



Original articles

Outcomes of manual small incision cataract surgery under topical anesthesia with lignocaine 2% jelly

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Abstract

Introduction: The manual small incision cataract surgery (MSICS) is the surgery of choice in countries with a huge back-log of cataract blindness.

Objective: To evaluate the outcome of manual small incision cataract surgery (MSICS) under topical anesthesia with lignocaine 2 % jelly.

Materials and methods: This study was a prospective interventional case series. One hundred and twenty eight patients of senile cataract were operated by MSICS under topical anesthesia using lignocaine 2% jelly. No intra-cameral anesthesia was used. The patients and the single operating surgeon were given a questionnaire to evaluate their experience in terms of pain, surgical experience and complications.

Results: The mean pain score was 0.82 (SD \pm 0.97). Seventy-one patients (55.4 %) had a pain score of zero, that is, no pain. One hundred and twenty one patients (94.5 %) had a score of 3 or less, that is, mild to none pain. All the surgeries except two were complication-free and the surgeon's experience was favorable in terms of the patient's cooperation, anterior chamber stability, difficulty, and complications.

Conclusions: MSICS can be performed under topical anesthesia with lignocaine jelly, which makes the surgery patient-friendly, without compromising the outcome.

Key-words: topical anesthesia, lignocaine jelly, pain evaluation, manual small incision cataract surgery

Introduction

Cataract is the main and biggest cause of curable blindness in India and worldwide. It has been estimated that 3.8 million people develop blinding cataract every year in India as against 2.7 million cataract surgeries done every year (Minansian & Mehera, 1990; Jose, 1997). Cataract extractions are one of the most cost-effective procedures of all

surgical interventions in terms of quality of life restored (Marseille, 1996; Porter, 1998). The only treatment option for cataract is the surgical removal of the opaque lens and the implantation of an artificial lens. The state-of-the-art technique is phacoemulsification with the insertion of a foldable intraocular lens (IOL) through a self-sealing incision. The cost considerations and the steep learning curve associated with the phacoemulsification procedure makes it a less feasible procedure for high-volume surgery needed in developing coun-

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tries. However, the MSICS is the surgery of choice in such circumstances (Chang, 2005)

The MSICS has been conventionally performed under peribulbar or retro-bulbar anesthesia. However, there are some reports of the procedure being performed under sub-tenon and sub-conjunctival anesthesia (Parkar et al, 2005). (Gupta et al, 2005) have described a similar technique under topical anaesthesia. Our study differs from that in using temporal section without any supplementary intra-cameral anesthesia. We here describe use of topical anesthesia with lignocaine 2 % jelly for performing MSICS. This not only obviates the risks associated with retro-bulbar or peribulbar anesthesia but also decreases the time especially in high volume set-up. We have performed a pain evaluation survey on patients who underwent this procedure. This technique of MSICS under topical anesthesia with 2 % lignocaine without any supplementary anesthesia has not been described in literature yet.

Materials and methods

The patients with significant cataract causing impairment of visual functions uncorrectable by glasses or causing unacceptable glare, polyopia or reduced quality of vision attributable to cataract and willing for cataract surgery were included in the study. The only contraindication was inability to understand verbal commands. Hypersensitivity to lignocaine was also an absolute contraindication to topical anesthesia.

Sample size was calculated by using confidence level of 95 %, confidence interval of 10 and population size as 3000 (the total number of cataract surgeries at the hospital). This gave us a sample size of 128. The study was approved by institute's ethics committee and adhered to the principles enshrined in the declaration of Helsinki. Informed consent was taken from all the individuals recruited in the study. One hundred and twenty eight patients were included in the study after performing tests and investigations for fitness for cataract surgery under local anesthesia. Cataract was classified according

to the morphology and the nuclear density was graded according to the slit-lamp examination and standard photographs.

