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MANUAL SMALL-INCISION CATARACT SURGERY USING AC MAINTAINER UNDER LIGNOCAINE 2% JELLY AND INTRACAMERAL LIDOCAINE

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ABSTRACT: INTRODUCTION: Manual small incision cataract surgery (MSICS) is a very popular technique of cataract surgery in India. It's a surgery which is done and in short time and in a country like India with a huge back-log of cataract blindness this surgery is very useful. **OBJECTIVE:** To evaluate the outcome of manual small incision cataract surgery (MSICS) with AC maintainer under topical anesthesia with lignocaine 2% jelly and intracameral lignocaine. **MATERIALS AND METHODS:** This study was a prospective interventional case series. One hundred patients of senile cataract were operated by MSICS under topical anesthesia using lignocaine 2% jelly and intracameral 1% lignocaine. 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±0.97). 63 patients (63%) had a pain score of zero, that is, no pain. 37 patients (37 %) had a score of 3 or less, that is, mild to none pain. 95 surgeries were free of complications while 5 had complications but they were not related to anaesthesia. Surgeon's experience was favorable in terms of patient's cooperation, anterior chamber stability, difficulty, and complications. **CONCLUSIONS:** MSICS can be comfortably performed under topical anesthesia with lignocaine jelly and intracameral lignocaine, which makes the surgery patient-friendly, without compromising the outcome.

KEYWORDS: Manual SICS, Topical anesthesia.

INTRODUCTION: Cataract is the most common cause of curable blindness in India and worldwide. It is estimated that 3.8 million people develop blinding cataract every year in India as against 2.7 million cataract surgeries done every year.^{1,2} Cataract extractions are one of the most cost-effective procedures of all surgical interventions in terms of quality of life restored.^{3,4} The only treatment option for cataract is the surgical removal of the opaque lens and the implantation of an artificial lens. The most advanced and state of the art technique is phacoemulsification with the insertion of a foldable intraocular lens (IOL) through a less than 3mm self-sealing incision. The cost of the machine, consumables and the lack of trained phaco surgeons makes this procedure less feasible for high-volume surgery which is the need of India. The MSICS is the surgery of choice in such circumstances.⁵

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.⁶ (Gupta et al, 2005) have described a similar technique under topical anaesthesia.⁷ We here describe use of topical anesthesia with lignocaine 2 % jelly intracameral along with intracameral 1% lignocaine 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.

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MATERIALS AND METHODS: The patients with visually 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 exclusion criteria was inability to understand the language and verbal commands and age below 40 years. Patients hypersensitive to lignocaine were excluded.

Sample size was calculated by using confidence level of 95 %, confidence interval of 10 and population size as 2800 (The total number of cataract surgeries at the hospital). This gave us a sample size of 93. 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 patients were included in the study. Routine pre-operative tests and investigations for fitness for cataract surgery under local anesthesia were done. Cataract was classified according to the morphology and the nuclear density was graded according to the slit-lamp examination.

Lignocaine 2% jelly was instilled in the conjunctival sac 10minutes 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. No lateral rectus bridle suture was taken.

All the surgeries were performed with superotemporal approach. Side port incisions were made at 12o'clock and 6o'clock positions. Air bubble was introduced into anterior chamber to replace aqueous humor. Intracameral preservative free 1% lignocaine (Oculan, Sunways India ltd.) was injected in anterior chamber. After waiting for period of 1 minute, air bubble was replaced by trypan blue 1%. AC maintainer was inserted at 6 o'clock side port and capsulorrhexis was performed under anterior chamber maintainer by bent 27G needle through 12o'clock side port. Sclera was exposed, by making a fornix-based conjunctival flap. The cauterization was not done and field of incision was made clear of blood by intermittent irrigation by the assistant. 6-8mm corneo-scleral tunnel was designed depending on surgeon's assessment of the nucleus size. Hydrodissection was performed to separate the cortex from the capsule. Nucleus was prolapsed out of the capsular bag. In few cases where nucleus was large and capsulorrhexis was small, 2-3 relaxing incisions were made in the rhhexis margin. 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 vectis with the assistance of hydroexpression from anterior chamber maintainer. The cortex was aspirated using bent 23G cannula from the side port. IOL was implanted in the bag under the AC maintainer flow. The tunnel was inspected for integrity by looking for any leakage. No sub-conjunctival injection of antibiotics and steroids were given. Dark goggles were given to the patient and topical broad spectrum antibiotics and topical steroids were started.

10 minutes after the surgery, 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 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 3-9points. The questionnaire was designed to provide results in a manner that the lower values represent favorable experience.

RESULTS: There were 100 patients enrolled in the study according to the inclusion and exclusion criteria. 62 (62 %) patients were male. Patients' age ranged from 42 to 78years (mean age =61). 68

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eyes were right and 32 were left. The type of cataract according to the morphology was nuclear in 44 patients (34 %), nuclear and subcapsular in 35 patients (36 %) and mature in 21(30%).

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.^{8,9} Thus, rest of the patients can be assumed to have mild pain. There were 85 patients (85%) who had a mean pain score of three or less. Fifty five patients (55%) 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.

Figure 1: Frequency distribution of visual analog scale response of patients undergoing cataract surgery under topical anesthesia.

Fig: 1

Surgeon's score	Patient cooperation	Unwanted ocular movements	Anterior chamber stability
1	80	70	90
2	10	17	6
3	10	13	4

Table 1: Frequency distribution of surgeon's score for surgical experience during MSICS under topical anesthesia (n = 100)

Lower score indicates favorable experience.

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.¹⁰ The described use of topical anesthesia is presently limited to clear corneal phacoemulsification technique. There are many advantages of topical anesthesia for the patients as well as for the surgeon. Topical anesthesia saves the patients from the risks of globe perforations, optic nerve injury, oculocardiac reflex and above all, the pain and fear perceived because of the peribulbar 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 and resultant rise of IOP.¹¹ Various studies regard Mithal C, Agarwal A, Mithal N Cataract surgery under topical anesthesia Nepl J Ophthalmol 2012; 4 (7): 114-118 117 comparing 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.^{12,13}

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.¹⁴ 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.¹⁵ 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.¹⁶ 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.^{17,18} 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.¹⁹

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.⁵ 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. 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-

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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.

Surgeon's questionnaire for evaluating surgical experience during MSICS under topical anesthesia.

Name:		Age		Sex	
Surgery		Anesthesia		Date	
Operating Surgeon					
	1		2		3
Patient cooperation	Excellent		Good		Poor
Difficulty due to ocular movements	None		Some		Great diff.
Anterior chamber stability	Excellent		Good		Poor
Complications	None		yes (mention)		

Pain evaluation form for cataract surgery under topical anesthesia.

Name:	Age	Sex
Surgery	Anesthesia	Date
Time		
Delivered by		

ऑपरेशन के दौरान हुए अपने अनुभव के अनुसार दर्द को छिपी दें, नीचे बने स्केल पर अपने दर्द की माप दर्ज करने हेतु अनुकूल जगह पर निशान लगाएं

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कोई दर्द नहीं मामूली दर्द थोड़ा दर्द काफी दर्द बहुत दर्द असहनीय दर्द

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