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THE USE OF SUB-TENON BLOCK AS PREEMPTIVE ANALGESIA TO IMPROVE PERIOPERATIV ADVERSE EFFECTS FOR RETINAL DETACHMENT SURGERY

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ABSTRACT

Background and objectives : To study the efficacy of sub-Tenon block in reducing the intensity of pain and reduction of perioperative adverse effects that Occur during retinal detachment repair surgery under general anesthesia.

Materials and methods : Sixty, 60 ASA physical status I or II patients undergoing retinal detachment repair surgery were randomized into two groups, both groups received general anesthesia either with sub-Tenon block(using 2 ml lidocain 2% and 2 ml bupivacaine 0.5%) in the case group or without sub-tenon block in the control group. Intraoperative hemodynamic changes, intraoperative complications and ocular tension monitoring were recorded. Postoperative intensity of pain were assessed by visual analogous score (VAS). Also, occurrence of postoperative nausea and vomiting (PONV) were recorded .

Result : As regard post operative pain, in group 1 (with sub-Tenon injection)early in the recovery, visual analogous score was less than in group 2(without sub-Tenon injection), also the proportion of patient with no

pain was higher in group 1 vs group 2 (56.7% vs 36.7%). visual analogous score at 3 hours post operative was lower in group 1 vs group 2 and the proportion of patient with no pain was more (53.3% in group 1 vs 23.3% group 2) .Occurrence of oculocardiac reflex was less in group 1 than in group 2 (30.0% vs 60.0%), also occurrence of postoperative nausea and vomiting in early post operative period was less in the group 1 than the group 2 (30.0 vs 60.0).

Conclusion : The use of sub-Tenon block as a preemptive analgesia for retinal detachment repair surgery may be safe and effective in reducing the intensity of pain in the early post operative period .Decrease the incidence of oculocardiac reflex and postoperative nausea and vomiting is another important benefit.

INTRODUCTION

Postoperative pain is one of the major problems in the surgical services(Akkaya and Ozkan). Previous study from (Henzler et al) in patient underwent various eye surgeries

showed that posterior segment surgery was more painful compared to the anterior segment.

Efficacy of preoperative ocular nerve block on pain severity and complications that occur intra and post operatively are frequently encountered by the anesthesiologist. One recommendation to reduce postoperative pain is using preemptive analgesia (Kelly et al) which defined as antinociceptive treatment that prevents establishment of altered central processing of afferent in put from sites of injury .Drugs that stabilize the membrane (e.g local anesthesia) can prevent the formation of action potential of the pain pathway (Kelly et al).

Previous studies showed that the efficacy and safety of a sub-Tenon's approach to local anesthesia in the anterior segment. Several investigators have demonstrated that the sub-Tenon's capsule block can provide safe and effective local anesthesia for vitreoretinal procedures (Patton et al). However, the efficacy of a sub-Tenon's capsule injection in posterior segment surgery is less well established.

Sub-Tenon's anesthesia acts on the short ciliary nerve, and causes sensory and motor blocks by directly operating on the extraocular muscles' oculomotor nerves (Kumar).

Clinical studies have been performed to know the efficacy of using local anesthetic agents in retinal detachment repair surgery. In one study after ocular nerve block, the incidence of intraoperative oculocardiac reflex, postoperative nausea and vomiting and doses of analgesia given during 24hours, postoperatively were all decreased (Mahfouz and Nabawi) .

Novel study from (Barakat) and (Lai et al) did not show any benefit of local anesthesia in vitroretinal surgery.

According to previous studies, the effectiveness of preoperative ocular nerve block on pain severity and complications is infrequently studied and the reliability of nerve block is controversial.

This study evaluates the efficacy of preoperative sub-Tenon block using a combination of lidocain and bupivacaine as preemptive analgesia in the repair of retinal detachment .

MATERIALS

After getting informed consent and ethical committee approval, sixty patients were scheduled for elective repair of retinal detachment   surgery under general anesthesia The patients had physical status I or II of ASA classification.

Inclusion criteria were, patients underwent retinal detachment repair with scleral buckling ,age above 18 years old, there were no history of anaphylaxis with local anesthetic and patients were willing to participate in the study . Exclusion criteria were verbal or visual disturbance to VAS interpretation, patient's undertaken beta-blockers and patients with history of postoperative nausea and vomiting after previous anesthesia.

Patients were prospectively randomly divided into two groups (30 patients in each group), randomization were done using the closed enve-

lope method ,the envelope opened by a nurse not engaged in the study . Both group received general anesthesia. One group (group 1) received the combination of (2ml of 2% lidocain and 2ml of 0.5% bupivacain)through sub-Tenon injection before the start of general anesthesia.

Basal values of systolic blood pressure, diastolic blood pressure, oxygen saturation were recorded preoperatively.

