

A STUDY TO ANALYSE THE CAUSES OF PERSISTENT POSTOPERATIVE PTOSIS AFTER CATARACT SURGERY

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ABSTRACT

BACKGROUND

One of the most common ocular surgery, i.e. cataract surgery is today highly efficient and has a predictable outcome. Still, eyelid malpositions can occur after cataract surgery. Of these, blepharoptosis of upper eyelid occurs and sometimes persists even after few months of surgery. This occurrence depends on the surgical technique and method of ocular anaesthesia given.

The aim of the study is to know the incidence and probability of developing postoperative persistent ptosis (>12 weeks) after different surgical techniques and anaesthetic methods.

MATERIALS AND METHODS

Retrospective analysis of 200 cataract surgery patients operated at Ophthalmology Department at Government Stanley Medical College and Hospital was done regarding the incidence and progression/persistence of postoperative ptosis. The causes analysed being method of cataract surgery performed whether ECCE by classical incision, SICS or by phacoemulsification. The anaesthesia being given was analysed whether peribulbar block or topical proparacaine block. The association between age factor and development of ptosis was analysed as well the worsening of pre-existing mild ptosis was also analysed in this study.

RESULTS

Of the 200 patients, 25 patients had pre-existing mild ptosis. Of these 25, fourteen patients worsened after surgery and had persistent ptosis. Of the 200 patients, new-onset ptosis was observed in 36 patients in first 14 days of postoperative period. Of these 36 patients, 11 patients had persistent ptosis at 12 weeks. Of those 100 patients operated by SICS and ECCE - 8 patients developed persistent ptosis compared to 4 patients who underwent phacoemulsification. Of those who had pre-existing ptosis and had repeat peribulbar blocks, 50% developed persistent ptosis. Of the 50 patients who had phacoemulsification under topical anaesthesia, only one developed ptosis. Development of ptosis by age criteria showed that 50-75% of persistent ptosis involved patients of age 70 or above.

CONCLUSION

Regarding development of persistent ptosis, the incidence is more with ECCE of classic incision/SICS than phacoemulsification, because of use of bridge suture and speculum usage. Ptosis is least in topical phacoemulsification. When peribulbar block is repeated, the probability of persistent ptosis development is higher. The patients who are above 70 years and who had pre-existing ptosis worsened more after repeat peribulbar blocks. The phacoemulsification under topical anaesthesia group had the least postoperative ptosis.

KEYWORDS

Postoperative Ptosis, Bridge Suture Effect, Anaesthetic Myotoxicity, Postop Ptosis Worsening.

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BACKGROUND

Cataract surgery, which is a predictable surgery with good visual outcome does have some important postoperative complications like those of cornea, vitreous leading to

reduced visual acuity postoperatively. Less often, they have lid-related complications, which are not vision threatening, but bothersome from patient's view. These complications of lid include postoperative ptosis, ectropion, entropion, etc. of these postoperative blepharoptosis occurs in a significant number of patients.

Blepharoptosis of the upper lid can be mild, moderate or severe depending on the amount of drooping of the eyelid or by margin reflex distance 1 (distance between the centre of the pupillary reflex and the upper lid margin, when the eye is in primary gaze).

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If the drooping is ≤ 2 mm graded as mild, 2-4 mm graded as moderate and >4 mm graded as severe blepharoptosis.

Based on MRD-1

Mild	- when MRD 1 is 2 mm or more.
Moderate	- <2 mm.
Severe	- 0 or -ve.

Ptosis are of five types - mechanical, aponeurotic, myogenic, neurogenic and neuromuscular.¹

In the immediate postoperative period, lid oedema can lead to mechanical ptosis.

Myogenic ptosis can develop due to musculotoxic effects of anaesthesia or due to the process of injecting anaesthetic into the muscle.

Aponeurotic ptosis is due to dehiscence or disinsertion of levator aponeurosis from its insertion to the tarsal plate. When the bridle suture is used in SICS along with lid speculum, opposing forces play and lead to either dehiscence or disinsertion of levator aponeurosis.

Neuromuscular ptosis usually exemplified by myasthenia can happen as a transient phenomenon in postop patients due to prolonged effect of the ocular anaesthetic agent on the neuromuscular junction.