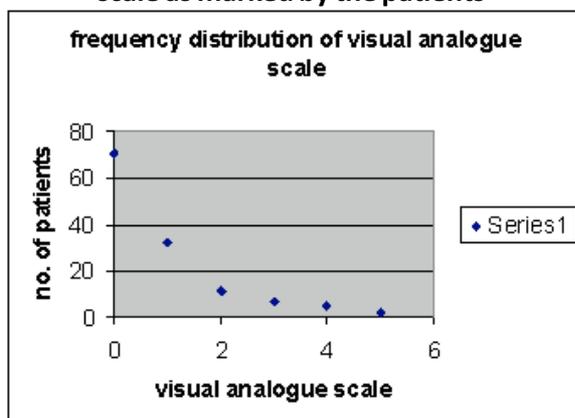
Lignocaine 2 % jelly was instilled in the conjunctival sac 5 minutes before the surgery. The lids and periocular area were painted with 5 % solution of povidone iodine twice and the patient was draped. Once fully draped, the eye speculum was applied. The patients usually reported a stinging sensation at this stage, but if instructed and advised to look towards the operating microscope light, brought the eye back in straight gaze. Lateral rectus bridle suture was taken for temporal approach. Sclera was exposed, by making a fornix-based conjunctival flap. The cauterization was not done in most of the cases to avoid pain and field of incision was made clear of blood by intermittent irrigation by the assistant. Corneo-scleral tunnel was designed. The incision length varied from 6 to 8 mm depending on the surgeon's assessment of the nucleus size. Then, 2% hydroxy propyl methyl cellulose was injected into the anterior chamber and capsulorrhexis was done. Hydrodissection was performed to separate the cortex from the capsule. Nucleus was prolapsed out of the capsular bag after making sure that the capsulorrhexis was large enough with respect to the nucleus size, otherwise a relaxing incision with a cystitome was made. With the nucleus in the anterior chamber, the chamber was inflated with 2 % hydroxy propyl methyl cellulose adequately to coat the endothelium. The nucleus was extracted out of the tunnel by the irrigating vectis with the support of lateral rectus bridle suture. The cortex was aspirated using Simcoe cannula, and then, with the chamber filled with 2 % hydroxy propyl methyl cellulose, an IOL was implanted in the bag. The gel was washed out and the tunnel was inspected for integrity by looking for any leakage. At the end of the surgery, a sub-conjunctival injection of dexamethasone and gentamycin was given (0.25 ml each). There was no need to suture the conjunctiva or to cauterize it to bring it back, as the ballooning caused by the sub-conjunctival injection made it come towards the exposed sclera.

The eye was patched for about 20–30 minutes and then the dressing was removed, the eye was examined and the topical medications were started. Before opening the dressing, a pain survey questionnaire having visual analog scale for pain evaluation or Wong scale for simplified version of pain evaluation was given to the patients depending on their ability to comprehend. The surgeon also evaluated his experience in terms of surgical ease or difficulty, complications with regards to the topical anesthesia at the end of the surgeries. Patient's cooperation, difficulty due to ocular movements, and anterior chamber stability were graded on a scale of 1–3, thus giving a cumulative range of 3–9 points. The questionnaire was designed to provide results in a manner that the lower values represent favorable experience. The fourth parameter was complications or adverse events, which were mentioned as and when they happened.

Results

There were 128 patients enrolled in the study according to the inclusion and exclusion criteria. Fifty eight (45.31 %) patients were male. Patients' age ranged from 38 to 78 years (mean age = 64.2 years, SD=12.6). Seventy eyes were right and 58 left. The type of cataract according to the morphology was nuclear in 42 patients (32.8 %), nuclear and sub-capsular in 58 patients (45.31 %) and sub-capsular in rest. Nuclear density ranged from grade I–V and correlated with age.

Table 1
Frequency distribution of visual analogue pain scale as marked by the patients



The patients felt mild pain during the fashioning of conjunctival flap (4 patients) and during irrigation-aspiration procedure (6 patients). The visual analog scale or the Wong scale was used to evaluate the mean pain score. The mean pain score was 0.82 (SD±0.97). Only seven patients (5.4 %) out of the whole series experienced pain who rated more than three on the visual analog scale of 10. The pain scores more than three has been accepted to represent moderate pain. (Collins et al, 1995; Lee et al, 2000). Thus, rest of the patients can be assumed to have mild pain. There were 121 patients (94.6 %) who had a mean pain score of three or less. Seventy-one patients (55.4 %) had a pain score of zero, that is, no pain. The surgeon's evaluation of the technique in terms of surgical ease and complications was favorable. On a cumulative scale ranging from 3 to 9 (lower value indicating favorable result), the average score was 2.8 (SD ± 0.85) for frequency distribution of individual parameters taken into account. Two patients had a posterior capsule rupture during irrigation-aspiration. Though there was a minimal vitreous disturbance in them, after adequate anterior vitrectomy IOL was placed in sulcus.