Administration of sub-Tenon local injection was conducted by the ophthalmologist through initially creating incision of the conjunctiva and Tenon capsule along the 2mm length starting approximately 6mm from the limbus in the inferotemporal quadrant ,blunt cannula was inserted into the retrobulbar space and local anesthetic was injected.The other group (group 2) receive only general anesthesia, both group received general anesthesia with similar method .Induction was done after preoxygenation (with 10 liter flow for 2min with (spo2>95%). Intravenous fentanyl 1µg/kg, thiopental 5mg/kg and tra-

cheal intubation was facilitated by using atracurium 0.5mg/kg Anesthesia was maintained with O2 only and isoflurane with inspiratory concentration of 1.2 %, evaluation of patients was done intraoperatively considering blood pressure (systolic and diastolic blood pressure), heart rate (each 10 minute up to the end of surgery, during the recovery room and in the ward) and occurrence of Oculocardiac Reflex(it was defined as 20% decrease in the heart rate due to muscle - twitch of ocular muscle).

Postoperative monitoring of the severity of ocular pain according to visual analogous scale (VAS) , mild pain with VAS=0-3 ,moderate pain with VAS =4-7 and severe pain with VAS =8-10.

Postoperative complications such as postoperative nausea and vomiting (PONV) and E.C.G changes were recorded . Also postoperative analgesic (in the form of nonsteroidal anti-inflammatory agent) requirement by the patient were recorded No prophylactic antiemetic or antimuscarinic agents were given.

STATISTICAL ANALYSIS

The statistical analysis of data done by using excel program and statistical package for social science version 10 (SPSS). To test the normality of data distribution Kolmogorov -Smirnov (K-S) test was done only significant data revealed to be nonparametric.

All tested data revealed to be parametric. The description of the data done in form of mean (+/-) SD for quantitative data.

The analysis of the data was done to test statistical significant difference between groups. For quantitative data student t-test was used to compare between two groups. Paired sample t-test to compare one group at different time. Chi square test was used for qualitative data.

P is significant if < or = 0.05 at confidence interval 95%.

RESULTS

Data were obtained from 60 patients (40 male & 20 female) aged from(20-78 years) who underwent retinal detachment repair surgery with scleral buckle. Both groups underwent the same perioperative procedure, except the subtenon injection before general anesthesia in group 1. The duration of surgical procedure was not statistically significant. The average ocular tension after subtenon injection of local anesthetic was slightly higher in group 1 but it was of no importance (table 1).

Perioperative hemodynamic changes (systolic blood pressure, diastolic blood pressure and heart rate) were not statistically significant (table 2).

Intraoperative monitoring of oxygen saturation and end -tidal CO_2 were not statistically significant .

Proportion of patients who were pain -free at recovery between group 1 and group 2 showed (56.7% vs 36.7%), also 3 hours postoperative (53.3% vs 23.3%). VAS was significantly lower in group 1 vs group 2) both at recovery and 3h postoperative, two patients in group 1 vs seven patients in group 2 who need additional analgesia (table 3).

Statistical analysis of severity of pain at 6h, 12h, 24 h, postoperative

showed that there were no significant difference between both groups (table 3).

Statistical analysis of occurrence of perioperative complications showed that there were significant differences between group 1 and group 2 as regard the proportion of occurrence of oculocardiac reflex (30.0% vs 60.0%) (table 4) .

Also postoperative nausea and vomiting at recovery showed that the proportion of cases with PONV in the group 1 were less than that of the group 2 (30.0% vs 60.0%) (table 4) .

TABLE (1) : Demographic characteristic Data

Variable	Group 1 N=30))	Group 2 N=30))	p-value
Gender			
Male	21(70.0%)	19(63.3%)	0.58
Female	9(30.0%)	11(36.7%)	
Age(year)	40~ 65	38 ~ 60	0.23
Duration of surgery In min))	105.6±9.8	103.3 ±7.5	0.30
Ocular tension (mmhg)(pre surgery after subtenon)	12.0. ±.83	11.4 ±.96	0.005 *

Values   were given as mean ± SD except for sex data were presented as relative frequency.

No significant differences

Increase ocular tension in   group 1._

Haemodynamic changes	Group 1 (n=30)	Group 2 (n=30)	P- value
SBp -basal	141.6 ± 11.0	140.3 ±10.0	0.64
SBP- (every 10 min) intraoperative	121.7 ±7.9	115.3 ±6.6	0.001**
SBP -recovery	129.5 ±13.3	130.7 ±8.2	0.68
SBP –ward	125.3 ±12.5	122.6 ±13.2	0.41
DBP-basal	92.1 ±6.1	89.4 ±6.1	0.08
DBP-(every 10 min) intraoperative	73.04 ±8.1	72.3 ±10.1	0.778
DBP- recovery	73.9 ±21.1	78.3 ±24.1	0.459
DBP-ward	74.9 ±14.9	77.8 ±12.9	o.43
HR-basal	83.1 ±12.1	82.9 ±12.2	0.95
HR-intraoperative	85.3 ±6.3	84.9 ±6.4	0.81
HR-recovery	99.2 ±10.3	98.8 ±10.9	0.89
HR-ward	79.7 ±7.1	80.3 ±6.1	0.72

No significant differences between both groups .

