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Comparing General Anesthesia with Preemptive IV Atropine versus General Anesthesia with Single Injection Peribulbar Block with Levobupivacaine 0.5% or Lidocaine 2% for Prevention of Oculocardiac Reflex in Children Undergoing Strabismus Surgery: Randomized Control Study

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ABSTRACT

Background: One of the frequent health issues affecting kids is strabismus. It is clinically relevant for paediatricians to know that the incidence of the oculocardiac reflex declines with age and tends to be more apparent in young, healthy patients since it is most frequently seen in young, healthy newborns and babies having strabismus surgery.

Objective: to prevent and attenuate the oculocardiac reflex in children age group from (2yrs to 14 yrs) undergoing surgical correction for strabismus.

Patients and Methods: Three groups were allocated Group C received general anaesthesia combined with pre-emptive atropine, Group L received general anaesthesia combined with Peribulbar block with Lidocaine 2 % and Group LB which received general anaesthesia combined with peribulbar block with Levobupivacaine 0.5%.

Results: In our study we found that group L which received peribulbar lidocaine 2 % was the most successful group regarding blocking the occurrence of the OCR and with acceptable post-operative pain control results.

Conclusion: According to our research, peribulbar lidocaine 2% combined with general anaesthesia is very effective at reducing the risk of OCR in children having strabismus surgery and is superior to intravenous pre-emptive atropine in terms of surgeon satisfaction. Peribulbar levobupivacaine 0.5% combined with general anaesthesia plays a significant role in post-operative pain management and is associated with higher patient satisfaction.

Keywords: Levobupivacaine, Lidocaine, Oculocardiac reflex

INTRODUCTION

One of the frequent health issues affecting youngsters is strabismus [(1)]. Aschner noted a reduction in pulse rate as a result of applying pressure directly on the eyeball in 1908. The clinical definition of this occurrence, which came to be known as "the oculocardiac reflex," is a 10% drop in heart rate after applying pressure to the eyeball or pulling on the ocular muscles.

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Depending on the research, the incidence of the oculocardiac reflex ranges from 14% to 90%, making it a moderately common condition [(2)].

An afferent and an efferent limb make up the OCR arc. The sensory afferent limb is the trigeminal nerve, also referred to as the fifth cranial nerve. The efferent limb of the OCR is made up of the vagus nerve, also referred to as cranial nerve ten. Stretch receptors in the ocular and periorbital tissues are what start the route. The ciliary ganglion receives impulses from the short and long ciliary nerves that transmit the sensory information. The trigeminal nerve's ophthalmic division carries the impulses from there to the Gasserian ganglion, the trigeminal nucleus, and the central nervous system, where the afferent limb will end (CNS). The brain will subsequently analyse this sensory data, and the trigeminal sensory nucleus and the visceral motor nucleus of the vagus nerve will communicate intracellularly. This activates the vagal motor response by stimulating the efferent limb, allowing impulses to leave the brainstem and travel to the heart where they synapse with the sinoatrial node. Negative chronotropy, which results in bradycardia, is one of the consequences. caused by pulling on the extraocular muscles, particularly the medial rectus, direct pressure on the eyeball, ocular manipulation, and eye discomfort [(3)].

Moreover, it might be caused by eye trauma, retrobulbar block (pressure from local infiltration), or manipulation of the orbital apex tissue after enulcleation [(2)].

The prevalence of the oculocardiac reflex decreases with age and tends to be more noticeable in young, healthy people, which is clinically significant for paediatric care because it is believed to occur most frequently in young, healthy infants and babies undergoing strabismus surgery [(4)].

A 26 gauge (25mm) or 27 gauge 1/2 inch (12mm) needle is placed as far laterally as feasible in the inferotemporal region to perform a peribulbar block. Once the needle has passed beneath the globe, it is steered along the orbital floor, passing the equator, and continuing to a depth that can be determined by watching the needle/hub junction as it approaches the iris plane. 4 to 5 cc of local anaesthetic agent are injected into the globe when it is in primary gaze following negative blood aspiration [(5)].

Any extraocular muscles, including the superior oblique, can be paralysed by this treatment. The orbital septum is penetrated by the local anaesthetic solution, and the orbicularis muscle may also become paralysed. With this method, a separate eyelid block might not be necessary. In paediatric ocular surgery, a single injection, peribulbar block utilising a short needle and a tiny volume is a safe and efficient procedure. Surgery for strabismus puts patients at greater risk for developing the oculocardiac reflex (OCR). Increased OCR might endanger your life. The way to lower this risk is to maintain a suitable depth of anaesthesia and utilise anti-cholinergic medications. The danger of OCR was not completely eliminated by regular prophylaxis [(6)].