Neurogenic ptosis usually exemplified by oculomotor nerve palsy in the postoperative patient may develop transiently due to van Lint type of facial block when given in case of persistent lid movements in spite of giving peribulbar block. But, due to the susceptibility of anteriorly located terminal nerve twigs of 3rd cranial nerve, this usually leads on to transient ptosis in the postoperative period.²

Postoperative blepharoptosis of upper eyelid can be transient or long lasting with varying severity. Transient ptosis may occur following postop lid oedema, haematoma formation or as a result of lid inflammation or from anaesthetic side effects. Of these causes, eyelid compression by a tight lid speculum against the opposing force of superior rectus suture leads to inflammatory postoperative lid oedema. When this lid oedema is associated with stretching injury to levator aponeurosis, the lid oedema persists for a longer while about 3 weeks and a permanent ptosis maybe seen after 3-4 months.

In peribulbar or retrobulbar anaesthesia, orbital haematoma may form. In giving van Lint facial block, lid haematoma may form.³ These lead to mechanical ptosis, which maybe transient and usually clears off in <3 weeks. But, rarely fibrosis follows, adhesions may appear between orbital septum and LPS. These changes might lead to a persistent ptosis even after 3-4 months.

The availability of anaesthetic agents with hyaluronidase increases spread and duration of the block. More the duration, the probability of ptosis increases.⁴ The buffering of ocular anaesthetic agent with bicarbonate increases the pH of the agent. This increases the availability of anaesthetic agent. Hence, the rate of ptosis development increases when buffered with bicarbonate. Similarly, prolonged ocular massaging done to decrease the lid

oedema and haematoma formation may lead to increased availability of anaesthetic agent in the orbital space. This increases the rate of ptosis especially in elderly patients >70 years.

Muscular toxicity that follows the anaesthetic block is increased by the addition of adrenaline to it. When myotoxic side effects lead on to ptosis, the recovery of the same takes 8 to 12 weeks because of hypertrophy of the remaining muscle fibres and its longer time to recover.^{5,6}

Persistent ptosis after 3 months of cataract surgery is usually due to dehiscence of levator aponeurosis, myotoxic effect of anaesthetic agent with or without adrenaline and prolonged lid oedema or haematoma after cataract surgery and prolonged surgical time. The prolonged surgical time and delayed clearing of lid oedema when happens in an elderly patient with a vulnerable aponeurosis, the incidence of persistent postoperative ptosis is high.

Bridle suture used during ECCE/SICS procedures cause ptosis by injury to the LPS.⁷ This happens due to grasping of superior rectus during passage of bridle suture and traction of superior rectus by the bridle suture. Traction of the superior rectus/levator complex, while the upper lid is tightly held with a speculum can cause levator aponeurotic dehiscence.^{8,9}

The tight adjustable Lasik speculum causes more injury than the flexible wire speculum, which yields to forces of lid closure, when the lid is forcefully squeezed or blinked.

Hence, in our study, the factors that lead on to both transient and persistent ptosis were analysed by dividing the study population into 4 groups.

Aims and Objectives- The postoperative ptosis after cataract surgery amounts to about 10% in several studies.

- The association between various techniques of ECCE (extracapsular cataract extraction) namely by classical incision, small tunnel incision (SICS) or by phacoemulsification and the occurrence of ptosis needed study.
- Similarly, the association between nature of block given whether peribulbar/topical, repetition of peribulbar block given and ptosis also needed a detailed analysis.
- Further patient factors like age that play a role in the development of ptosis needs an analysis. So, these are our objectives in our study.

Inclusion Criteria

- Patients who underwent uncomplicated ECCE, SICS phacoemulsification surgeries.
- Patients who needed repeat peribulbar blocks after the first block.

Exclusion Criteria

- Patients who had surgical delay (i.e. >20 minutes) due to intraoperative complications.
- Patients who needed peribulbar block after they had been posted for topical anaesthesia.
- Patients who were operated under general anaesthesia.
- Patients who had moderate and severe ptosis preoperatively.