Values were given as mean ± SD.

SBP=systolic blood pressure(mmhg) .

DBP=diastolic blood pressure(mmhg) .

HR= heart rate(beat /min).

TABLE (3) : Post operative severity of pain.

Time	recovery			3h			6-h			12-h			24-h		
Group	Group 1 (n=30)	Group 2 (n=30)	p-value	Group 1 (n=30)	Group2 (n=30)	p-value	Group 1 (n=30)	Group 2 (n=30)	p-value	Group 1 (n=30)	Group 2(n=30)	p-value	Group 1 (n=30)	Group 2 (n=30)	p-value
VAS	2.84±2.51	3.47±2.80	0.016*	2.00±1.41	3.66±1.83	0.011*	1.46±1.12	2.33±1.07	0.06	1.40±0.54	1.56±0.81	0.55	1.0	1.0	0.64
No	17(56.7%)	11(36.7%)		16(53.3%)	7(23.3%)		17(56.7%)	18(60.0%)		25(83.3%)	24(80.0%)		27(90%..)	28(93%)	
Mild(+)	9(30.0%)	7(23.3%)		12(40.0%)	8(26.7%)		12(40.0%)	11(36.7%)		5(16.7%)	6(20.0%)		3(10%)	2(6.7%)	
Moderate (++)	2(6.7%)	5(16.7%)	0.133	2(6.7%)	15(50.0%)	*0.001	1(3.3%)	1(3.3%)	0.96			0.73			
Severe (+++)	2(6.7%)	7(23.3%)													

VAS(visual analogue score) .

significant difference between both groups*

TABLE (4) : Perioperative complications.

variable	Group1 (n=30)	Group 2 N=30))	P- value
OCR	9(30.0%)	18(60.0%)	0.020 *
PONV- recovery	9(30.0%)	18(60.0%)	0.020*
PONV-ward	5(16.7%)	10(33.3%)	0.136
With sleep disturbance	19(63.3%)	18(60.0%)	0.893

OCR =oculocardiac reflex.

PONV=post operative nausea and vomiting.

Data are presented as relative frequency.

* significant reduction of proportion of patient without occurrence of OCR   and
  PONV in the case group .

DISCUSSION

This study showed that the proportion of patient with no pain in group 1 was more than that of group 2 (56.7% vs 36.7%) at the recovery period , and also 3hours post operative (53.3% vs 23.3%) this may indicate the success of analgesic effect of local subtenon in group 1

According to (Safavi et al), study the incidences of post operative ocular severity of pain, up to 24 hours, were significantly lower in the case group compared with the control group.

(Afifudin et al), showed that the mean VAS and the proportion of pain free patients between the two groups were similar .

(Kristin et al), showed that the average value of VAS in the case group was 1.00 while that of the control group was 3.00, their study showed that the proportion of pain free patients was 65% 3 hours post operative . Similar research by (Clarke et al), showed that a number of success range between (56% - 72% cases), while proportion of

patients who were pain free in both groups were similar (65% vs 65%).

Systemic study from (Ong et al), showed that the results for preemptive analgesia in many cases were still variable. (Mason et al), showed that the addition of local block did not affect the measurement of pain incidence, also (Bahcecioqlu et al), showed that the local anesthesia did not provide additional benefits in the vitroretinal operation. some authors have observed that preemptive anesthesia with preoperative nerve block is insufficient this may be due to, less adequate afferent block, pain intensity and type of operation, inflammatory mediators and the individual reaction post-operative.

Controversial result was obtained from (Guise), who showed that the sub-Tenon block was very effective.

(Calenda et al), showed that the average VAS in sub-Tenon group was lower than that of the control group .

The result of this revealed that

sub -Tenon block decrease the PONV during the recovery and later in the ward also significant reduction of the occurrence of intraoperative OCR which was very useful result in this research, also there was decrease postoperative analgesia given in group 1.

Similar research by (Safavi et al) which revealed that sub-Tenon block reduced PONV and occurrence of intraoperative OCR .

As a whole, according to this study, sub-Tenon block as a preemptive analgesia for retinal detachment repair surgery was safe and effective in reducing pain intensity at early post operative period and also decrease the incidence of intraoperative complication and postoperative nausea and vomiting .

CONCLUSION

1-This study showed that sub-Tenon block reduce the intensity of ocular pain in retinal detachment repair surgery

2-Reduction of PONV during recovery.

3-In addition, reducing the incidence

of occurrence of intraoperative OCR is another usefulness of this block

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