OFISA

NEWSLETTER

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MESSAGES

Message from ISA Secretary

I am very happy to hear that Ophthalmic Forum of ISA is coming out with news letter. Any branch or section of an Association or society will progress by its communication to its members by news letters. The news letters will also tell the others about its activities.I feel under your able leadership the Ophthalmic Forum will raise to its cause. I wish the News letter be a thumping success.

Dr.S.S.C.Chakra Rao
Secretary I.S.A. (National)
Secretary FBF-ISA
67-B, Shanthi Nagar
Kakinada-533003.(A.P)

Message from Vice President, OFISA

Ophthalmic Anaesthesia has gained lots of importance which it really deserves .I am happy that the Indian Society of Anaesthesiologists has allowed this speciality and approved the formation of the ophthalmic forum to function as a separate wing of ISA .

I am sure with all the enthusiastic young ophthalmic anaesthetists ,the future will be very good .My best wishes '

Dr K Balakrishnan
Past President ISA

Editor Message

With great pride, we are releasing 1st edition of our OIFSA Newsletter. I hope this newsletter will help the members of OFISA to share their views pertaining to ophthalmic anaesthesia.

In this edition, a very interesting and easy way of reducing the IOP acutely, is discussed by Dr Uday Goraksha. Dr Ian Sundaraaj, explains about the importance and technique for securing the airway in Probing and Syringing of nasolacrimal duct, in children, under general anaesthesia. The challenges faced by anaesthesiologists practicing ophthalmic anaesthesia is explained in detail by Dr Ravichandar. Dr Raseesh Diwan reports an interesting case of anklyosing spondylitis posted for cataract surgery. A case of Congenital laryngeal web posted for oculoplastic surgery is reported by Dr Sujatha V, along with the Video clippings of this very rare case. Dr Jaichandran V V, gives some practical pearls for instilling dilatation eye drops in children.

I hope this edition will not only benefit anaesthesiologists but also useful for ophthalmologists too.

Dr. R. Kannan
Editor, OFISA Newsletter

Intravenous Lignocaine Hydrochloride as an Intraocular Hypotensive Agent

Dr. Uday Goraksha

Consultant Anaesthesiologists, Mumbai, udayg@hotmail.com.

Every anesthesiologist who helps during ophthalmic surgery knows the significance and importance of a normal, if not a low, intraocular pressure (IOP).

Bedford in 1980 first recommended lignocaine hydrochloride intravenously to achieve a rapid reduction of intracranial pressure (ICP) during neurosurgery. He reported that a rapid reduction of ICP could be achieved within 90 seconds following an intravenous bolus of 1.5 mg / kg of lignocaine hydrochloride. Subsequently Rout et al (1986) provided the validity and safety of the concept. Shapiro (1973), Sakabe (1974) and Himes (1977) postulated that lignocaine reduces both cerebral oxygen consumption and cerebral blood flow by increasing cerebrovascular resistance and thus reducing intra cranial pressure (ICP).

The author hypothesized that if this concept was valid to ICP, then there was no reason why, if applied in an identical manner, the same would not work on IOP.

Material Methods Application

Lignocaine hydrochloride, 2% solution for intravenous usewith no preservatives-was given over 15 to 20 seconds as boluses of 0.5 to 1.5mg/kg body weight in normal IOP patients. The intraocular pressure was monitored before giving, and for every 5 minutes for 30 minutes following. All intraocular pressure measurements were taken in the supine position. In the initial 1500 cases measurements were made in the eye not being operated on. The fall in IOP in a normal patient is striking. No other technique, Diamox, I/V Lasix or Mannitol could reduce IOP to such levels, in such a short time in a normal eye.