The premedication and anaesthetic drug used during strabismus surgery affect the OCR's frequency. Studies have found that compared to regional anaesthesia, general anaesthesia had a greater frequency of OCR [(7)]. Also, it has been shown that extraocular muscle manipulation can make post-operative nausea and vomiting (PONV) worse [(8)].

Levobupivacaine, the S() 3- isomer of the racemate bupivacaine, is a long-acting, amide-type local anaesthetic. Levobupivacaine is generally considered to be as powerful as bupivacaine and to elicit equivalent sensory and motor block, according to in vitro, in vivo, and human volunteer investigations of nerve block. Levobupivacaine has a tendency to provide a longer sensory block than other anaesthetics, which may be due to its stronger vasoconstrictive

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effects. Levobupivacaine is approved for peribulbar administration, local infiltration, and peripheral nerve block for surgical anaesthetic in adults [(9)].

The effectiveness profile of lidocaine as a local anaesthetic is defined by a quick start of action and an intermediate duration of efficacy. Lidocaine is an intermediate-acting local anaesthetic (amide type). Lidocaine is therefore appropriate for infiltration, block, and surface anaesthesia[(10)].

Due to its capacity to aid in the dispersion and/or absorption of a variety of drugs and fluids, hyaluronidase, an enzyme that breaks down hyaluronan (HA), has a wide range of therapeutic uses. It allows anaesthetic drugs to penetrate quickly, especially into hard-to-reach areas. Hyaluronidase is most frequently used in ophthalmology as a supplement to local anaesthetic for retrobulbar, peribulbar, or sub-blocks. Tenon's Hyaluronidase was first used in ophthalmology in 1949 when Atkinson put it to retrobulbar and lid blocks [(11)].

AIM OF THE WORK

The main goal of this Thesis was to evaluate and assess the efficacy of Levobupivacaine 0.5% and Lidocaine 2% if injected in peribulbar block in preventing the incidence of Oculocardiac reflex in Pediatrics patients undergoing strabismus surgery. The secondary goal is to evaluate the effect of peribulbar block if combined with general anesthesia on post-operative pain and analgesia.

PATIENTS AND METHODS

Type of Study: Randomized control study.

Study Setting: Research Institute of Ophthalmology.

Study Period: 6 months

Study Population

Inclusion Criteria: Patients with ASA I, II. Age from 2 to 14 years old. Patients undergoing Strabismus Surgery.

Exclusion Criteria: Patients with ASA III, IV. Patients with Endophthalmitis, orbital fractures. Any Congenital or Cardiac anomalies. Patients with history of allergy to local anesthetics. Revision Surgeries. Refusal of the Surgeon. Refusal of the patients' parents.

Sampling Method: Patients were subdivided randomly into 3 groups. **Group C:** received General anesthesia combined with preemptive IV atropine. **Group L:** received General Anesthesia combined with Peribulbar Block with 5ml of Lidocaine 2% and 10 IU of Hyaluronidase. **Group LB:** received General Anesthesia combined with Peribulbar Block with 5 ml of Levobupivacaine 0.5 % and 10 IU of Hyaluronidase.

Sample Size: The outcome in this study is the proportion of cases with OCR as well as the proportion with post-operative pain and nausea and vomiting. A test of difference between proportions in the three groups was used to estimate the sample size. A sample size of 63 participants (21 per group) achieves 80% power to detect an effect size (W) of 0.40 using a 2 degrees of freedom Chi-Square Test with a significance level (alpha) of 0.05. Statistical Power Analysis for the Behavioral Sciences, Lawrence Erlbaum Associates, Hillsdale, New Jersey. PASS 11 Power Analysis and Sample Size Software (2009). NCSS, LLC. Kaysville, Utah, USA, ncss.com/software/pass.

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Ethical Considerations: Patients' parents or their Guardians informed written consent after Local Committee approval was obtained before patient allocation.

Study Procedures: Patients were divided into three groups at random after receiving written informed permission from the parents of minors and describing the process to them. In all groups, conventional monitoring equipment, such as an electrocardiogram (ECG), non-invasive blood pressure gauges, and pulse oximeters, were linked to the patients as soon as they entered the operating room. Propofol 2-3 mg/kg and fentanyl 1 lg/kg were used to produce general anaesthesia (GA) in all patients following the placement of a 24-22 G IV catheter. A laryngeal mask airway (LMA) of the proper size was implanted.

For the purpose of obtaining a continuous measurement of end-tidal carbon dioxide (ETCO2), anaesthesia was maintained using 100% oxygen and sevoflurane.

For group C: IV atropine in a dose of.01 mg / kg was given to all patients under GA before induction of Anesthesia.