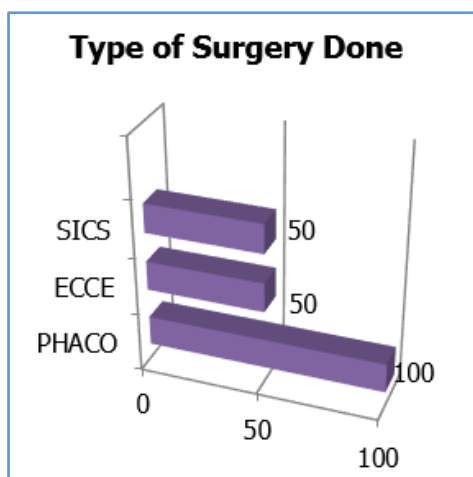
MATERIALS AND METHODS

Retrospective analysis of 200 patients operated at Government Stanley Medical College Hospital was done. The patients were examined 1, 2, 4, 6, 12 weeks postoperatively as outpatients. The discharge summaries carried the details of type of anaesthesia given and whether repeat blocks were given. All the patients were given 5 mL of 2% Xylocaine with/without adrenaline 1:1000 dilution mixed with Hyalase and bupivacaine. When the block was not taken even after thorough ocular massage, a 3 mL repeat block was given. Ptosis evaluation and details were obtained from hospital records. The hospital MRD help was sought for clarifications in the inpatient records regarding anaesthesia/immediate postoperative details, if needed.

RESULTS

Of these 200 patients, 100 patients had undergone phacoemulsification.

Of these 100 patients, 50 had peribulbar block and 50 patients had topical proparacaine drops.



Graph 1. Type of Surgery Done

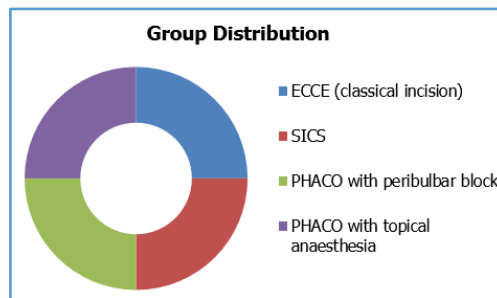
Surgery	Number of Patients who had Peribulbar Block	Number of Patients with Topical Anaesthesia
Phaco	50	50
ECCE	50	Nil
SICS	50	Nil

Table 1. Type of Surgery Done

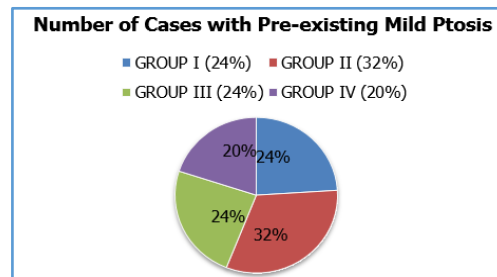
The other 100 patients were operated by either classical ECCE incision technique (50 patients) or SICS technique (50 patients). Both ECCE and SICS groups had peribulbar block.

These 200 patients were grouped into 4 groups-

First group - ECCE by classical incision, second group - SICS, third group - phacoemulsification with peribulbar block and fourth group - phacoemulsification with topical anaesthetic drops.

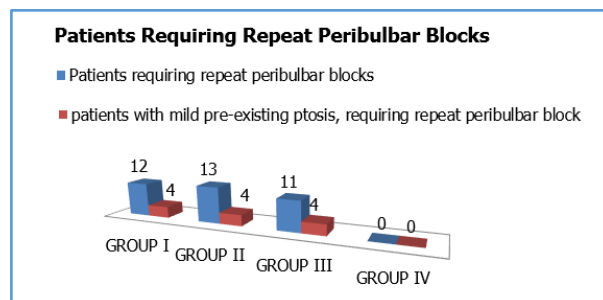


Graph 2. Group Distribution



Graph 3. Number of Cases with Pre-existing Mild Ptosis

The patients were observed for 3 months for appearance or worsening of ptosis during their postoperative check-ups.

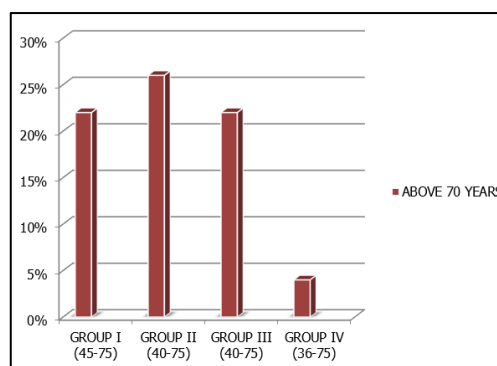


Graph 4. Patients Requiring Repeat Peribulbar Blocks

Of the patients who had pre-existing mild ptosis, repeat peribulbar block was needed in 4 cases - group 1, 4 cases - group 2 and 4 cases - group 3.