Techniques and Dosage

The most effective application was during cataract surgery. The study included more than 12,000 cases between 35 and 75 yrs of age over a period of 12 years. During the first year only ASA 1 & 2 status patients were studied, but subsequently ASA 3 and even many cases of ASA 4 status patients were included. Routine peribulbar blocks or topical anaesthesia were utilized. No premedication was given preoperatively and only phenylephrine 5 or 10% and homatropine 1 or 2% drops were used for dilatation of the pupils. Most patients were mildly sedated just before the blocks or sometimes during surgery with midazolam, ketamine and / or propofol after initial i.v. anticholinergics.

B.P., pulse, ECG, O2 saturation, respiration and ETC02 were continuously monitored-before, during and after surgery.

Intravenous lignocaine 0.5 to 1.5 mg/kg body weight was given over 15 to 20 seconds towards the end of irrigation / aspiration after phakoemulsification or nuclear extraction. This was given earlier or repeated later if and when required to reduce IOP whenever it was raised during surgery. A maximum of 2 mg/kg was given.

Contraindication & Precautions

1. Hypersensitivity to lignocaine.

2. To be used with caution in AV blocks and any type of conduction defects.

3. In severe hepatic damage and renal insufficiency.

4. I V lignocaine causes sedation and drowsiness and potentiates the effect of other sedatives, so the dose of sedatives required may have to be reduced.

Observations and Results

In the present study, i.v. lignocaine 2% was used routinely in cataract surgeries, for both ECCE as well as phakoemulsification. The rapid onset of action with a 40% reduction in about 60 to 90 seconds reaching a 50 to 60% peak in 8 to 12 minutes, after which the effect gradually wore off. No rebound rise in IOP was noted. Following I.V. injection, a flat taut capsule, with a medium to shallow chamber after extraction, gradually changed

to a deep chamber with a concave capsular membrane, indicative of a fall in lOP.

Intra and postoperative B.P., pulse, O2 saturation, respiration and ETC02 were stable and normal. No nausea, vomiting or coughing noted.

As a matter of fact, an added advantage of i.v. lignocaine is that it has great antitussive properties (E. Steinhans - 1963)

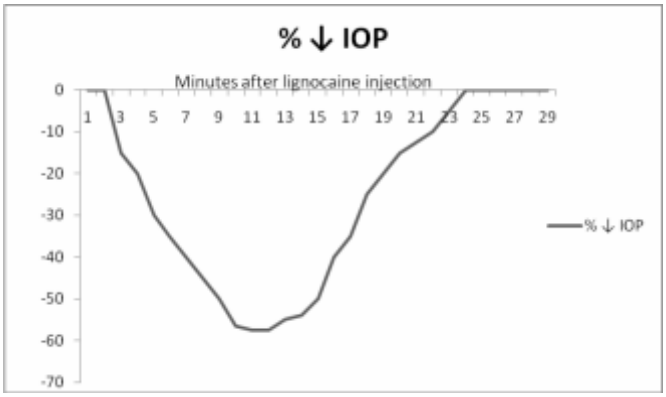

Figure : Effect of IV Lignocaine on IOP

Summary

Various studies by Steinhans (1958), Philips (1960), Knight (1980), and Kundu (1982) have commented upon the remarkable stability of multisystemic parameters with lignocaine.

Steinhans (1963) in addition also commented upon the effective suppression of the cough reflex with i.v. lignocaine. As to the mode of action, Sakabe (1974) and Himes (1977) postulated that the reduction of cerebral oxygen consumption and reduction of cerebral blood flow may be due to enhanced cerebrovascular resistance resulting in a fall in ICP, a view which was also subscribed to by Rout et al (1986).

It is possible that it may be the mechanism for fall in intraocular pressure as well. Intravenous lignocaine is very useful for rapid reduction of intraoperative lOP. We have used this extensively, and at times under very difficult conditions and have found the results very encouraging.

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Probing and Syringing Nasolacrimal Duct in Children.

Dr. Ian Sundara Raj
Department of Anaesthesia, Sankara Nethralaya, Chennai, India, drisr@snmail.org

Probing and Syringing for congenital nasolacrimal duct obstruction is a simple outpatient procedure for ophthalmologists but it cannot be taken lightly by anaesthetist as it carries many anaesthetic implications-

Stimulation of larynx by the syringed fluid/ secretions may lead to laryngospasm.

