

## Small Incision Cataract Suregry Under Sunconjunctival Anesthesia: A Study Onpain Evaluation

Madhumita Prasad<sup>1</sup>, Sachin Daigavane<sup>2</sup>, Siddarth Gautam<sup>3</sup>

<sup>1</sup>Senior Resident Datta meghe Institute of medical sciences

<sup>2</sup>Professor & Head Datta meghe Institute of medical sciences

<sup>3</sup>Consultant Gautam eye hospital

Name of institute – Jawaharlal Nehru medical college, Datta meghe institute of medical sciences, Sawangi, Wardha..

Address- Jawaharlal Nehru medical college, Datta meghe institute of medical sciences, Sawangi, Wardha, 442001

### Abstract

**INTRODUCTION-** The recent trend in cataract surgery is the use of regional ophthalmic nerve blocks or topical anesthesia. The presence of pain during and after cataract surgery has been associated with lower patient's satisfaction with their anesthesia. We determined to know the effectiveness of subconjunctival anesthesia for pain evaluation in Small incision cataract surgery. **AIM-** To evaluate the effectiveness of subconjunctival anesthesia for pain control during small-incision cataract surgery (SICS). **METHOD-** This was a interventional study done to know the effectiveness of subconjunctival anesthesia for evaluation of pain in patients. Total of 50 patients were selected randomly. **RESULTS-** A total of 50 patients were enrolled in the study. 36 patients had no pain during surgery. Maximum patients had visual acuity in the range 6/12-6/9. **CONCLUSION-** The use of subconjunctival block resulted in lower pain scores and higher patient's satisfaction.

**key words-** cataract, SICS, subconjunctival anesthesia, visual acuity

Date of Submission: 27-04-2020

Date of Acceptance: 10-05-2020

### I. Introduction:

Cataract is the commonest cause of treatable blindness. It is the main and biggest cause of curable blindness in India and worldwide.(1)The annual incidence of cataract in India has been estimated to be 3.8 million (2) and 1.8 million sight-restoring operations are performed every year.(3)

It has been documented to be the most significant cause of bilateral blindness in India where vision < 20/200 in the better eye on presentation is defined as blindness.In India cataract has been reported to be responsible for 50-80% of the bilaterally blind. Thus, its need of hour to carry out maximum amount of cataract extraction surgery everyday. For this purpose we need faster, painless and cost-effective technique to be used. Amongst all known surgical techniques the Small Incision Cataract Surgery(SICS) proves to be easy, cost effective and suitable to cater mass bulk of cataract patients. SICS has been conventionally performed under peribulbar, retrobulbar anesthesia.(4) Now there are some reports of the procedure being performed under subtenon and subconjunctival anesthesia too.(5)Thus, by invention of such newer modalities time of surgery can be curtailed and maximum surgeries can be carried out by every ophthalmic surgeon. However, the difference between topical and these techniques remains palpable to the surgeon and the patients.

The incidence of intraoperative and postoperative pain after regional ophthalmic block has been reported to be 13% and 37%, respectively.(6) The presence of pain during and after cataract surgery has been associated with lower patient's satisfaction with their anesthesia.(6)

Topical anesthesia is administered as topical proparacaine or tetracaine drops, cellulose pledgets, or lidocaine jelly. Topical anesthesia may be supplemented with the *intracameral* use of preservative-free lidocaine.*Subconjunctival* lidocaine (Xylocaine) can be used to augment topical anesthesia in patients who experience sensation after administration of topical tetracaine or intracameral lidocaine.But in this study have solely used subconjunctival anaesthesia of 2% lignocaine with adrenaline(0.01mg) for SICS.A 26-gauge needle was used to inject the lignocaine plus adrenaline posterior to the SICS scleral tunnel incision.

This study is carried out with a aim to evaluate pain in patients and surgeon's surgical experience in SICS under subconjunctival anesthesia.

## **AIM**

To evaluate the effectiveness of subconjunctival anesthesia for pain control during small-incision cataract surgery (SICS).

## **II. Materials And Methods:**

The study was adhered to the tenets of the declaration of Helsinki, and was approved by an institutional ethic committee. It included 50 patients who had undergone Small Incision Cataract surgery (SICS) with implantation of posterior chamber intraocular lens in all forms of cataract at our hospital.

Informed consent was obtained from all subjects after the nature and possible consequences of the study will be explained to them.

All patient coming to eye OPD and diagnosed as cataract were admitted for cataract extraction surgery.

- **RESEARCH DESIGN:** This was a hospital based prospective interventional study.
- **DURATION OF STUDY:** Study was carried out for 6 months from April 2019 to September 2019.
- **PARTICIPANTS:** 50 patients diagnosed to have senile cataract coming to ophthalmology outpatient department were selected.