Group	Age Range	Percentage (>70 Years)
I	45-75	20%
II	40-75	26%
III	40-75	22%
IV	36-75	4%

Table 2. Age Distribution

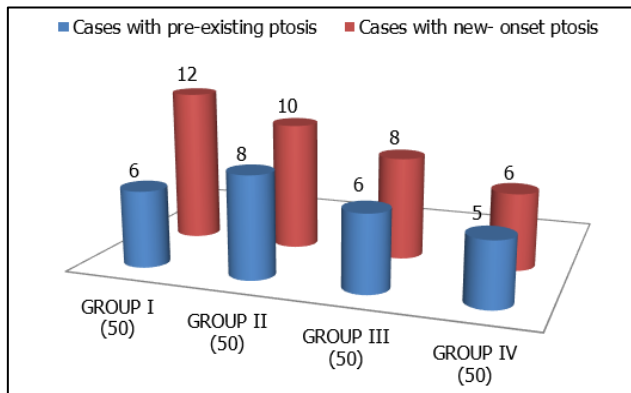


Graph 5. Age Distribution

Patients developed transient ptosis, which disappeared 2 weeks postoperative.

Total Number of Cases with Transient Ptosis (Pre-Existing + New-Onset Ptosis)	
Group I	18
Group II	18
Group III	14
Group IV	11

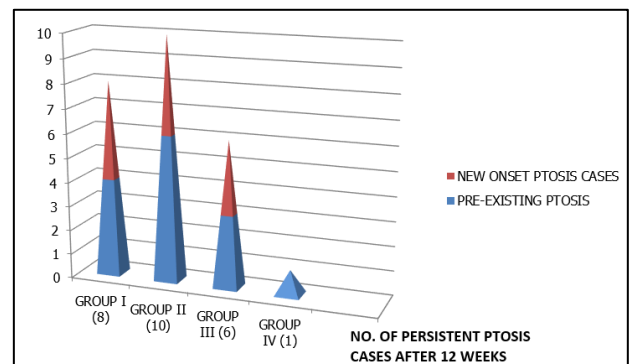
Table 3. Number of Cases of Transient Ptosis in Each Group



Graph 6. Number of Cases of Transient Ptosis in Each Group

Group	Total Number in the Group	Number of Cases with Pre-Existing Ptosis	Number of Cases with New-Onset Ptosis	Total Cases with Persistent Ptosis (Pre-Existing + New Onset)
I	50	4	4	8
II	50	6	4	10
III	50	3	3	6
IV	50	1	Nil	1

Table 4. Patients who had Persistent Ptosis after 12 Weeks

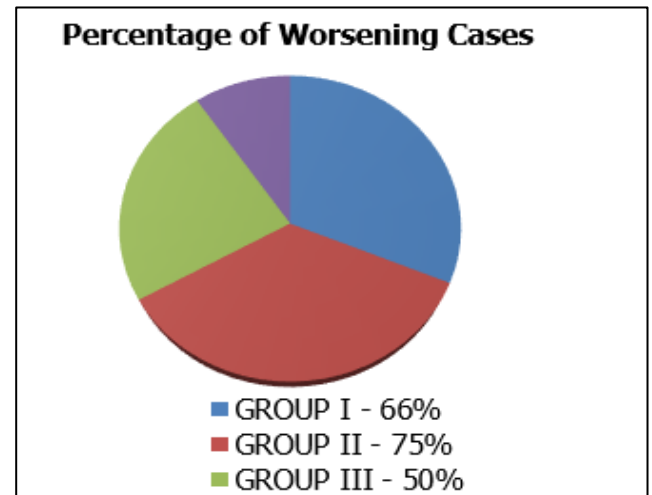


Graph 7. Patients who had Persistent Ptosis after 12 Weeks

Worsening of Pre-Existing Ptosis Happened as Follows-

Group	Number of Cases with Preoperative Mild Ptosis	Number of Cases with Persistent Ptosis	Percentage of Worsening Cases
I	6	4	66
II	8	6	75
III	6	3	50
IV	5	1	20

