Research Article

Effects of Using Cis-Atracourium as Adjuvant Agents to the Local Anaesthetic on Peribulbar Anesthesia.

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Abstract
Background and aim of work: Peribulbar block is widely practiced in cataract surgery, but it has slow onset of ocular akinesia. This study was done to evaluate the effects of adding law dose cis-Atracurium to the local anesthetics on akinesia in peribulbar block. **Patients and methods:** This study was done on ٨٠ ASA patients undergoing cataract surgery under peribulbar anesthesia. The patients were divided blindly in two groups, The ١st group received ٥ml solution containing ٣ml of ٢٪ lidocaine with ٩٠ iu of hyaluronic acid, ١.٥ml of bupivacaine ٠.٥٪ plus ٠.٥ml ١mg of cis-Atracurium, while the ٢nd recived ٥ml solution containing ٣ml of ٢٪ lidocaine with ٩٠ iu of hyaluronic acid, ١.٥ml of bupivacaine ٠.٥٪ plus ٠.٥ml of Nacl ٠.٩٪. Onset, duration, and intensity of globe and lid akinesia were recorded. **Results:** globe and lid akinesia were faster in ١st group and has longer duration with less need for ٢nd injection and more surgeon satisfaction. **Conclusion:** the addition of law dose cis-Atracurium to the local anesthetic in peribulbar block accelerates akinesia and improves quality of block and increases surgeons satisfaction.
Key words: cis-Atracurium; peribulbar block

Introduction
Most of eye surgeries are done under local anesthesia, as the patients are elderly and have multiple systemic diseases beside that the ability of the local anesthesia to induce good akinesia and anesthesia.[1,2]

The corner stone of ophthalmic anesthesia is establishment of akinesia which help the surgeon during operation and controlling pain through limiting eye movement[3].

Retrobulbar block is more effective and rapid than the peribulbar block in establishing akinesia but it has hazardous side effects[4].

Peribulbar block is more safe but it is used less frequently because of its slow onset and inadequate intensity of akinesia which needs large volume of anesthetic substance to overcome leading to increase in the IOP making +ve vitreous pressure making difficulty to the surgeons[5].

Multiple clinical trials have shown that the addition of neuromuscular blocker to the local anesthetic solution improves the quality of anesthesia[6], so we aim to study the effect of adding law dose cisAtracurium on the peri-bulbar anesthesia.

Patients and methods
Following approval of local ethical committee and informed written consent, this study was performed in El-Minia University Hospital in the period from January ٢٠١٢ to September ٢٠١٢. The study involved ٨٠ patients, ASA I or II aged between ٤٠ and ٨٠ years scheduled to undergo cataract surgeries under peribulbar block.

We exclude patients with history of allergic reactions to local anesthetics, history of seizures, peripheral neurological diseases, patients with coagulopathy or on anti coagulant therapy and axial length more than ٢٦ mm. local anesthetic solution was prepared- by anesthesiologist other than the one who will gave the peribulbar block without being aware of the type of the group of patient- in ٥ milliliters syringe which labeled as ١ containing solution of ٣ml of lidocaine hydrochloride ٢٪ and ١.٥ ml of bupivacaine ٠.٥٪ plus ٠.٥ ml (١mg) of cis-Atracurium or ٢ containing

solution of ٣ml of lidocaine hydrochloride ٢٪ and ١.٥ ml of bupivacaine ٠.٥٪ plus ٠.٥ml of normal saline. Patients were divided randomly in two equal groups, after routine monitoring was applied to the patients, they received peribulbar block with the two different mixtures.

The injections will be carried out using a needle (٢٥G) with the length of ٢٥mm being connected to a syringe containing anesthetic solution of ٥cc volume.

The block was done as follows:
The patient lies supine and look directly ahead focusing on a fixed point on the ceiling, so that the eyes are in the neutral position. Needle was introduced inferotemporal at a point ١-١.٥ cm medial to the lateral canthus and directed slightly medially (٢٠) and cephalad (١٠) until needle hub contact the skin. After -ve aspiration ٥cc of the local anesthetic mixture according to patient's group was injected guarded by no crowdness of the eye. Then soft intermittent digital pressure on the eye was applied for ٥ minutes to decrease the intraocular pressure, help spread the anesthetic solution and promote akinesia of peripulbar muscles.