Aspiration of secretions/ fluid into the lungs could occur

Various types of anaesthetic techniques have been followed by anaesthetists and it has also been done without anaesthetists and anaesthesia.

Riser[1] advocated probing without anaesthesia by wrapping the child in a sheet of cloth and holding its head forcibly.

Agarwal and Gupta[2] have done Dacryocystography and lacrimal probing in cases of congenital obstruction of nasolacrimal duct. In all the cases Ketamine anaesthesia was used for radiography and probing.

Sharma, Vaidya & Shrivastava[3] have performed Syringing and probing under topical anesthesia in 376 infants between 5 to 7 months of age. Their infants were sedated by giving syrup Trichloryl 50 mg per kg-orally. They have found that early probing can be done without general anesthesia, as it was easier to restraint the infant. This they say not only avoids the morbidity, hospital stay and hazards of general anesthesia, but also at the same time reduces the total cost of treatment and this procedure can be easily repeated.

With increasing availability of good anaesthetic facility, Maheshwari[4] personally recommends probing to be done under general anesthesia and feels it is safer and comfortable to both the patient and surgeon.

I do all cases of probing and syringing under ETT general anaesthesia

Preanaesthetic evaluation

Preoperative examination is done by our paediatrician which includes detailed history, clinical examination, examination for other congenital anomalies especially congenital heart disease .

The child is referred to the anaesthetist for opinion regarding fitness for general anaesthesia or any further references required. If the child has any congenital anomalies, metabolic or, endocrine disorders the child is referred to the concerned speciality and their clearance obtained.

Pre-operative investigations

Routine haemogram, urine analysis, bleeding and clotting time.

Anaesthesia

These children are usually operated as day care procedures with instructions given for a preoperative fasting of solids for 6 hours and clear fluids for 2 hours.

The children are premedicated with injection glycopyrrolate(0.004-0.006 mg/Kg) and syrup Trichloryl (50 mg /Kg)

General anaesthesia is induced by either inhalational technique using sevoflurane or with intravenous technique with propofol/ thiopentone followed by endotracheal intubation with or without muscle relaxants. After securing the airway, throat is packed with saline gauze.

The child is positioned in Rose position as followed for tonsillectomy .

Figure - 1 Rose positioning of the patient

Sister Rose position: In this position both the head and neck are extended (Fig. 1). This is done by keeping a sand bag under the patient's shoulder blade. In this position there is virtually no aspiration of blood or secretions into the airway.

Pediatric size suction catheter is placed in the corresponding nasopharynx (Fig.2) and all secretions in the throat are sucked out before probing. After probing, saline colored with sterile fluorescein strip is injected into the nasolacrimal duct and simultaneously the suction apparatus is switched on.

Flow of saline in the nasolacrimal duct is confirmed by passage of fluorescein stained saline through the suction catheter.

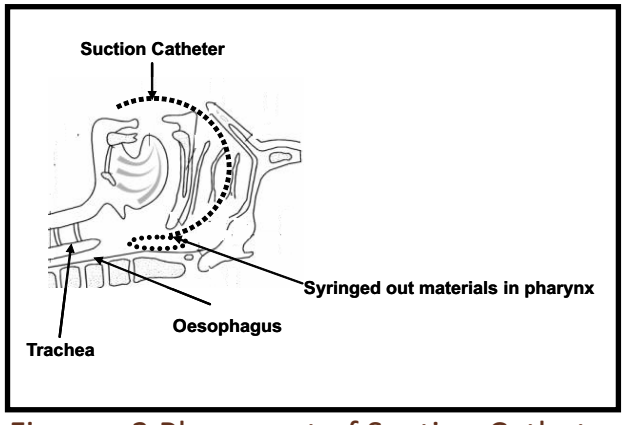

Figure - 2 Placement of Suction Catheter in the nasopharynx

The same procedure may be repeated on the other side if required by the surgeon. Before recovering the child from extubation, all secretions, blood and syringed fluid should be sucked out.