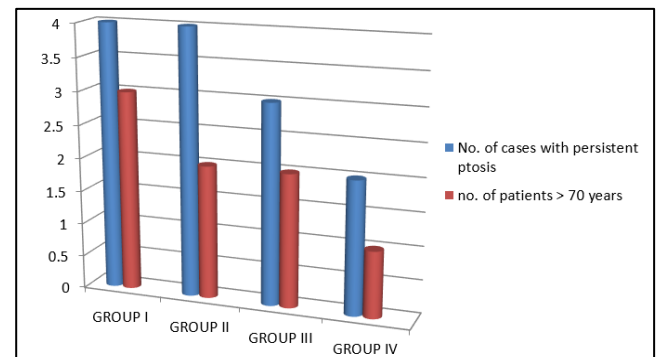
Table 5. Worsening of Pre-Existing Ptosis



Graph 8. Percentage of Worsening Cases

Group	Total Cases with Persistent Ptosis	Number of Patients >70 Years	Percentage of Cases with Persistent Ptosis
I	4	3	75
II	4	2	50
III	3	2	66
IV	2	1	50

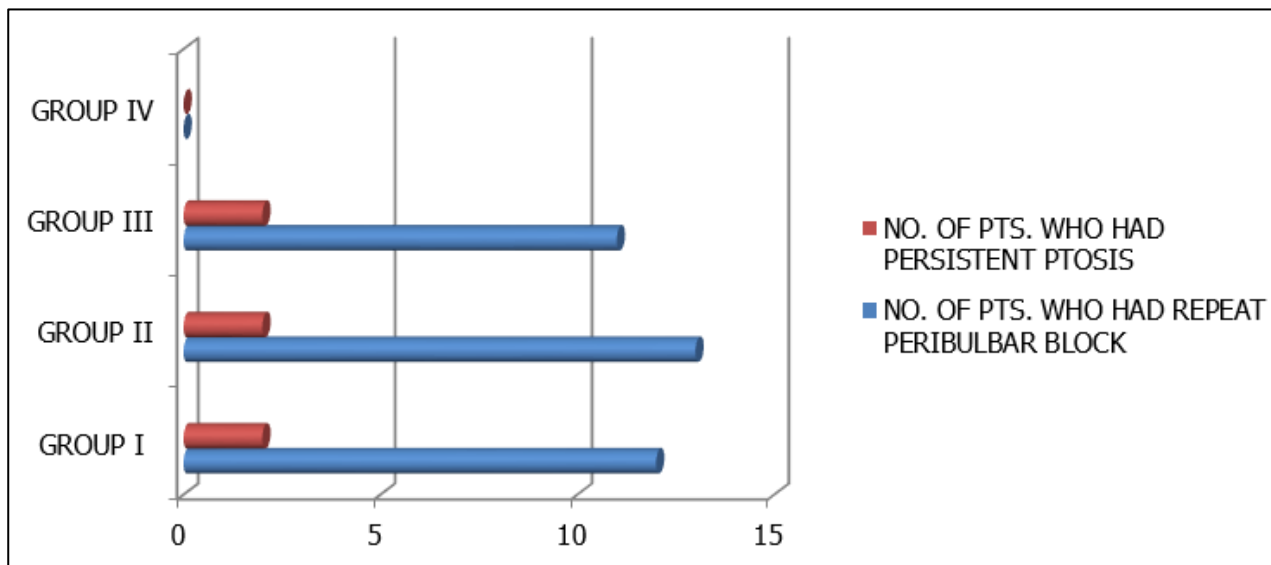
Table 6. Persistent Ptosis as Per Age Distribution



Graph 9. Persistent Ptosis as per Age Distribution

Group	Number of Cases who had Repeat Peribulbar Block	Number of Cases with Persistent Ptosis	Percentage of Worsening Cases (%) New Onset
I	12	2	17
II	13	2	15
III	11	2	18
IV	Nil	Nil	Nil