For Group L: General Anesthesia was inducted as before in addition of giving a peribulbar block up to 5 ml (according to the volume of the eye) of Lidocaine 2%mixed with 10IU of Hyaluronidase by a single injection technique: the inferotemporal quadrant is punctured as far laterally as feasible with a 26/27 gauge needle. Once the needle has passed beneath the globe, it is steered along the orbital floor, passing the equator, and continuing to a depth that can be determined by watching the needle/hub junction as it approaches the iris plane. Before the surgeon is permitted to begin the surgery, 5 cc of local anaesthetic agent is administered with the globe in primary gaze after blood aspiration results are negative.

For group LB: General Anesthesia was inducted as before in addition of giving a peribulbar block up to 5 ml (according to the volume of the eye) of levobupivacaine 0.5% mixed with 10IU of Hyaluronidase by a single injection technique: The inferotemporal quadrant is punctured as far laterally as feasible with a 26/27 gauge needle. Once the needle has passed beneath the globe, it is steered along the orbital floor, passing the equator, and continuing to a depth that can be determined by watching the needle/hub junction as it approaches the iris plane. The surgeon cannot begin the surgery until negative blood aspiration has been performed, the globe is in primary gaze, and 5 cc of local anaesthetic agent has been administered.

In all of the three groups Intraoperative continuous monitoring with electrocardiography monitor, pulse oximeter and Capnography was done, and adequate hydration was taken care with IV fluid ringer lactate until the oral intake is allowed.

In all Groups: monitoring for the incidence of Oculocardiac reflex was done within (2-3) mins after induction of general anesthesia and giving either the IV Atropine or the Peribulbar Block which is the time of required for draping and sterilization of the eye, there was intraoperative monitoring for the incidence of Oculocardiac reflex during eye manipulations, good attention for the depth of anesthesia, any rise or drop in the Heart Rate or the Blood Pressure.

Any incidence of oculocardiac reflex was recorded regarding its onset and time of occurrence and the associated or causing manipulations along with recording of the way the reflex had been dealt with and any given medications or additional blocks required to interfere with the oculocardiac reflex.

Any complications regarding the Peribulbar block (Hemorrhage, Hematoma, etc) was recorded.

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Patients who suffered pain within 2 hours postoperatively received Paracetamol suppositories (Abimol).

Statistical Analysis:

Version 20.0 of the statistical software for social sciences was used to evaluate the recorded data (SPSS Inc., Chicago, Illinois, USA). The mean ±standard deviation(SD) were used to convey quantitative data. Frequency and percentage were used to convey qualitative data. The further tests were conducted: When comparing more than two means, use a one-way analysis of variance (ANOVA). The proportions between qualitative measures were compared using the Chi-square (x2) test of significance. The allowable margin of error was set at 5%, while the confidence interval was set at 95%. P value < 0.05 was considered significant.

RESULTS

Table (1): Comparison between groups according to demographic data

Demographic data	Control (n=21)	Lidocaine group (n=21)	Levobupivacaine group (n=21)	F/x2#	p-value
Age (years)					
Mean±SD	7.62±4.90	7.12±4.40	8.14±3.85	2.091	0.133
Range	2-a14	2-a14	3-a14		
Sex					
Male	12 (57.1%)	14 (66.7%)	10 (47.6%)	1.556#	0.459
Female	9 (42.9%)	7 (33.3%)	11 (52.4%)		

F-One Way ANOVA; #x^2: Chi-square test p-value >0.05 NS

Table (1) shows no statistically significant difference between groups according to demographic data.

Table (2): Comparison between groups according to base heart rate

Base HR	Control (n=21)	Lidocaine group (n=21)	Levobupivacaine group (n=21)	ANOVA	p-value
Mean±SD	95.62±15.22	94.38±9.94	87.95±12.22	2.223	0.117
Range	56-a118	74-a110	69-a112		

F-One Way ANOVA; p-value >0.05 NS;

Table (2) shows no statistically significant difference between groups according to base heart rate.

Table (3): Comparison between groups according to incidence of OCR

Incidence of OCR	Control (n=21)	Lidocaine group (n=21)	Levobupivacaine group (n=21)	x2	p-value
Yes	15 (71.4%)	4 (19.0%)	8 (38.1%)	12.056	0.002*
No	6 (28.6%)	17 (81.0%)	13 (61.9%)		

x^2: Chi-square test; *p-value <0.05 S

Table (3) shows statistically significant difference between groups according to incidence of OCR.