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Challenges faced by the Anaesthetist practicing Ophthalmic Anaesthesia

Dr. Ravichandar.A.Krishnan
Consultant Anaesthetist, Aravind Eye Hospital, Madurai

Introduction

In general, anaesthesiologists have an apprehension about the field of ophthalmic anesthesia, but this is a very challenging and interesting field. There are some basic issues that have to be understood before practicing ophthalmic anaesthesia which could be from the patient, or the anaesthesia. Surgical causes are unlikely to induce major haemodynamic changes.

Ophthalmic surgery is generally perceived by the patient as a simple procedure sometimes not even considered as a surgery. Often the patients' focus is on his visual complaints and systemic illness is overlooked and the patient fails to mention this to the doctor. The current scenario in all parts of the world including India is the early occurrence of diabetes, hypertension, and cardiac problems. Nowadays majority of ophthalmic surgeries are performed as day care procedures with no overnight hospital admissions.

Preoperative assessment

The preoperative assessment of the patient before the surgical procedure is very crucial. The aim of this is to elicit the systemic diseases and perform relevant investigations, to assess the functional reserve and identification of organs at risk and modifications in drugs if needed. In case of systemically compromised patients, it is wise to perform the surgery after discussing the risk/benefit with the surgeon and the various anesthetic techniques which may be safe for the patient. All cardiac and antihypertensive drugs are to be continued on the day of surgery and adrenaline mixed local anaesthetics can be avoided in cardiac patients.

Some of the non ocular problems that may be encountered are syncope due to fear or pain, convulsion due to vascular spread of the anaesthetic and respiratory depression due to neural spread.

Nowadays more and more ocular surgeries are being performed under topical anesthesia and is preferred over the regional anaesthesia as it is relatively safe

Intra-operative concern in regional anesthesia

During ocular surgery, a facial drape is applied to cover the adjacent sites and expose only the surgical site. Patients need to be explained about the drape since they may feel apprehensive and anxious about this which may induce a feeling of suffocation. . Oxygen enriched air is provided under the drape through nasal cannula. The other concern faced by the patient may be discomfort in supine position especially when lying for long during vitreo-retinal surgeries.

Sedation

Sedation relieves anxiety, produces amnesia, decreases the discomfort of the block and is useful in patients who are slightly uncooperative. It must be remembered that sedation is only supplement and not a replacement for anaesthesia.

In sedation the neck has to be little extended (to prevent tongue fallback), head stabilized (head rest), and oxygen rich air has to be administered through nasal cannula. Monitoring with pulse oxymeter, ECG and NIBP has to be done. Some of the pitfalls of sedation are to either over sedate and cause respiratory depression or sudden movement during surgery. Among the various combinations that are used as sedations are- intra venous midazolam , inj.propofol, or propofol infusion with fentanyl

Sub-specialty challenges

Ophthalmology has now developed into various sub specialties like Retina, Glaucoma, Cornea, Pediatric Ophthalmology and Orbit and Oculoplasty .In the pediatric age group the issues of neonatal anaesthesia,

preterm babies for ROP and their associated problems, mental trauma from parental separation, respiratory infection, co-existing congenital anomalies, and metabolic disturbances especially in glaucoma patients are the major challenges .

In patients with corneal injury who may be on a full stomach – it is advisable to wait till the gastric emptying occurs but in rare severe cases Rapid Sequence Intubation with higher dose Rocuronium, Vecuronium may be used. In case of corneal transplants, IOP has to be maintained in a lower and stable level throughout the surgery, and the patient should not strain at any point of time. Inhalational agents like Sevoflurane are quite useful for this and PONV is also reduced by using Ondansetron, Dexamethasone combinations

Orbit oculoplastic procedures are little deviated from regular ophthalmologic procedures. Some of the difficulties encountered are in holding the mask, requirement of hypotensive anaesthesia, haemodynamic disturbances and repeated anaesthesias. Some tumors bleed a lot, with risks of hypotension unless blood pressure is closely monitored.