### **INCLUSION CRITERIA**

1. Patient having cataract of any grade as diagnosed by slit lamp microscopy and distant direct ophthalmoscopy.
2. Patients without any history of ocular pathology and surgery.
3. Patients must be accessible and willing for follow-up.
4. Age group: 40-80 years.

### **EXCLUSION CRITERIA**

1. Patients with additional visual comorbidity which may influence the visual outcome after surgery, viz. glaucoma, corneal and retinal pathologies.
2. Mute patients
3. Patients with traumatic, subluxated cataracts.
4. Systemic pathologies affecting the visual outcome, viz. hypertensive retinopathy and diabetic retinopathy.
5. Sensitivity to lignocaine
6. One eyed patients

### **SAMPLING PROCEDURE:**

All patients presenting with immature senile cataract to Ophthalmology outpatient department were screened. After taking inclusion and exclusion criteria into consideration, patient were admitted to the Ophthalmology ward. Patient were explained about the details of the study. Those patients who were willing to participate in study, written informed consent was filled and patient was enrolled in study.

- **SAMPLE SIZE:** Total of 50 patients were included.

## **III. Methods**

Patients coming to ophthalmology OPD with significant cataract causing impairment of vision not correctable by glasses or with unacceptable glare, polyopia, or reduced quality of vision attributable to cataract and willing for cataract surgery were selected for the study. All subjects were evaluated and those following inclusion criteria were consecutively included.

### **GENERAL EXAMINATION**

General vital data like pulse, blood pressure, peripheral pulses was noted, higher function status also will be noted. Examination of cranial nerves was done.

### **OCULAR EXAMINATION**

Visual acuity

The presenting distant uncorrected visual acuity (UCVA) of all patients was recorded using Snellen's chart or illiterate E chart of both eye. If UCVA was less than 6/6 then pinhole improvement was be recorded.

### **ANTERIOR SEGMENT EXAMINATION**

Torch light examination

External eye examination was performed for conditions like exophthalmos, bupthalmos etc. Any deviation of the eyeball where recorded. Extraocular movements where noted down- both for ductions and versions in all cardinal positions. Details of the anterior segment from the lids to the lens was written in the form.

Pupillary reaction was also noted down- both direct and consensual reflex

Slit Lamp Examination (if possible according to physical status of patient)

Anterior chamber depth examination. To see any opacity in all media like cornea is hazy or not, the lens was examined for evidence of cataract and its staging. Anterior vitreous examination for pigment and cells.

Tonometry

Intraocular pressure was measured using NCT/schiotz tonometer. An average of 3 readings was considered. Normal range where considered of 10-21 mm of mercury.

#### POSTERIOR SEGMENT EXAMINATION

The pupils of the patients with normal IOP and normal A/C depth on slit lamp will be dilated with Tropicamide 0.8% eye drop then fundus examination using direct ophthalmoscope (monocular view) or slit lamp biomicroscope using 90D was done. Indirect ophthalmoscope was also used.

#### STATISTICAL ANALYSIS:

By using convenient random sampling, all patient who are admitted in the department of ophthalmology for cataract extraction surgery were included in this study.

Statistical analysis was performed by using descriptive and inferential statistics using Chi square test. Software used in the analysis was SPSS 17.0 and Graph Pad 6.0 and  $p < 0.05$  was considered as level of significance.

#### Surgical Procedure:

- The patient was instructed to hold hand of paramedical staff & squeeze whenever pain felt. Eye drop lignocaine 2% was instilled.
  - Cleaning & drapping was done. Eye speculum was inserted.
  - 2ml of 2% lignocaine with 1:200000 of adrenaline was subconjunctivally injected at 12'o clock position with 26 G needle. Advised to look towards the operating light was given. 1 minute after waiting, surgery was started.
  - Superior rectus suture was fixed.
  - Fornix based conjunctival flap between 10 to 2 O'clock position was dissected for Superior tunnel incision.
  - Hemostasis was achieved wet field-bipolar cautery
  - Single side port at 10 o'clock was made with a 15 degree Lance tip knife
  - Anterior capsule was stained with trypan blue dye
  - Anterior chamber (AC) wash given
  - AC filled with visco-elastic material
  - A 6mm Continuous Curvilinear Capsulorrhexis (CCC) performed in a closed chamber with bent 26 gauge needle (cystitome) through the side port.
- A partial thickness 6mm scleral frown incision was made with 11 no. bard parker blade 2mm from the limbus
- A sclera-corneal tunnel is fashioned using a bevel up crescent blade and extended up to 1mm into clear cornea.(7)
  - The pocket tunnel dissection is carried forward 1mm into the clear cornea in front of the vascular arcade.
  - A 3.2 mm angled keratome was used to enter the AC to form a three-stepped self-sealing tunnel incision.
  - The incision was enlarged with a 5.2 mm angled keratome, such that the internal corneal lip was kept about 25% larger than the external incision to facilitate the smooth delivery of the nucleus
  - Hydrodissection and hydrodilneation was performed by injecting ringer lactate through a 27 gauge cannula separating the cortex and epinucleus of the lens from the hardcore nucleus, till it can be rotated freely clockwise or counter-clockwise in the bag
  - A visco cannula was used to facilitate nuclear prolapse from the bag into the AC through CCC19
  - The AC was filled with visco-elastic substance both above and below the nucleus to protect the bag posteriorly and endothelium anteriorly during the delivery of nucleus.
  - The nucleus was delivered out of the AC through the tunnel by hydro procedure created by corrugated wire Vectis.
  - Most of the cortex was expressed out through visco-expression by injecting visco-elastic material while pressing the inferior lip of the tunnel
  - The residual cortex was aspirated using a Simcoe's 2-way irrigation and aspiration cannula manually
  - A 6 mm optic size (overall 12.5mm) single piece posterior chamber PMMA-IOL was then implanted into the capsular bag with the help of McPherson's forceps and dialer
  - The remaining visco-elastic material was aspirated, AC reformed with ringer lactate and side port was hydrated.