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Table (4): Comparison between groups according to time of OCR

Time of OCR	Control (n=21)	Lidocaine group (n=21)	Levobupivacaine group (n=21)	x2	p-value
Yes	15 (71.4%)	4 (19.0%)	3 (14.3%)	18.579	<0.001**
No	6 (28.6%)	17 (81.0%)	18 (85.7%)		

x^2: Chi-square test; **p-value <0.001 HS

Table (4) shows highly statistically significant difference between groups according to time of OCR.

Table (5): Comparison between groups according to intervention

Intervention	Control (n=21)	Lidocaine group (n=21)	Levobupivacaine group (n=21)	x2	p-value
No	6 (28.6%)	17 (81.0%)	13 (61.9%)	31.967	<0.001**
Asked Surgeon to Stop	12 (57.1%)	0 (0.0%)	0 (0.0%)		
Asked Surgeon to Stop + Booster Atropine	3 (14.3%)	4 (19.0%)	8 (38.1%)		

x^2: Chi-square test; **p-value <0.001 HS

Table (5) shows highly statistically significant difference between groups according to intervention.

Table (6): Comparison between groups according to complications

Complications	Control (n=21)	Lidocaine group (n=21)	Levobupivacaine group (n=21)	x2	p-value
No	16 (76.2%)	15 (71.4%)	16 (76.2%)	17.757	0.023*
Yes	5 (23.8%)	6 (28.6%)	5 (23.8%)		
Blushing	5 (23.8%)	0 (0.0%)	0 (0.0%)		
Down ward shift	0 (0.0%)	1 (4.8%)	0 (0.0%)		
Medial shifting of the eye	0 (0.0%)	1 (4.8%)	2 (9.5%)		
Subconjunctival Hemorrhage	0 (0.0%)	4 (19.0%)	3 (14.3%)		

x^2: Chi-square test; *p-value <0.05 S;

Table (6) shows statistically significant difference between groups according to complications.

Table (7): Comparison between groups according to post-operative pain

Postoperative pain	Control (n=21)	Lidocaine group (n=21)	Levobupivacaine group (n=21)	x2	p-value
Yes	14 (66.7%)	4 (19.0%)	1 (4.8%)	20.95	<0.001**
No	7 (33.3%)	17 (81.0%)	20 (95.2%)		

x^2: Chi-square test; **p-value <0.001 HS

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Table (7) shows highly statistically significant difference between groups according to postoperative pain.

DISCUSSION

The main goal of this study is to avoid and lessen the oculocardiac reflex in children having surgical correction for strabismus in the age range of 2 to 14 years.

There were three groups assigned. General anaesthesia was administered along with pre-emptive atropine to Group C, peribulbar blocks with Lidocaine 2% and 0.5% were administered to Group L and Group LB, respectively, while Group C also got general anaesthesia.

The incidence of oculocardiac reflex occurred in 15 case which accounts for 71.4% of the total group.

Espahbodi et al.[12] study that concluded the occurrence of OCR in about 13 out of 30 patients (43 %) which is also lower than the results recorded in our study.

A P-value of < 0.05 was deemed statistically significant in the **Espahbodi et al.** [12] study, which found that atropine could not completely prevent bradycardia or hypotension but could also increase ectopic beats and cause bigeminy. These arrhythmias were also found to be more persistent than OCR, with HR of 20% with a P-value of 0.025 and HR of 20–30% with a P-value of 0.02.

The lowest Incidence of OCR was recorded in **Syed et al.** [13]**, Misurya et al.** [14]**.** In **Syed et al.** [13] study which was carried on sixty patients age from 2 to 30 years with mean age of 14.96 in the Atropine group which consisted of 30 patients in his study; just three individuals, or 10% of patients, had OCR, and it was shown that this trigeminovagal reaction, which is frequently present during squint surgery and is characterised by bradycardia, ectopic beats, nodal rhythm, and even cardiac arrest, is what causes OCR. That might be a major incident and is unexpected. Prophylactic anticholinergic medication, such as atropine, can stop it. The current investigation has established the necessity of using preinduction IV atropine before all eye surgeries to prevent the development of OCR during squint surgery.

Also in **Misurya et al.** [14] the incidence of OCR was only 10 % and for the comparison to incidence of OCR in control group is not statistically significant (P>0.2) and his study concluded that giving both atropine and xylocaine in a retrobulbar block would be very effective against the OCR. Heart rate is frequently lowered by central vagal stimulation caused by the average therapeutic dosage of atropine sulphate (0.4 to 0.6 mg), which penetrates the blood brain barrier, before peripheral muscarinic cholinergic receptor blockage at the heart begins. In order to reduce the effects of its central vagal stimulatory activity, atropine was quickly administered intravenously before anaesthesia. 10% of patients in the atropine-premedicated group experienced positive OCR. Protection offered is not statistically significant (P>.2) when compared to the incidence of OCR in the control group. This is due to the fact that atropine's 0.4–0.6 mg vagal blocking activity is insufficient to prevent parasympathetically generated cardiovascular symptoms like hypotension and bradycardia brought on by the activation of the oculocardiac reflex.