The next major challenge in ophthalmic anesthesia is in retinal surgeries, and for electroretinograms under general anaesthesia. As the operation theater has to be in dim light during these the anesthetist has to be extra vigilant watching the monitors and the patient. In case where intravitreal injection of C3F8 gas is planned the surgeon may request to stop N2O for at least 20mts before the injection. In such situations air- O2 mixture can be used, increasing the volatile concentration, or propofol infusion can be used.

Conclusion

In ophthalmology, anaesthesia does not mean dealing with only cataract surgeries.. Ophthalmology is rapidly evolving with newer technology, varied surgeries and diagnostic modalities. Ophthalmologists are taking up challenging situations and team work is the need of the hour to enhance eye care services

Anaesthetic management of child with congenital laryngeal web for oculoplastic surgery.

Dr Sujatha V, Consultant Anaesthesiologists, Dr. Bhanulakshmi Indermohan, Former, Director
Medical Research Foundation, Sankara Nethralaya, Chennai, drvs@snmail.org

Securing the airway is vital while anaesthetising children. Accessing a difficult airway in any age group and especially in children is extremely challenging.

We describe the successful anaesthetic management for oculoplastic surgery of a 4 yr old Nigerian boy diagnosed to have a laryngeal web. He was predicted to be difficult to intubate. The clinical features, preoperative assessment anaesthetic management and concerns are discussed and reviewed.

Key words: congenital laryngeal web

Introduction: Incomplete recanalization of the laryngotracheal tube during the third month of gestation leads to different degrees of laryngeal web formation.[1] The extreme of this situation is complete laryngeal atresia[7]. These webs constitute a spectrum of developmental laryngeal disorders and range from a small incomplete anterior glottic web causing minimal dysphonia with extreme obstruction to a complete glottic web causing total laryngeal atresia.[2] The most common site of development of laryngeal web is at the level of vocal cords anteriorly.[3] Patients manifest with symptoms ranging from mild dysphonia to significant airway obstruction depending on the size of web. Stridor is rare except in patients who have a posterior interarytenoid web. Acquired webs can include infectious and post traumatic or post intubation etiologies.

Case report

A 4 year old boy was scheduled for lid reconstruction in both eyes as a staged procedure. (Figure 1) He was a full term baby, delivered normally. The child had a previous history of ocular surgery for symblepharon release at 3 weeks of age with difficulty in intubation. On examination the child weighed in at 14 kgs, had bilateral partial cryptophalmos, frontal bossing, a flat nasal bridge and coloboma of both eyelids. There was a history of stridor with noisy breathing since birth. During crying, the accessory muscles of respiration went into play. The nostrils were patent. There was no history of apnea at any time.

Figure 1 The child seen with frontal bossing & crypthophthalmos

The child was referred for a paediatric otorhinolaryn gological examination preoperatively. A video-laryngoscopy revealed an anterior glottic web, moderately thick, admitting a 4mm rigid telescope i.e. approximately the outer size of 3.5mm ETT.

(CLICK HERE FOR VIDEO)

A chest x-ray showed normal cardiac and lungs vasculature. The peripheral arterial oxygen saturation while breathing room air was 100%

Laboratory investigations revealed a normal hemogram, blood biochemistry and basic coagulation tests.

Anaesthetic Management

The child was adequately fasted. He was premedicated one hour before the procedure with injection glycopyrrolate 0.005mg/kg and trichloryl syrup 50mg/kg orally.

Induction of anaesthesia was by mask using sevoflurane in nitrous oxide and oxygen, 50:50. (Figure 2) As anticipated, spontaneous respiration was jerky and so breathing was assisted. Intravenous access was secured and a total dose of 40mg of propofol was given. A trial laryngoscopy was performed after ascertaining adequate depth of anaesthesia and stable vital signs. The glottic opening with anterior web occluding more than half the glottis was visualized. (Figure 3)

Figure 2 Child being induced

Figure 3 Laryngoscopic view of glottis along with web.