After ٥ minutes eye examined for successful block which known by ptosis, no or minimal eye movement and inability to close the opened eye. If there is incomplete block, a second injection (٣ cc lidocaine ٢٪) can be given as an augmentation to the first injection between the caruncle and the medial canthus, passing back and slightly medially (away from the globe) for about ٢٤mm. Complete the injection was considered ٠ time

Parameters assessed after the block:
(A) Onset and intensity of motor blockade (Akinesia): Ocular akinesia was assessed by asking the patient to look superior, inferior, medial and lateral; also lid akinesia was assessed by testing the ability to close the eye. They were assessed at ٢,٤,٦,٨ and ١٠ minutes after injection. Ocular akinesia was assessed using (Akinesia score)[٦].
    ٠=No movement (٠-١mm motion in ١ to ٢ main directions) Total akinesia
    ١=Slight movement(١mm motion in

each of the main directions or ٢mm motion in ٢ or many other main directions) Relative akinesia
    ٢=Full movement(more than ٢mm motion range in each of the main directions or ٢mm motion range in ٢ or more main directions) No akinesia

(B)   akinesia of the orbicularis muscle was assessed as follows:
    ٠=Complete akinesia
    ١=Partial movement in either or both eyelid margins.
    ٢=Normal movement in either or both eyelid margins.[٧]

(C) Number of second injections needed:
A second dose of the local anesthetic (٣cc lidocaine ٢٪) may be needed if the block is incomplete after ١٠min from the first injection as manifested by akinesia score ٢.

(D) Duration of the block (Akinesia):
Starting from injecting the anesthetic solution till complete recovery from the block occurs. It was tested by movement assessment using the previous scoring system at ٢ and ٣hrs post-operatively.

(E) Quality of operative condition assessed by a surgeon:
    ٠= unsuccessful (Failed to work)
    ١= poor (Inadequate for surgery)
    ٢= acceptable (Block is incomplete but surgery could proceed)
    ٣= perfect (Effective block)

Sample size analysis: power analysis was performed using a power of ٩٠٪ and value of ٠.٠٥ sample size was calculated using graphpad instat satatistics program for power analysis.

Statistical analysis
Results were expressed as mean ± standard deviation (± SD) or No. & %. Input data were processed using computer-based software (SPSS version ١٧ interface). Un paired t test was used for comparing the two groups as regard quantitative variables and Kruskal Wallis test followed by Mann- Whitney test for comparison of the qualitative data. P value of <٠.٠٥ was considered statistically significant.

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Results

٨٠ patients included in this study divided in two groups, the two groups were comparable with respect to demographic data and duration of the surgery.

The time adequate to begin the surgery:

In the cis-Atracurium group there was significant decrease in this time (٥.٣ ± ٣.١٩min) compared to the control group, as it was ٩.٩ ± ٣.٥٢ min., and we find that the duration of the block was significant longer in group ١ (١٦٥ ± ٢١.٧٦ min.) compared to group ٢ (١٠٥ ± ٢٧.٥٢min.).

Table (١): Onset, duration of the block and time adequate to begin the surgery in the two groups (Mean ± SD and Range).

Variables	Ggroup ١ (Cis-atracurium) N = ٤٠ Mean±SD (Range)	Ggroup ٢ (Control) N = ٤٠ Mean± SD (Range)	P ١vs٢
Onset of motor block (min)	٣.٤ ± ٢.١٣ (٢-٨)	٧.٠٥ ± ٢.٩٦ (٢-١٢)	<٠.٠٠١*
Time adequate to begin surgery (min)	٥.٣ ± ٣.١٩ (٢-١٢)	٩.٩ ± ٣.٥٢ (٢-١٤)	<٠.٠٠١*
Duration of block (min)	١٦٥ ± ٢١.٧٦ (١٣٥-١٩٥)	١٠٥± ٢٧.٥٢ (٦٠-١٣٥)	<٠.٠٠١*

Un paired t test was used for these data.
*: Significant difference between groups (p value < ٠.٠٥).

Intensity of the Block (Globe and Lid Akinesia): Eye movement was assessed at ٢, ٤, ٦, ٨ and ١٠ minutes after injection in the two groups using akinesia scoring system for the globe and eyelids.

Globe akinesia:
Group ١ (cis-atracurium group) reached score ٠ significantly more rapid than in the control group (group ٢).

As at ٢min. ٢٨ patients (٧٠٪) in group ١ reached score ٠, while only ٦ patients in group ٢.