Table 7. Number of Persistent Ptosis Patients who had Repeat Peribulbar Block

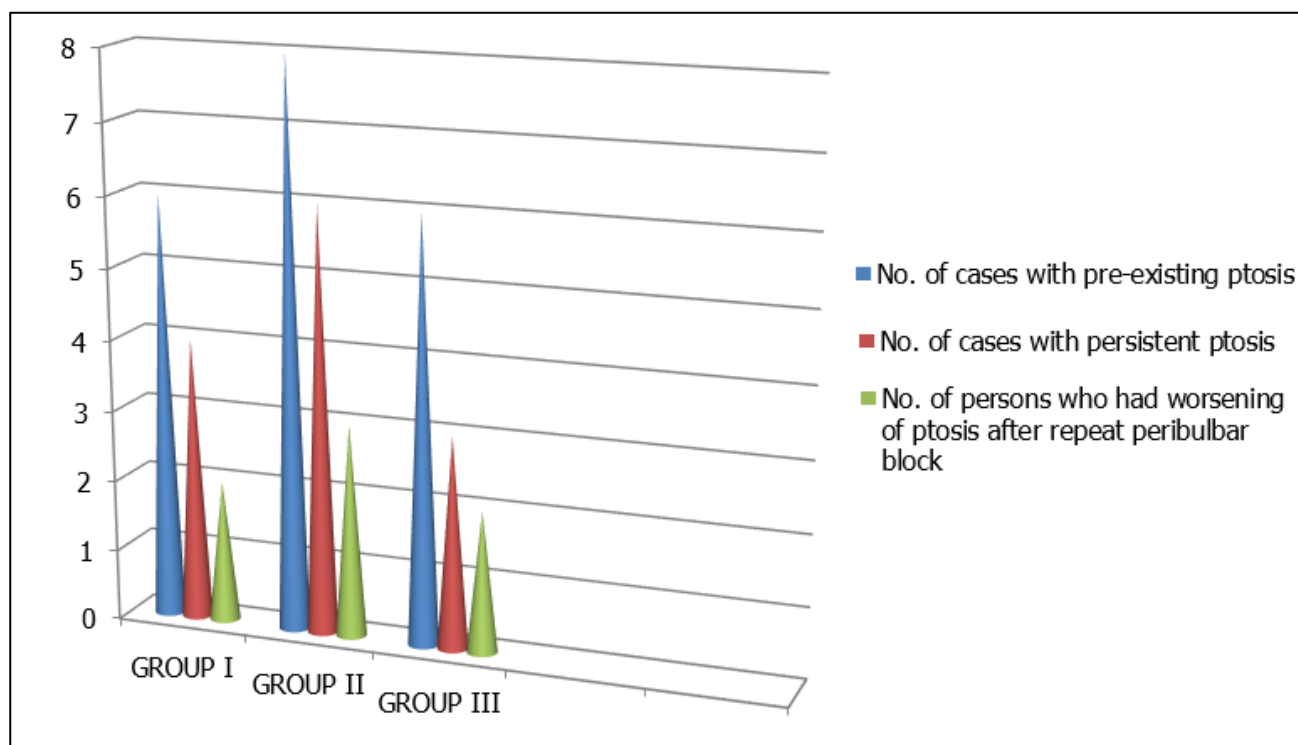


Graph 10. Number of Persistent Ptosis Patients who had Repeat Peribulbar Block

Number of patients with pre-existing ptosis who had worsening of ptosis after repeat block-

Group	Number of Cases with Pre-Existing Ptosis	Number of Cases with Persistent Ptosis	Number of Persons who had Worsening of Ptosis After Repeat Block	Percentage of Worsening Cases (%)
I	6	4	2	50
II	8	6	3	50
III	6	3	2	66

Table 8. Number of Patients with Pre-Existing Ptosis who had Worsening of Ptosis after Repeat Block



Graph 11. Number of Patients with Pre-Existing Ptosis who had Worsening of Ptosis after Repeat Block

In Group I, the percentage of patients who had pre-existing ptosis - 12%; in Group II - 16%; Group III - 12%; and Group IV - 10%

Of these patients who had pre-existing ptosis, in Group I - 66% worsened and had persistent ptosis at 12 weeks; in group II - 75% of these patients worsened; in Group III - 50% worsened; and in Group IV - only 20% worsened.

Repeat peribulbar blocks were given in 12 patients (24%) in Group I, in 13 patients (26%) Group II, in 11 patients (22%) Group III and nobody in Group IV as topical anaesthesia was used.

