reactions [4].

The improvement of anesthetic support for children's operations remains relevant. In our clinic, for this purpose, we used a combination of propofol 1% with ketamine, sevoflurane with fentanyl. The introduction of this anesthetic practice was an important milestone in the development of intravenous anesthesia. Combined anesthesia, ketamine with propofol, ensured a gradual emergence from anesthesia without agitation and without complications in the postoperative period. Hemodynamics remained stable with no significant changes. Anesthesia protocols for elective ophthalmic surgeries are aimed at providing pain relief, immobilizing the patient, and allowing the ophthalmologist to perform the surgery effectively.

The use of propofol with ketamine, in comparison to previously used medications for inhalation and non-inhalation anesthesia, reduced the time for emergence from anesthesia, decreased the need for antiemetic drugs to prevent nausea and vomiting during the recovery from anesthesia. The depth of anesthesia and analgesia could be regulated by adjusting the dose. After discontinuation of propofol with ketamine, the child woke up from anesthesia within a few minutes. Thanks to the rapid onset and offset of propofol's effect and its anxiolytic properties, propofol with ketamine is well-suited for quick and short surgical procedures. Propofol also reduces intracranial and intraocular pressure. These effects can be beneficial in ophthalmology and neurosurgery. Propofol can be used as a sole anesthetic for brief surgical procedures and, when combined with fentanyl and ketamine, allows for successful anesthesia during ophthalmic procedures with spontaneous breathing.

Furthermore, maintaining anesthesia with a propofol infusion and bolus fentanyl administration ensures an adequate level of anesthesia throughout all stages of the surgical procedure and offers good control. Hemodynamics remained stable with no significant changes. Anesthesia protocols for elective ophthalmic surgeries aim to provide pain relief, immobilize the patient, and enable the ophthalmologist to perform the surgery effectively. For patients with accompanying diseases, preoperative preparation was

conducted, including correction of fluid and electrolyte balance, correction of metabolic disturbances, and replenishment of circulating blood volume.

Choosing the most suitable type of anesthesia for emergency ophthalmic interventions, especially for penetrating eye injuries in children, presents certain challenges because it is not always possible to assess the severity of penetrating eye injuries in extreme situations and anticipate the full scope of the upcoming surgical operation. In emergency situations, 257 children were operated on for penetrating eye injuries (58), trabeculectomy (4), removal of foreign body from the eye (6), primary surgical treatment of eyelids and lacrimal ducts (172), removal of corneal sutures (7). Pre-medication was also administered according to the standard scheme.

We applied a combined endotracheal anesthesia based on 1% propofol with ketamine or sevoflurane, oxygen, and fentanyl for emergency ophthalmic interventions. During anesthesia, specific issues in ophthalmic surgery were taken into account, such as preventing an increase in intraocular pressure and reflex tearing caused by eye irritation. Depending on the nature of the surgery, the induction of anesthesia was carried out using propofol or a combination of oxygen and sevoflurane. An antidepolarizing neuromuscular blocker was used for intubation to reduce fasciculation and, consequently, prevent an increase in intraocular pressure. The main anesthesia was administered in the following combinations: propofol with ketamine, fentanyl with sevoflurane, or propofol alone, with the addition of benzodiazepine drugs as needed. With these combinations of anesthetics, children quickly fell asleep without agitation, and the course of anesthesia was smooth, with no complications during surgery. After the operation, patients were transferred to the intensive care and therapy unit, where they received infusion therapy, antibacterial and hemostatic treatment, and pain management in the postoperative period. After waking up, patients were transferred to the ophthalmology department for further treatment.

Conclusion: Thus, the proposed anesthesia protocols for pediatric ophthalmic surgery allow for the administration of adequate anesthesia without significant changes in hemodynamics. When using propofol with ketamine and fentanyl, stable hemodynamic parameters are observed during anesthesia and the early post-anesthetic period, and induction occurs without signs of agitation. The postoperative period proceeds smoothly, with patients waking up without significant signs of agitation or hemodynamic changes, allowing for early extubation and transfer to the ophthalmology department for further treatment.

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