And At ١٠min., all patients (١٠٠٪) reached score ٠ in the first group, while ١٦ patients (٤٠٪) in group ٢, so there were significant differences between group ١ with group ٢. These data are illustrated in table ٢

Table (٢): Showing globe akinesia scores in the three groups at ٢,٤,٦,٨ and ١٠ min. after injection

Time after injection	Score	Group ١ cis-Atracurium N = ٤٠	Group ٢ Control N = ٤٠	P ١vs٢
٢ min	٠	٢٨ (٧٠٪)	٦ (١٥٪)	<٠.٠٠١*
	١	٨ (٢٠٪)	٢ (٥٪)	
	٢	٤ (١٠٪)	٣٢ (٨٠٪)	
٤ min	٠	٣٢ (٨٠٪)	٦ (١٥٪)	<٠.٠٠١*
	١	٦ (١٥٪)	٦ (١٥٪)	
	٢	٢ (٥٪)	٢٨ (٧٠٪)	
٦ min	٠	٣٤ (٨٥٪)	٨ (٢٠٪)	<٠.٠٠١*
	١	٤ (١٠٪)	٦ (١٥٪)	
	٢	٢ (٥٪)	٢٦ (٦٥٪)	
٨ min	٠	٣٦ (٩٠٪)	١٠ (٢٥٪)	<٠.٠٠١*
	١	٤ (١٠٪)	٦ (١٥٪)	
	٢	٠(٠٪)	٢٤ (٦٠٪)	
١٠ min	٠	٤٠ (١٠٠٪)	١٢ (٣٠٪)	<٠.٠٠١*
	١	٠ (٠٪)	٤ (١٠٪)	
	٢	٠ (٠٪)	٢٤ (٦٠٪)	

(Data expressed as N and %)
Kruskal-Wallis test was used for comparison between groups.
*: Significant difference between groups (p value < ٠.٠٠٥).

Lid akinesia:

Cis-Atracurium group reaches the score ٠ more rapidly than the control group significantly, but more delayed than the globe akinesia, as at ٢min, ٢٢ patients (٥٥٪) in group ١ (cis-Atracurium group) reached score ٠, while ٢ (٥٪) patients were in group ٢, at ٤min. only ٤(١٠٪) patients were presented with score ٢ in the first group, while ٣٢ (٨٠٪) patients still having score ٢ in the control group. At ١٠min., no patients with score ٠ presented in group ١, and ٢٤ patients (٦٠٪) in the control group. So our results showed that there were significant differences between the two groups.

Table (٣): Showing lid akinesia scores in the two groups at ٢,٤,٦,٨ and ١٠min. after injection.

Time after injection	Score	Group ١ cis-Atracurium N = ٤٠	Group ٢ control N = ٤٠	P ١vs٢
٢ min	٠	٢٢ (٥٥٪)	٢ (٥٪)	<٠.٠٠١*
	١	٨ (٢٠٪)	٢ (٥٪)	
	٢	١٠ (٢٥٪)	٣٦ (٩٠٪)	
٤ min	٠	٢٤ (٦٠٪)	٤ (١٠٪)	<٠.٠٠١*
	١	١٢(٣٠٪)	٤ (١٠٪)	
	٢	٤ (١٠٪)	٣٢ (٨٠٪)	
٦ min	٠	٣٠(٧٥٪)	٦ (١٥٪)	<٠.٠٠١*
	١	٦ (١٥٪)	٤ (١٠٪)	
	٢	٤ (١٠٪)	٣٠ (٧٥٪)	
٨ min	٠	٣٦ (٩٠٪)	٦ (١٥٪)	<٠.٠٠١*
	١	٢ (٥٪)	٨ (٢٠٪)	
	٢	٢(٥٪)	٢٦ (٦٥٪)	
١٠ min	٠	٣٨ (٩٥٪)	٦ (١٥٪)	<٠.٠٠١*
	١	١٠ (٥٪)	١٠(٢٥٪)	
	٢	٠ (٠٪)	٢٤(٦٠٪)	

Chi- square test was used for comparison between the two groups.
*: Significant difference between groups (p value < ٠.٠٠٥).

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Quality of block

The block was perfect in ٥٥٪ of the patients in group ١ (receiving cis-atracutium), it was acceptable in ٤٥٪ While in group ٢ (control group), the block was perfect in ١٠٪ only and acceptable in ٩٠٪ of the patients.

Table (٤): Quality of the block in the three groups.

Quality of block	Group ١ N (%)	Group ٢ N (%)	P ١vs٢
Acceptable:	١٨ (٤٥٪)	٣٦ (٩٠٪)	٠.٠٠٦*
Perfect:	٢٢ (٥٥٪)	٤ (١٠٪)	

Fisher's exact test comparison of these data

Patient Satisfaction Score:

There was significant difference when comparing patient satisfaction score. There was complete satisfaction in group ١ in ٧٠٪ of the patients While in group ٢ (control group) it was only١٠% .