In 57.1% (12 case) of the cases in this Group of this study the Intervention was to ask the surgeon to stop manipulating the extraocular muscles in order to stop further slowing of the heart rate and only 3 cases needed additional atropine to be given to the patients to prevent

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possible cardiac insult which dictates the importance of the presence of atropine within the reach of the anaesthetist's hands.

Schaller et al. [15]; Schaller et al.[16] advised that if a TCR is evoked, the surgeon must halt the stimulation and wait until the pulse returns to its regular rhythm. The therapy of TCR merits additional consideration. The TCR's occurrence is correlated with the degree of mechanical stimulation of the trigeminal system. This recommendation was taken into consideration during our investigation since abrupt and continuous traction is more likely to trigger the TCR than smooth and mild manipulations.

According to Chong and Tan [17], the patient has a propensity to adjust to the vagal tone when the extraocular muscle is tense and the heart rate returns to the pretraction rate**.** With the use of Atropine, all the patients who had oculocardiac reflex demonstrated vagal escape. In the group not premedicated with Atropine, 2 patients (6.45%) did not show vagal escape and intravenous Atropine had to be given to treat the persistent bradycardia. None of the patients who had Atropine as premedi- cation had Bigeminy, Sinus Arrest or Complete Atrioventricular Block.

In our study there was recording of the possible complications of the use of the Atropine. Blushing with very dry mouth was recorded in 5 cases of the group C (23.8 %).

Syed et al. [13] and Hunsley et al.[18] indicated that IV atropine must be administered in all cases of eye surgery since it is beneficial against the incidence of OCR during squint surgery, despite larger dosages increasing side effects such tachycardia and dry mouth.

According to Misurya et al. [14] larger dosages of atropine are not utilised by anaesthetists due to severe mouth and respiratory passage dryness, bothersome tachycardia, and pupillary dilatation that obstructs accurate depth of anaesthesia evaluation. Also, in glaucoma-prone individuals, pupil dilation may obstruct the angle of the anterior chamber of the eye, resulting in an increase in intraocular tension that may further enable OCR, which is supported by our study as a way to reduce the dosages of atropine to avoid potential adverse effects.

In the control Group (group c) of our study the incidence of post operative pain was 14 (66.7%) out of 21 case which was recorded and observed in the two hours post operatively during recovery period and they needed analgesia in the form of Paracetamol tabs or suppositories according to the age of the patient.

In our study the use of the peribulbar block was done in 2 of the study groups one of the groups the peribulbar block was given using lidocaine 2% in the local anaesthetic mixture (Group L).

OCR can also be reduced by shortening the reflex arc's afferent limb. To do this, the ciliary ganglion can be blocked with a retro or peribulbar block of xylocaine hydrochloride. Taken in conjunction with another medication demonstrated to lower OCR incidence, such as atropine, can give extra protection from OCR activation [3].

In the group L of our study the total patients experienced OCR after start of the operation were only 4 patients out of 21 with a percentage of (19.0%).

The efficacy of the peribulbar block with lidocaine 2 % was described in other studies, the peribulbar group in **Gupta et al.[19]** study had a mean age of 7.8 (1.4) and a male to female ratio of 11/4. It involved 45 ASA I/II children between the ages of 2 and 13 who were scheduled for elective strabismus surgery. They were randomly assigned to receive either a

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peribulbar block, topical lidocaine 2% combined with general anaesthesia, or general anaesthesia alone.

2 out of 15 patients in the lidocaine group experienced OCR representing 13 % of the total group.

In their study, **Gupta et al.** [19] discovered that peribulbar block was superior to topical LA drops in lowering the frequency and severity of intra-operative OCR in children undergoing squint surgery while under general anaesthesia, with p values of 0.0001 vs group C and 0.013 versus group L.

In our study only 4 patients suffered OCR which is slightly similar to **Gupta et al.** [19] study.

In **Deb et al.** [20] study which was carried on Fifty children (age 5±14 years, ASA I±II) undergoing elective ophthalmic surgery 17 of them were undergoing strabismus surgery under the peribulbar block, the mean age was 9.0 (5±14) in the block group and male / female was 16/9.

Only one out of the 17 patient undergoing the strabismus surgery in the peribulbar block in his study suffered the OCR with a percentage of only 4 %.