Discussion

The use of topical anesthesia has been described with the supplemented sub-conjunctival anesthesia for standard extra-capsular cataract extraction with the implantation of IOL by (Smith et al, 1990). The described use of topical anesthesia is presently limited to clear corneal phacoemulsification technique. The advantages are numerous, for the patients as well as for the surgeon. Topical anesthesia saves the patients from the risks of globe perforations, optic nerve injury, possibility of life-threatening respiratory arrest, and above all, the pain and fear perceived because of the peribulbar or retrobulbar injections.

Topical anesthesia has additional benefits like not interfering with visual function, immediate visual recovery, absence of pain due to injection, unlimited ocular motility, and absence of an increase in orbital volume (Nielsen, 1995). Various studies regard-

ing the pain perception and patients' acceptability for anesthetic technique have been done and they concluded that the patients' satisfaction for anesthesia is comparable for topical versus other techniques. (Maclean et al, 1995; Johnston et al, 1998). Fichman (1996) has investigated the blood pressure, pulse rate, and respiration rate of patients during surgery under topical anesthesia and has found no major changes in these parameters. There is no significant change in the plasma cortisol levels during surgery under topical anesthesia, indicating that the procedure is well tolerated and does not pose stress to the patient (Gozum et al, 2003). Thus, with all the advantages of topical anesthesia, it may be the preferred technique. Lignocaine gel has been previously shown to be an effective (Barequet et al, 2003) and possibly, a superior substitute to lignocaine drops. (Bardocci et al, 2003, Soliman et al 2004) There has been no unwanted effect of the gel preparation of the drug on extracapsular cataract surgery and phacoemulsification; both have been successfully performed using the 2 % lignocaine jelly.

In this study, the mean pain score of 0.82 (SD ± 0.97) is comparable to the studies done on topical anesthesia use for phacoemulsification. The mean pain score of 0.84 (SD ± 1.30), against peribulbar anesthesia 0.73 (SD ± 1.5) was seen in a study done by (Jacobi PC et al 2003), using 2 % lignocaine drops. Similar results have been observed with the use of lignocaine 2 % jelly for providing topical anesthesia for phacoemulsification for cataract removal in various other studies. The mean pain score in the present study was similar to the mentioned studies for the topical group, except that none of the patients in our study needed sub-tenon/intracameral lignocaine supplementation as was required by some patients in all the mentioned studies. (Gupta et al 2009)

Topical anesthesia is used to anesthetize conjunctiva and sclera for several procedures like scleral indentation, forced duction test, sub-conjunctival injections, pterygium surgery] and for retinal cryopexy. Thus, topical anesthesia is effective and safe for manipulating conjunctiva and sclera as well.

This fact has been utilized and demonstrated well in our study, where the pain experience of the patients has been comparable to that during phacoemulsification performed under topical anesthesia reported in other studies. The clear corneal approach for MSICS has the problem that an attempt to keep the incision size small, so that it is self-sealing will cause stretching of the wound during delivery of the nucleus and will cause pain. Moreover tunnels exceeding 3.5 mm will need to be sutured to prevent any post-operative wound leak and risk of infections.

In this study, we have used 2 % lignocaine gel in place of drops, as the gel formulation is superior in providing anesthesia (Barequet et al 1999). Secondly, as we used sclero-corneal tunnel, the wound length could be increased to accommodate a larger nucleus, and hence, less stretching and less pain was experienced by the patient. Surgeon's evaluation of the technique has been favorable as demonstrated by the fact that patients' cooperation was good in majority of cases (91.6 %). In most of the patients, there were no unwanted eye movements (74 %).

This study, however, has its own limitations. Being a non-comparative study, conclusive evidence of superiority of topical anesthesia over injections of local anesthesia for MSICS is not available. The surgeries were done by a single surgeon. This arrangement might have omitted differences induced by variations in the surgical technique and skill. These limitations can be overcome by performing a prospective comparative study involving multiple centers and surgeons.