Table (٥): patient satisfaction score in the three groups.

Patient Satisfaction Score	Group ١ N (%)	Group ٢ N (%)	P ١vs٢
Dissatisfaction	٠ (٠٪)	١٦ (٤٠٪)	
Some dissatisfaction	١٢ (٣٠٪)	٢٠ (٥٠٪)	<٠.٠٠١*
Complete satisfaction	٢٨ (٧٠٪)	٤ (١٠٪)	

Fisher's exact test, for categorical data.
*: Significant difference between groups (p value < ٠.٠٥).

Discussion:

Peribulbar block is widely used in cataract surgery, but it is slow onset and needs large volume of local anesthetics which may increase the intraocular pressure producing positive vitreous pressure intraoperatively[8]., so some clinical trials have shown that addition of neuromuscular blocker (e.g. vecuronium, pancronium, cis-Atracurium or atracurium) to the local anaesthetics improves the quality of the block and accelerates onset of akinesia ,and decrease the volume required for the block[9].

The main finding in our study is that adding cis-Atracurium ١mg to a mixture of lidocaine ٢٪ and bupivacaine ٠.٥٪ provided adequate peribulbar anesthesia, decreased its onset time and prolong its duration in patients undergoing cataract surgery without causing adverse effects.

The results of our study revealed that cis-atracurium increased intensity of akinesia, quality of the block assessed by the anesthiologist, quality of the operative condition assessed by the surgeon and time to adequate condition to begin surgery. However, the exact mechanism through which the local administration of a non-depolarizing muscle relaxant improves globe and eyelid akinesia is not known, but is believed to be due to local effects at the muscles motor end plate, this idea was suggested by Abdellatif et al in ٢٠١١[10].

These results are in agreement with the results of Godarzi et al., double blind study compared effects of atracurium and cis-Atracurium added to local anesthetic, and found that total ٩٩ akinesia is comparatively more frequent in group of atracurium and cis-atracurium than the placebo group[11].

In the present study, we found that the onset of the akinesia was significantly faster in group I (cis-atracurium group) was ٣.٤±٢.١٣min,while in group ٢ (control group) was ٧.٠٥±٢.٩٦min. This result was in line with the studies of Soltani and his colleagues who proved that atracurium group was of more rapid onset compared with the control group[١٢].

Also Küçükyavuz and Arici concluded that adding low dose of atracurium (٥mg) to the local anesthetics in peribulbar block decreases the onset time of akinesia[٩].

The current study revealed that the mean duration of the block was significantly longer in cis-atracurium group which was ١٦٥±٢١.٧٦ min than in the control group which was ١٠٥±٢٧.٥٢min.

The same as in Eghbal et al., results showed that atracurium addition to the local anesthetics prolongs the duration of the block and fastens the onset of the block[١٣]. As regard time adequate to begin the surgery, its mean duration in cis-atracurium group was ٥.٣±٣.١٩min, while in the control group was ٩.٩±٣.٥٢min, so there was significant difference between groups I and III and between groups II and III.

In the study of Abdellatif et al., found that adding low dose of rocuronium to the local anaesthetics in peribulbar block decreases the time adequate to begin the surgery[١٠].

Our study showed that the need for a second injection was significantly increased in control group than in the other group.

Abdellatif et al., suggested that adding rocuronium to a low concentration of the local anaesthetics decreases the need for these supplemental blocks, [١٠]

Concerning the quality or intensity of globe akinesia in the different times with cis-atracurium group was comparatively better than the control group. Also as regard the lid akinesia it was faster in group ١ than in group ٢. Godarzi et al., showed in their study that as regard the quality of akinesia, cis-atracurium group was comparatively better than atracurium group and placebo group[١١].

As regard quality of the block, our results showed that it was perfect in ٢٢ patients of group ١ (cis-atracurium group), while in group ٢ only ٤ patients were perfect block.

Küçükyavuz and Arici proved that adding atracurium (٥mg) to the local anesthetics in peribulbar block provides better surgical conditions without obvious side-effects[٩].

In conclusion, the quality of peribulber block ,surgical satisfaction may be improved by addition of law dose cis-Atracurium to the local anesthetics. Further evaluation of another dose regimen to obtain perfect block is recomm-ended.
Conflict of interest: no conflict of interest

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