As the glottis was visualized and the anaesthetist was confident that endotracheal intubation was possible, atracurium 0.5mg/kg IV was given and intubated wtih size 3.5mm Portex uncuffed ETT, without any difficulty. Analgesia was provided with fentanyl 1µg/kg. Anaesthesia was maintained with 50% nitrous oxide in oxygen and sevoflurane 1%. Inj Hydrocortisone 2mg/kg IV was given. Ventilation was controlled mechanically with an ohmeda paediatric ventilator throughout the procedure which lasted for 4 hours. 0.45% saline in 5% dextrose provided intra operative fluid maintenance. Intra operative monitoring included pulse oximetry, electrocardiogram, non-invasive blood pressure and end tidal carbon dioxide. Throughout the procedure vital signs remained stable. At the end of the procedure anaesthesia was reversed with neostigmine 0.5mg/kg and glycopyrrolate 0.005mg/kg. The child was extubated after complete return of reflexes and when fully awake and monitored in PACU for 2 hrs.

Incidence

Laryngeal webs constitute about 5% of all congenital anomalies of the larynx 75% of these are at the glottic level. The rest are at the supraglottic or subglottic level [4]. They are usually symptomatic in infancy or early childhood. A third of these children have associated anomalies of respiratory tract most commonly subglottic stenosis.[7] Other anomalies must be suspected when respiratory distress is disproportionate to that caused by web.[7] Many of these patients have other congenital abnormal lesions affecting the genital or renal organs, cleft lip and palate, eye problems like coloboma of iris and squint, accessory limbs and dislocation of the hip. Chromosomal and cardiovascular anomalies are also common. A chromosome 22q11 deletion is particularly common. [5]

Discussion

Based on the degree of occlusion of the lumen there are 4 types. Type 1, 35% covering the anterior glottis, Type 2, 35-50% occlusion of the lumen with the vocal cords visible, Type 3, 50-70% occlusion of the lumen with the vocal cords possibly visualized, Type 4, 70-90% occlusion with the vocal cords not visualized,[6] A funnel chest deformity can be associated with impairment of the airway. Our patient had a pigeon chest deformity which could have been due to the stridor and noisy breathing. Frequent attacks of bronchitis and pneumonia can occur. The voice can be high-pitched and squeaky. The child may or may not have significant respiratory distress(nasal flaring, supraclavicular or intercostals indrawing, stridor, tracheal tug or cyanosis).[7]

In a known difficult airway patient, preanaesthetic examination of the upper airway and nostril patency are important. A cardiac examination is also useful to rule out cardiac disease which can be present in patients with laryngeal webs. Radiographic evaluation may help to assess the site and extent of the laryngeal web prior to bronchoscopy. Bronchoscopy and laryngoscopy are necessary to assess web site, thickness and extent,

whether horizontal or vertical. Webs may also appear as thin translucent defects or as a thick fibrosis.[7] Although the diagnosis is based on the endoscopy findings in most of the cases, laryngoscopy may fail to show the subglottic extension of the disease. Virtual endoscopy may provide the information needed for surgery in such cases. [8]

Preanaesthetic medication with an anticholinergic reduces volume of secretion and prevents reflex bradycardia during airway manipulation. It is better to avoid narcotics preoperatively because of the potential for cardiorespiratory depression.

Inhalation induction is a suitable choice for induction of anaesthesia as this permits the anaesthetist to assess the degree of airway obstruction, as we did in our patient. Sevoflurane is least irritable to the airway and produces smooth induction. Use of muscle relaxant during induction of anaesthesia may result in a situation where anaesthetist can neither manually inflate the lungs nor intubate.