All patients received 2mg of dexamethasone and 20mg of gentamicin subconjunctivally.

The eye was patched for about an hour, and then, the dressing was removed, eye was examined, and 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 at the end of the surgeries.

The surgeon's evaluation was based on 4 parameters.

1. Patient's cooperation,
2. Difficulty due to ocular movements, and
3. Anterior chamber stability .

These parameters were graded on a scale of 1-3, thus giving a cumulative range of 3–9 points, the lower values represent favorable experience.







The fourth parameter was complications or adverse events, which were mentioned as and when they happened.

#### IV. Results:

##### PAIN EVALUATION OF PATIENTS:

Table 1: Frequency distribution of visual analog scale response of patients undergoing cataract surgery under subconjunctival anesthesia

Wong Scale No. Of patients

 0	36
 1 2 3	13
 4	00
 6 7	00
 8 9	01
 10	00

36 patients (72%) had pain score of zero, that is, no pain. 13 (~26%) had a score of less than 3, that is, mild pain to none.

**SURGEON’S EXPERIENCE:**

**Table 2:**Frequency distribution of surgeon's score for surgical experience during SICS under subconjunctival anesthesia

SURGEON’S SCORE	PATIENT COOPERATION	UNWANTED OCULAR MOVEMENTS	ANTERIOR CHAMBER STABILITY
1	47	45	48
2	02	04	00
3	01	01	02

\*Lower score indicates favorable experience

**COMPLICATIONS:**

- Surgeon experienced extension of capsulorrhexis as the only complication in 1 patient.

**POST OPERATIVE (DAY 1) VISUAL OUTCOME:**

**Table 3:** Frequency distribution of patient’s vision on post op day 1 after SICS under subconjunctival anesthesia

VISUAL ACUITY	NO. OF PATIENTS
<6/60	1
6/60-6/36	0
6/36-6/24	2
6/24-6/18	2
6/18-6/12	16
6/12-6/9	<b>25</b>
6/9-6/6	4

25 patients (50%) had visual acuity in the range of 6/12-6/9.

**V. Discussion:**

In the present prospective interventional study, we evaluated effectiveness of subconjunctival anesthesia for pain control during small-incision cataract surgery. The study was done for the period of 6months. We studied the result of visual analog of response of patients to subconjunctival anesthesia who underwent cataract surgery in 50 cases.

Subconjunctival anaesthesia was comfortable for the patient at the time of anaesthetic administration. They also had good analgesia intraoperatively, but the surgeons had to operate with incomplete akinesia, which some may find disconcerting. The surgery was started immediately after administration of anaesthesia. As lesser amount of the anaesthetic agent was used, the chances of adverse effects are also minimised. In a large hospital or in a community eye care setting, the cost would also be less.(5)

Patient’s intra operative pain evaluation by squeezing hand of paramedical staff gave the information that maximum patients experienced pain while taking bridge suture > cauterization of scleral vessels > injection of subconjunctival anesthesia. Negligible pain was experienced during nucleus delivery.

Maximum patients rated “0” grade pain on visual analog scale.(table 1). Surgeon was comfortable while performing MSICS under subconjunctival anesthesia. Only in 1 uncooperative patient difficulty was faced due to unwanted ocular movements. No other mentionable complication was faced. Visual outcomes on day 1 postoperative was > 6/12 in maximum patients.

**VI. Conclusion:**

It is possible to perform SICS under subconjunctival anesthesia with following advantages:

1. lesser anesthesia administration pain as compared to methods of local anesthesia.
2. more patient satisfaction as the eye pad was removed within an hour after surgery and patient could be discharged.
3. surgery time i.e from anesthesia induction to eye speculum removal is less.
4. lost effective procedure.

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