Original Article

Subjective Assessment of Pain Level during Phacoemulsification and Extra Capsular Cataract Extraction with Intraocular Lens Implantation under Topical Anesthesia

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Pak J Ophthalmol 2009, Vol. 25 No. 3

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Received for publication
December' 2008
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Purpose: To investigate the level of pain in both phacoemulsicification and extra capsular cataract extraction using topical anesthesia with proparacain hydrochloride 0.5% as an alternate to peribulbar and retro bulbar anesthesia.

Materials and Methods: Sixty patients undergoing cataract surgery (thirty eyes using phacoemulsicification and thirty eyes with extra capsular cataract extraction technique) were included in the study. All patients received topical anesthesia with proparacain (Alcain) eye drops combined with sponge socked in Alcain eye drops in superior conjuctival sac, which remained there till the end of surgery.

In all Phacoemulsification cases incision site was supro-temporal clear corneal for right eyes and supro-nasal clear corneal for left eye with foldable intraocular lenses without sutures. In all cases of extra capsular cataract extraction, clear corneal superior limbal incision was given with implantation of 6.5 mm PMMA intraocular Lens and stitched with shoe-lace continuous 10/0 nylon sutures.

All patients were evaluated for intra-operative pain. Subjected pain was assessed by using 4-point scale.

Results: 3 patients (10 %) of patients in both groups experienced mild pain during both Phacoemulsification and extra capsular cataract extraction.6 patients (20 %) had moderate pain during passing first suture in extra capsular cataract extraction cases only, for which subconjuctival xylocain was infiltrated just behind incision before suturing. No patient had severe pain during extra capsular cataract extraction in all 30 cases.

Conclusion: Topical anesthesia can be safely used not only in Phacoemulsification but also in extra capsular cataract extraction procedure, which is safe and effective alternative to peribulbar and retro bulbar anesthesia, thus, avoiding pain and other complications of regional blocks.

Cataract extraction is the most commonly performed operation in patients over 65 years of age[1]. Topical anesthesia was first used in 1884 by Koller who used cocaine[2]. After one century, Fichman used an attractive alternative method of injecting local anesthetic agents resulting in faster visual recovery and high patient satisfaction 1995[3].

The advantages of topical anesthesia include its ease of application, minimal to absent pain/ discomfort on administration, rapid onset of anesthesia and more important lack of devastating complications such as globe perforation and retro bulbar hemorrhage, injury to the nerves, muscles, raised vitreous pressure, which may occur following

local injection[4,5]. The technique is also economical, avoids undesirable cosmetic adverse effects, and allows instant visual rehabilitation. Topical anesthesia blocks the trigeminal nerve ending, provides at least analgesia of the eye. The optic nerve and motor neurons are not affected, and the ocular motility is maintained[6].

This is most likely due to the fact that, unlike retro bulbar or peribulbar anesthesia, topical anesthetic agents have no effect on the optic nerve. Revolution in cataract surgery has brought about by Phacoemulsification technique and the consequent reduced surgical time, led to further interest in topical anesthesia. However, in dense cataracts, extra capsular cataract extraction can also be performed under topical anesthesia (eye drops and xylocain soaked sponge in superior fornix) safely. Some patients may require augmentation with subconjuctival infiltration of xylocain just behind the incision in extra capsular cataract extraction to prevent pain before suturing.

The goal of study was to investigate the level of pain during both Phacoemulsification and extra capsular cataract extraction procedures.

MATERIALS AND METHODS

Sixty eyes of 60 patients with cataract were included in this study, 30 eyes undergoing Phacoemulsification and foldable IOL implantation and 30 eyes undergoing extra capsular cataract extraction with rigid 6.5 mm IOL operated under topical anesthesia. None of the patients had a history and/or ocular findings of glaucoma, uveitis or corneal opacity. The study protocol was explained to the patients and informed consent was obtained from all of them. The patients were told that they would be asked about their pain level, if any, during every stage of the surgery. As for the degree of pain, a 4-grade scale was used. 0=no pain, 1= mild (tolerated pain), 2= moderate (need interference like more anesthetic), 3= severe (not tolerated and need to stop the procedure).

The surgery was divided into 9 stages, i.e., clear corneal incision, continuous curvilinear capsulorhexis, side-port incisions at 3 and 9 o'clock positions, hydro dissection, nuclear rotation, Phacoemulsification, bimanual irrigation and aspiration, IOL implantation, apposition of corneal incisions with stromal hydration and suturing in ECCE. After each stage, patients were asked to grade their pain according to the pain scale described above. The surgical time was also recorded for each case.

The pupillary dilatation was obtained by mydriacyl 1% and phenylephrine 2.5% given 30 min preoperatively (3 times at 10-min intervals). Topical anesthesia was achieved by proparacain hydrochloride 0.5% (Alcaine, Alcon Pharmaceuticals), given 3 times with 2-min intervals before the surgery along with sponge soaked in proparacain0.5% placed in superior fornix till the end of surgery. All operations were performed by a single surgeon (AHA). In 30 eyes following a 2.75-mm superior clear corneal incision, Phacoemulsification technique was used. By enlarging the corneal incision using 3.2mm keratome, a acrylic foldable posterior chamber IOL with 6.0-mm optic diameter (Kontour) was implanted into the capsular bag. 30 eyes undergoing ECCE, partial thickness clear corneal incision given, capsulorhexis done, ripped at 10 and 2 o clock. After hydro dissection wound enlarged and nucleus delivered, PMMA rigid posterior chamber IOL (Kontour) with 6.5 mm optic diameter was implanted into the capsular bag. Wound stitched with continuous 10/0 nylon.