There were no arrhythmias seen in either group. 15 out of 25 (60%) of the control group's kids had OCR. Nine of them had just one episode, while six others had two or more. In the block group, the incidence of OCR was 1/25 (4%) and was considerably lower than in the control group (P 0.001). This was recorded as a single episode. When opposed to the block group, which had none of the children who needed intraoperative rescue analgesics, the control group had six of the 25 (24%) children.

In comparison to our study, **Deb et al.** [20] found a decreased incidence of OCR, with the beginning of block occurring within 3±5 minutes and analgesia established by the time the eye was cleaned and draped.

In **Batterbury et al.** [21] study which was carried on 11 individuals total 8 patients out of the 11 patients suffered the incidence of the OCR, which is the higher incidence in comparison to our study.

Darwish [22] conducted a research on 89 children, ASA I or II, aged 8 to 14 years, who were scheduled for elective VR surgery or surgery for RD with or without scleral buckling under GA.

Darwish [22] allocated 42 children in the peribulbar group receiving the peribulbar block with lidocaine 2 % with mean age 11.9 (2.55) and males to females are 30/12.

In **Darwish** [22] study only 3 out of the 42 patients in the peribulbar block group had OCR which approximately represents 7.41% of the total group and that percentage is slightly lower than our study's findings and The incidence of intraoperative oculocardiac reflex was significantly less in the peribulbar group (p=.0001).

Darwish (22) discovered that in juvenile VR and RD surgery, peribulbar block appeared to be a safe and therapeutically superior alternative to IV opioid (fentanyl). It was simple to use and did not cause any local or systemic issues. In the majority of children, it dramatically improved postoperative comfort and reduced the need for opioids.

In the study by **Subhedar et al.** [6], total 32 cases were evaluated, and 17 of them received general anaesthesia with peribulbar block using injection lignocaine 2% in the dose of

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3 mg/kg body weight. The mean age was 9.8±2.76 years (range 7-15 years), and they were subjected to elective strabismus surgery, with males outnumbering females 9 (53%)/ 8 (47%).

In **Subhedar et al.** [6] study the incidence of OCR in the peribulbar receiving group was 0 cases out of the total 17 cases with a percentage of 0 % which makes a big difference compared to our study.

According to **Subhedar et al.** [6]**,** using peribulbar block with injectable lignocaine in conjunction with general anaesthesia can minimise or eliminate the occurrence of OCR. Also, the usage of injectable ketamine may be a contributing cause to the lack of OCR.

Elgohary and Hosny [23] conducted a study on forty children aged 6-12 years, ASA I or II, scheduled for ophthalmic surgery. The children were randomly assigned to two equal groups (n= 20) to receive either general anaesthesia alone (GA group) or single injection peribulbar block in conjunction with general anaesthesia (GA-PB group). The mean age in the peribulbar block was 7.9±1.3.

In **Elgohary and Hosny** [23] study 0 out of the 20 patients underwent ophthalmic surgery had OCR which is also a very low incidence compared with our study, in the GA -pb group, no patient experienced OCR or required intraoperative analgesic supplements, compared to 11 (55%) and 5 (25%) patients in the GA group (p 0.05 and p 0.05, respectively).

Also **Subramaniam et al.** [24] study which was carried on 85 children (ages 6 to 13 years) underwent ophthalmic surgery 42 patients were given the peribulbar block with lidocaine a very few patients developed OCR with a significance (P =.0001).

In our study there was recoding of the complications we faced during the study. The surgeon was asked to stop and giving booster atropine was encountered in 4 (19.0%) of the patients.

About 6 cases out of 21 (28.6%) faced complications due to the injection itself. Subconjunctival Hge happened in 4 (19.0%) which was self limiting with no further extension of the bleeding and was rechecked after the operations.

Eye shifting due to escape of the local anaesthesia mixture into the muscles or due to the technique itself happened in 2 cases out of the 21 case with a percentage of 4.8 % for each case.

In other investigations, there were no significant complications associated with the peribulbar block. There were no issues from the block. During paediatric ophthalmic surgery, peribulbar block appears to be a safe and effective analgesic approach [20].

Complications were also reported to be extremely rare (orbital haemorrhage, 0.74%; globe perforation, 0.006%; grand mal seizure, 0.006%) [25].

Subhedar et al. [6] didn't report any complication regarding the peribulbar block. According to **Elgohary and Hosny**[23] the use of peribulbar block was not related with any significant consequences. Just four patients in the peribulbar block group experienced self-limiting subconjunctival bleeding that cleared without therapy, which is comparable to the problems we encountered in our trial.

In Our study there was two hours observing for the patients in the recovery room before discharge into the wards. The observation was for the possible anaesthetic complication post operatively and for the post operative pain.