Maintain spontaneous ventilation until airway is secured if necessary. Once intubated, controlled ventilation with muscle relaxants reduces anaesthetic requirements promoting a more rapid wake up and recovery of reflexes. Short acting analgesic agent eg. fentanyl 1-2 mcg /kg is sufficient to provide analgesia. This has the advantage of promoting smoother emergence and less crying and reduce swelling and bleeding from the surgical site.

The very real risk of postoperative airway obstruction is most likely to occur in children with preoperative airway problems. Post operative care is critical in children. Meticulous care from health care providers in the PICU may decrease the number of complications.. Post operative analgesia with NSAID or paracetamol is sufficient.

Conclusion :

Every patient diagnosed with congenital laryngeal web should be considered to have a difficult airway, until proven otherwise and consequently has increased risk for anaesthesia. Clinical examination of each patient can elicit disease features that might predict a difficult tracheal intubation and thus allow the anaes- thesiologist an opportunity to plan accordingly.

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A Challenge to the Anaesthesiologists

Dr Rasesh Diwan. M.D., D.A. Chief Anaesthesiologist,
Raghudeep Eye Clinic, Ahmedabad, India. rpdiwan_99@hotmail.com

The comfort of the patient on surgical table is the prime requirement, when patient is undergoing surgery under local anaesthesia in Ophthalmology. We come across many patients with various kinds of physical disabilities. One of them is "cannot lie down supine" because of various reasons. Most common causes include obesity, orthopnea, kypho-scoliosis, ankylosing spondilosis etc.

Figure 1

These patients require a different approach - pre-operatively and during surgery. Utmost care is necessary to position the patient comfortably for sufficient duration to carry out surgery successfully.

I am presenting a case of extreme degree of kypho-scoliosis which was planned for cataract surgery at Raghudeep Eye Clinic.

Any diagnostic procedure like slit lamp examination or other pre-operative examination, which requires the patient to sit, could not be done. However, pre-operative biometry with the contact technique could be done in the same position with one assistant holding the legs as shown in Figure 1.

Figure 2

Figure 2 is the radiograph of the same patient explaining the extreme degree of Ankylosing spondylosis.

The patient was explained the difficulty in positioning during surgery. Counseling was done and patient was reassured for the comfort during surgery under topical anaesthetic technique with mild sedation pre-operatively.

Figure 3

Patient could walk to the operation theatre as seen in Figure 3, and was positioned on operation table as shown in Figure 4.

Figure 4

The patient was positioned in order to have the head as horizontal as possible. This position, shown in Figure 4 was achieved by placing multiple cushions below the head and lower back. A separate arrangement was done to support the feet. One theatre assistant constantly supported the knees during surgery. Patient received 0.5 mg. of Inj. Midazolam IV.

Cataract Surgery with phaco-emulsification was completed very successfully and patient walked back to the recovery room.

There are various causes for difficulty in lying down flat on operation table. For all these causes, the technique of general anaesthesia

carries a very high risk. It is absolutely obligatory to carry out eye surgery under local anaesthetic technique taking utmost care to provide mental and physical comfort to the patient during surgery.

NLO and ELC: Why and How to achieve it, following instillation of topical eye drops in children?

Dr V V Jaichandran, Consultant Anaesthesiologists, Sankara Nethralaya, Chennai, India.
jaichand1971@yahoomail.com

Topical phenylephrine solutions are widely used in ophthalmic surgery, both for capillary decongestion and for pupillary dilatation. The ocular effect becomes manifest when the drug penetrates the outer and inner parts of the globe and the periocular tissues. However, the eye has several natural barriers which limit the penetration of topically applied drugs.[1]

1. The corneal epithelium is five layers thick, which limits absorption into the deeper structures of the eye.

2. The tear film acts to dilute drug and has natural buffers in proteins and bicarbonates.

The normal volume of the tear film is 7 µl namely, 1µl in the precorneal tear film and 3 µl in each of the tear menisci. Shell[2] has estimated that about 80% of the volume of a 50 µl drop rapidly passes down the nasolacrimal duct, so that most of the administered drug has minimal contact time with the eye and passes to the highly vascular nasal mucosa, where it can be systemically absorbed (Fig-1). In paediatrics, tachycardia and pulmonary edema following instillation of phenylephrine eye drops have been reported.[3]