The results of pain level were given as percentages and means with range, respectively. Statistical analysis was performed with t test and p value less than 0.05 was accepted as statistically significant.

RESULTS

There were 39 male (65%) and 21 female (35%) patients. The average age was 60.5 years (range: 42-79 years). The preoperative best-corrected visual acuity was between counting fingers and 6/18 (Snellen). The mean operation duration was 13.0 min (range: 8-18 min) in Phacoemulsification and 31.5 min (range: 23-40) in extra capsular cataract extraction.

For the pain level during surgery, the overall pain score was found to be 0.66 (range: 0-3) in Phacoemulsification, the highest mean pain score was during IOL implantation (1.0) followed by Phacoemulsification (0.7) and bimanual irrigation and aspiration 0.61, (Table 1), which is comparable to previous study[7] and in ECCE, highest mean pain score was during suturing (2.0) followed by IOL implantation (1.25). A previous paper[8] reported a mean pain score of 1.46 over a scale ranging from 0 to 10, which is fairly similar to our result. In that study, the most painful stage was Phacoemulsification, followed by IOL insertion and irrigation-aspiration. Similarly, the highest mean pain scores were encountered during IOL implantation, Phacoemulsification, and bimanual irrigation-aspiration stages in our study.

Table 1. Mean pain scores during different stages of Phacoemulsification and extra capsular cataract extraction under topical anesthesia

Stage	Pain Score	
	Mean	**Range**
Corneal incision	0.0	0-1
Capsulorhexis	0.0	0-1
Hydrodisection	0.25	0.2
Phacoemulsification	0.5	0.2
Irrigation aspiration	0.7	0.2
IOL implantation	1.25	0-3
Wound enlargement in ECCE	1.5	0-3
Corneal opposition with stromal hydration	0.2	0-1
Suturing wound in ECCE	2.0	0-3

When the mean pain scores were compared across phaco and extra capsular cataract extraction The difference between Phacoemulsification/nucleus delivery versus irrigation-aspiration, and IOL implantation was not found to be statistically significant ($p = 0.66$ and $p = 0.103$, respectively). However, the difference between wound closure in ECCE and stromal hydration in Phacoemulsification was statistically significant ($p = 0.007$). All surgeries were completed with topical anesthesia alone in Phacoemulsification but subconjuctival infiltration of xylocain was required before suturing in ECCE with IOL in 9 eyes (30 %), and no other complication was observed during any operation.

DISCUSSION

The popularity of topical anesthesia has increased progressively in recent years. In 1995 only 5% of eye surgeons in USA were doing cataract surgery using topical anesthesia, but this ratio has increased to 45% (1). However, there is hesitation to perform ECCE using topical anesthesia.

Patients may experience pain during cataract surgery (Phacoemulsification & extra capsular cataract extraction) under topical anesthesia. No such study is available to compare the results of pain level in both procedures simultaneously. The level of pain was compared between two groups and found to be similar to other local anesthesia methods (5,6). In our study, overall pain score was found to be 0.66 using a scale between 0 and 4. A previous paper[8] reported a mean pain score of 1.46 over a scale ranging from 0 to 10, which is fairly similar to our result. In that study, the most painful stage was Phacoemulsification, followed by IOL insertion and irrigation-aspiration. Similarly, the highest mean pain scores were encountered during IOL implantation, Phacoemulsification, and bimanual irrigation-aspiration stages in our study. However, the difference between wound closure in ECCE and stromal hydration in Phacoemulsification was statistically significant. Therefore, in all those who felt mild to moderate pain during passing first suture were given subconjuctival xylocain, which make them pain free till the end of surgery, which is comparable with previous study[9].

The surgeon's experience with reduced intraocular manipulations, avoiding unnecessary conjunctival handling and short operation time also favored the low pain scores in our study. The reason for overall less pain score during phaco with foldable IOL implantation is possibly due to insertion of the single piece acrylic foldable lens as compared to pain score in patients undergoing ECCE, in which rigid silicon IOL was implanted.

Topical anesthesia avoids the risk of globe perforation, retro bulbar hemorrhage, and damage to optic nerve, dural perforation and significant conjunctival chemosis. Possible disadvantages of topical anesthesia is adverse eye movement but it appear to provide acceptable analgesia during surgery, wears off rapidly after surgery, and does not interfere with the patient's ability to blink, see or move the eye. Patients are able to follow commands, which are sometimes needed during surgery. In our study, movement of eyeball was rarely a problem.

CONCLUSION

Topical anesthesia is safe and effective method for not only small incision clear corneal Phacoemulsification cataract surgery but also for quick and minimal manipulative extra capsular cataract extraction with IOL with subconjuctival augmentation anesthesia if required before suturing wound. Patients may experience visual sensations, and preoperatively they should be informed about the possibility of these experiences. Additionally, patients can be told that the pain felt during the operation is low and tolerable. Topical anesthesia with proparacain (soaked sponge in superior conjunctival sac and eye drops) provide

effective analgesic effect in both Phacoemulsification as well as extra capsular cataract extraction.

Finally, topical anesthesia is rather comfortable and prevent long list of complications associated with local blocks. However, surgical training and good patient preparation is required for safe use of topical anesthesia.

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