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Children who were able to express themselves and talk about their feelings were asked frankly about the operation experience and the presence of pain. Younger children were observed for the agitation and the signs of pain like hysterical crying, rubbing the eyes, agitation and facial expressions all of these were used to assess the possibility of pain presence.

In our study 17 (81%) patients didn't suffer of the post operative pain while only 4 patients (19%) required post operative analgesia with paracetamol. This means that the lidocaine injection alone in the peribulbar block isn't fully effective against the postoperative pain especially in some lengthy operations.

According to **Deb et al. [20],** when assessed by the recovery room nurse after 30 minutes, 22/25 (88%) children in the block group were pain free. When one of the investigators (KD) used CHEOPS at 2 h, 19/25 (76%) children in the block group were pain free compared to 9/25 (36%) in the control group (P 0.05). Using a coloured and numeric VAS scale, 20/25 (80%) of the children in the block group characterised themselves as pain free, compared to 6/25 (24%) of the children in the control group (P 0.01).

In children having ocular surgery, we discovered that peribulbar anaesthesia combined with general anaesthetic is safe and effective for intra- and postoperative analgesia. It successfully minimises the occurrence of OCR and the requirement for additional opioid analgesics. The recovery following anaesthesia is painless. After 3 hours, the majority of the youngsters were able to accept oral liquids. In the day care situation, where sedation and nausea may delay release, this method may provide early, alert recovery and a low incidence of nausea and vomiting [20].

Darwish [22] discovered that when children had a peribulbar block combined with GA, the incidence of discomfort was decreased to 9.52%. These children had reduced pain levels for the whole 24-hour postoperative period, and significantly more children who received peribulbar block were pain free on waking (p=.0004) and throughout the entire postoperative time. Peribulbar block considerably reduced the number of children who need opioids (p=.008).

In paediatric VR and RD surgery, peribulbar block appears to be a safe and therapeutically superior alternative to IV opioid (fentanyl). It was simple to use and did not cause any local or systemic issues. In the majority of children, it dramatically improved postoperative comfort and reduced the need for opioids [22].

In **Elgohary and Hosny [23]** study Postoperative pain was assessed at 30 min, 1, 3, 6 h and 12 h using visual analogue score (VAS). 1 mg/kg diclofenac suppository was given if VAS> 3. And only 6 (30%) of the patients required postoperative analgesia due to post op pain ($p < 0.05$)

In **Deb et al. [20]** study 5/25 (20%) children in the peribulbar block group required post operative management due to pain and vomiting.

According to **Gupta et al. [19],** PONV is still a prevalent and painful condition following strabismus surgery. The prevalence ranges from 48% to 85%. Emetic reaction is triggered by ocular manipulation or pain.

In **Gupta et al. [19]** study 4 patients required post operative care and analgesia may be due to the pain or the manipulation of the eye with p =.008.

In **Subhedar et al. [6]** study, three out of 17 patients in his lidocaine block group experienced post-operative discomfort and emesis, and three patients got PONV. These patients also reacted favourably to sufficient analgesia provided by paracetamol suppository

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and injectable ondensetron. PONV was found in 23.5% of Group A individuals compared to 17.6% of Group B participants. The relationship between type of anaesthetic and PONV is deemed insignificant (Fisher's exact test: two-tailed P = 0.6783).

In the research by **Subramaniam et al.** [24], considerably more children who had peribulbar block were pain free on waking (P =.0004) and throughout the duration of the postoperative period. With peribulbar block, the number of children requiring opioids was considerably decreased (P =.008).

Most of previous studies findings strongly support that peribulbar block with lidocaine is not perfectly effective against the post operative pain. Our study finds that peribulbar block with lidocaine is acceptable but not perfect against the post operative pain.

In our study the use of the peribulbar block was done in 2 of the study groups one of the groups the peribulbar block was given using levobupivaicaine 0.5% in the local anaesthetic mixture (Group LB).

OCR can also be reduced by shortening the afferent limb of the reflex arc [3]. There were no issues from the block. During paediatric ophthalmic surgery, peribulbar block appears to be a safe and effective analgesic approach [20].

There may be concerns regarding the safety of peribulbar block. On 1,600 consecutive blocks, Davis and Mandel reported no difficulties. Another set of 16,224 consecutive blocks 25 revealed a very low rate of sequelae (orbital haemorrhage, 0.74%; globe perforation, 0.006%; grand mal seizure, 0.006%) [22].

The incidence of the oculocardiac reflex (OCR) in this group after giving the peribulbar block with levobupivaicaine 0.5% was 8 (38.1%). The incidence of blocking the reflex arc and the block of OCR in this group occurred in 13 cases which compromises (61.9%) of the total group population.