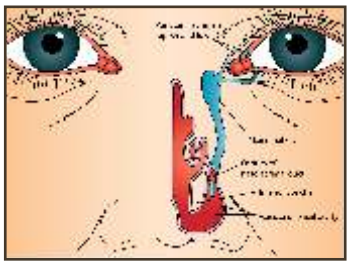

Figure-1

Only 10-20% of the drug applied topically exert their local effect. Absorption across the conjunctiva and nasal mucosa avoids first-pass metabolism in the liver and results in peak levels in about 10 minutes after topical administration.

The accepted safe dose of intravenous phenylephrine is 1.5mg[4]. A 50 µl drop of phenylephrine contains 5.0 mg, so that systemic absorption can easily lead to dangerously high levels, particularly when multiple drops are given. Systemic absorption may have a greater impact in children than in adults due to their lower body mass with potentially higher plasma concentrations reached. In infants, toxicity may be compounded by altered metabolic capacity and an immature blood brain barrier. Thus, in children, a relatively larger dose of topical eye medication can reach the systemic circulation where it may be metabolised at a slower rate, leading to potentially higher plasma.[5]

Hence it is very important to adopt several strict measures/ techniques to reduce the systemic absorption of the topically applied drops in children. Previous studies have found that use of microdrops in infants achieves equal dilatation with a decreased systemic absorption.[6] Reducing drop size may increase bioavailability of the medication This could be because the smaller drops stimulate less lacrimation and so increase contact time. One of the limiting factors in reducing the size of eye drops is ease of administration.[7]

Reducing the volume of eyedrops is not the only way to reduce systemic absorption: nasolacrimal occlusion (NLO), and eye lid closure (ELC) after eyedrop instillation are all effective.

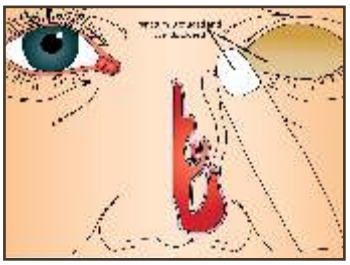

Figure-2

Nasolacrimal occlusion:

The punctal occlusion is blocking the punctum, which is an opening on the edge of the lid (present on the upper and lower lids). The puncta are where the tears drain from the surface of the eye. The tears travel down the nasolacrimal duct and exit through the nasal mucosa and into the pharyngeal mucosa . Most tears exit via the lower punctum. Studies have shown that only about 20 percent of a drop is absorbed into the eye, the rest spills over the lids and down the punctum. So by blocking the punctum, significant systemic absorption of the drug and thus its side effects can be reduced.

Technique of NLO:

Place your same side index finger to the corner of the eye and apply pressure not into the eye but rather against the bone at the nasal side, leave your finger there for atleast one minute. (Fig-2)

Eyelid closure (ELC):

The blinking creates a pump like mechanism that forces tear across the eye and down the nasolacrimal duct. Thus following instillation of dilatation drops, blinking could result in the drops to go down the punctum. Hence it is always recommended to passively close the eyelids following instillation of any eye drops.

Difficulties in accomplishing NLO and ELC in paediatrics:

However, both NLO and ELC require prolonged commitment from medical staff and cooperativeness of the patient. Practically speaking, in paediatrics, it is quite difficult to occlude the punctum with a finger for 60 seconds continuously, as they would never allow us to do so. They would be in an anxious and fearful state especially following injections (Premedicants) in the Preoperative area.

An alternative way of achieving them in children is through their parents. Hence, I believe, that it is not only enough to create an awareness, among the paramedic nurses, who instill eye drops in the ward, but also to teach, show and educate the parents about NLO and ELC.

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