Conclusions

It is possible to perform MSICS under topical anesthesia with the use of 2 % lignocaine jelly without any supplementary sub-conjunctival, sub-tenon or intra-cameral anesthesia. The anesthesia achieved is adequate for patient comfort and for safe cataract surgery.

References

Bardocci A, Lofoco G, Perdicaro S, Ciucci F, Manna L (2003). Lidocaine 2 % gel versus



lidocaine 4% unpreserved drops for topical anesthesia in cataract surgery: A randomized controlled trial. *Ophthalmology*;110:144–9.

Barequet IS, Soriano ES, Green WR, O'Brien TP (1999). Provision of anesthesia with single application of lidocaine 2% gel. *J Cataract Refract Surg*; 25:626–31.

Chang DF (2005). Tackling the greatest challenge in cataract surgery. *Br J Ophthalmol*;89:1073–7.

Collins SL, Moore RA, McQuay HJ (1997). The visual analogue pain intensity scale: What is moderate pain in millimetres? *Pain*;72:95–7.

Fichman RA (1996). Use of topical anesthesia alone in cataract surgery. *J Cataract Refract Surg*;22:612–4.

Gozum N, Altan-Yaycioglu R, Gucukoglu A, Arslan O (2003). Does topical anesthesia increase patient's serum cortisol level? *Int J Ophthalmol Visual Sci*;2:2.

Gupta SK, Kumar A, Kumar D, Agarwal S (2009). Manual small incision cataract surgery under topical anesthesia with intracameral lignocaine: study on pain evaluation and surgical outcome. *Indian J Ophthalmol*;57(1):3-7.

Jacobi PC, Dietlein TS, Jacobi FK (2000). A comparative study of topical vs. Retrobulbar anesthesia in complicated cataract surgery. *Arch Ophthalmol*;118:1037–43

Johnston RL, Whitefield LA, Giralt J, Harrun S, Akerele T, Bryan SJ, et al (1998). Topical versus peribulbar anesthesia, without sedation, for clear corneal phacoemulsification. *J Cataract Refract Surg*;24:407–10.

Jose R (1997). National programme for the control of blindness. *Indian J Comm Health*; 3:5–9.

Lee J, Stiell I, Hobden E, Wells G (2000). Clinically meaningful values of the visual analog scale

of pain severity. *Acad Emerg Med*;7:550.

Maclean H, Burton T, Murray A (1997). Patient comfort during cataract surgery with modified topical and peribulbar anesthesia. *J Cataract Refract Surg*; 23:277–83

Marseille E (1996). Cost-effectiveness of cataract surgery in a public health eye care program in Nepal. *World Health Organ Bull OMS*; 74:319–24.

Minasian DC, Mehera V (1990). 3.8 Million blinded by cataract each year: Projections of the first epidemiological study of incidence of cataract blindness in India. *Br J Ophthalmol*;74:341–3

Nielsen PJ (1995). Immediate visual capability after cataract surgery: Topical versus retrobulbar anesthesia. *J Cataract Refract Surg*;21:302–4

Nielsen PJ (1995). A prospective evaluation of anxiety and pain with topical anesthesia or retrobulbar anesthesia for small incision cataract surgery. *Eur J Implant Ref Surg*;7:6-10.

Parkar T, Gogate P, Deshpande M, Adenwala A, Maske A, Verappa K (2005). Comparison of subtenon anesthesia with peribulbar anesthesia for manual small incision cataract surgery. *Indian J Ophthalmol*;53:255–9.

Porter R (1998). Global initiative: The economic case. *Commun Eye Health*;27:44–5-6

Smith R (1990). Cataract extraction without retrobulbar anesthetic injection. *Br J Ophthalmol*;74:205–7.

Soliman MM, Macky TA, Samir MK (2004). Comparative clinical trial of topical anesthetic agents in cataract surgery: Lidocaine 2% gel, bupivacaine 0.5% drops, and benoxinate 0.4% drops. *J Cataract Refract Surg*;30:1716–20.

Wong DL, Hockenberry-Eaton M, Wilson D, Winkelstein ML, Schwartz P (2001). *Wong's Essentials of Pediatric Nursing*, 6/e, St. Louis, P: 1301.

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