No specific intervention was needed in 13 cases (61.9%). The surgeon wasn't asked to stop at all in this group study. The use of preoperative block with levobupivaicaine was used in a number of studies in order to attenuate the oculocardiad reflex and for the post operative pain control.

Pacella et al. [26] used levobupivacaine 0.5% in the peribulbar block on 160 patients undergoing ocular surgery and found that Levobupivacaine is a long-lasting local anaesthetic with reduced cardiotoxicity and neurotoxicity, and may be regarded a landmark for vitreoretinal surgery.

There was no change in the heart rate in the group in **Aksu et al.** [27] investigation, which employed the retrobulbar block of levobupivaicaine 0.5% in vetiroretinal surgery, and thus he noted no occurrence of oculocardiac reflex. Over the whole study period, there were no statistically significant inter- or intragroup variations in hemodynamic data such as noninvasive systolic and diastolic arterial blood pressures and heart rate ($p>0.05$). Statistical examination of the onset timings of motor blocks revealed no significant difference between the two groups ($p>0.05$).

In our study only one case experienced the post operative pain (4.8%). This provides better post operative analgesia than the other 2 groups. The incidence of post operative pain relief achieved by injections of levobupivaicaine in ocular surgeries and strabismus surgery was far more mentioned in other studies.

Morris et al. [28] selected children aged 1-16 years receiving strabismus surgery for their research. The test group was given sub-Tenon levobupivacaine before the surgery and topical

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anaesthetic eye drops at the conclusion. The control group received topical anaesthetic eye drops only at the end of surgery, implying that levobupivacaine, which is commonly used for postoperative pain relief in paediatric strabismus surgery, was ineffective when administered preoperatively in this cohort, in contrast to our study, which found that only one case required postoperative analgesia in this group, implying that the PBB with levobupivaicaine is highly effective for postoperative pain relief. The primary outcome for both groups was the pain score at each time interval. There were 27 age- and sex-matched controls and 27 patients who got sub-Tenon levobupivacaine. The test group's pain score was not lower than the control group's ($p = 0.22$ at 30 min, $p = 0.37$ after 2 h).

According to **Ghali and Ashraf** [(29)] study, vetiroretinal surgery is usually linked with a significant incidence of postoperative discomfort, most likely due to tension on the ocular muscles and sclera and/or increased intraocular pressure due to gas bubble expansion or tight buckling or encirclement. Many ophthalmic surgeons favour local anaesthesia (LA) over general anaesthesia (GA) due to faster patient rehabilitation, avoidance of potential problems from GA, and greater analgesic characteristics postoperatively, thus he investigated the effectiveness of levobupivaicaine for postoperative pain. During the postoperative phase, patients in the levobupivacaine group had lower values of the verbal numeric rating scale of pain compared to patients in the ropivacaine group from 4 to 12 h. The diclofenac intake (mg) in the levobupivacaine group (86.9±11.7) was substantially lower (P=0.001) than in the ropivacaine group (182.2±36.1). Also, the percentage of patients who required tramadol rescue medicine in the levobupivacaine group (6.6%) was considerably lower (P=0.034) than in the ropivacaine group (21.6%).

In **Aksu et al.** [(27)] study there was better satisfaction in patients and surgeon in the group receiving levobupivaicaine according to the post operative pain which is also similar to our study findings. Group L (15 patients) required substantially more postoperative analgesia than Group B (6 patients) or Group LB (no patients) (p0.05), and no postoperative complications were seen in any of the groups.

Darwish et al. [(30)] found that utilising a short needle and a modest volume for a single medial canthus injection peribulbar anaesthesia with levobupivaicaine 0.5% under ultrasound imaging is successful in paediatric eye surgery and improves postoperative analgesia. It also had the benefit of being simple and safe, with the lowest frequency of problems, which corresponded to the findings of our study on post-operative analgesia. In the first 24 hours after surgery, the number of patients who required pain relief was comparable in the two groups. Nevertheless, the mean time to first analgesic necessity differed considerably between the two groups; the peribulbar group (group 1) required 6.1±1.8 hours, whereas the acupuncture group (group 2) required 3.5±2.0 hours ($p = 0.001$).

CONCLUSION

In this study, we found that using a peribulbar injection of lidocaine 2% with general anaesthesia in strabismus surgeries in paediatrics is effective in decreasing the incidence of OCR more than the use of pre-emptive Atropine and with higher surgeon satisfaction. And also, the use of a peribulbar injection of levobupivacaine 0.5% with general anaesthesia has an effective role in decreasing the post-operative pain and better patient satisfaction. Although atropine has a very important role as an emergency drug for managing bradycardia, in this study we found that its role in preventing OCR or decreasing pain was limited; it also has side effects like dry mouth and blushing, so we don’t recommend its use unless indicated.

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