Of these patients who needed repeat blocks, about 30% had pre-existing ptosis (Group I - 30%, Group II - 31% and Group III - 36%).

Of these patients who had pre-existing ptosis and repeat blocks, the percentage of patients who worsened to a persistent ptosis include Group I- 2 cases (50%), Group II - 3 cases (50%), Group III - 2 cases (66%), Group IV - nil case. About 50-65% patients who had pre-existing ptosis and needed repeat peribulbar blocks developed persistent ptosis.

Transient ptosis developed in 36% patients - Group I and II, 26% - Group III and 22% - Group IV.

Persistent ptosis developed in 16% - Group I, 20% - Group II, 12% - Group III and 2% - Group IV.

Excluding patients who had pre-existing ptosis and who had worsened to a moderate/severe ptosis, percentage of patients who developed new-onset ptosis include 8.5% - Group I, 9% - Group II, 6.5% - Group III, and nil case - Group IV.

In the age distribution, percentage of patients who belonged to >70 years include 20% - Group I, 26% - Group II, 22% - Group III and 4% - Group IV.

Patients who developed persistent ptosis in >70 years and above include 75% - Group I, 50% - Group II, 66% - Group III and 50% - Group IV.

DISCUSSION

Post cataract surgery, ptosis development and worsening of pre-existing ptosis depended on several factors- patient factors, ocular anaesthesia and difference in surgical techniques.

In Group I, classical incision ECCE, 12% had pre-existing ptosis, of them- two-third worsened to persistent ptosis.¹⁰ Transient ptosis developed in 36% (one-third) patients, but only 8.5% developed new-onset persistent ptosis. Of these 8.5%, about 75% belonged to >70 years. Here, repeat peribulbar block was needed in 24% patients. Of these, one third had pre-existing ptosis. Of the patients who had pre-existing ptosis and who were given repeat peribulbar blocks - 50% worsened to persistent ptosis at 12 weeks.

In group II, SICS group - 16% had pre-existing ptosis, of them 75% worsened to persistent ptosis at 12 weeks. Transient ptosis developed in 36% patients, but among them, only 9% developed new-onset persistent ptosis. Of these 9%, about 50% belonged to >70 years. Here, repeat peribulbar block was needed in 26% patients. Of these, one-

third had pre-existing ptosis. Of the patients who had pre-existing ptosis and given repeat peribulbar blocks – two thirds worsened to persistent ptosis at 12 weeks.

In Group III, phacoemulsification with peribulbar block, 12% had pre-existing ptosis; of them - 50% had persistent ptosis and worsened. Transient ptosis developed in 28% patients, but only 6.5% developed new-onset persistent ptosis. In group III, repeat peribulbar block was needed in 22% patients; of these, one-third had pre-existing ptosis. Of these patients who had pre-existing ptosis and given repeat peribulbar blocks, half of them worsened to persistent ptosis at 12 weeks.

In Group IV, phacoemulsification with topical anaesthesia, 10% had pre-existing ptosis; of them - 2% had persistent ptosis. Transient ptosis developed in 10% patients, but new-onset ptosis did not occur in any. Those who developed persistent ptosis had pre-existing ptosis, which worsened in spite of not giving peribulbar block.

In this study, it was found that repeat peribulbar block caused only transient ptosis, but did not lead to development of new-onset persistent ptosis.

CONCLUSION

Postoperative new-onset ptosis varies from 2% in topical anaesthesia group to 6.5% in phacoemulsification with peribulbar block group to 8.5 to 9% in ECCE/SICS group. Worsening of pre-existing ptosis happened in half to two-third of patients in SICS/ECCE/phaco with peribulbar groups, especially when repeat peribulbar block was given. This worsening still happened in Group IV, i.e. topical anaesthesia group, but here the patient belonged >70 years age group.

Patient >70 years with weak levator aponeurosis develop new-onset ptosis or worsening of pre-existing ptosis when they undergo stretching of levator aponeurosis due to myotoxic effect of repeat peribulbar block.

Hence, the factors include stretching of levator aponeurosis by opposing forces of bridle suture and tight lid speculum, myotoxic effects of repeat peribulbar block and age of the patient with pre-existing mild LPS weakness.

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