

A Novel Approach – Extra-capsular Cataract Extraction under Topical Anesthesia

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Abstract:

Objective: To determine the efficacy of topical anesthesia for performing extra-capsular cataract extraction in patients with mature, hypermature and brunescant cataract.

Methods: Patients of either gender, between 40-80 years of age, with mature, hypermature and brunescant cataracts, having uneventful ECCE were included in this study at eye department of Gomal Medical College, from Jan 2022 to Dec 2022. Topical anesthesia was acquired by proparacaine hydrochloride 0.5% eye drops. Pain score from patient and satisfaction score from surgeon were assessed during each surgery and recorded on proforma. Data was analyzed using SPSS v 25.

Results: Out of 52 patients, 46.1% were male and 53.8% were female with mean age of 60.7 ± 6.5 years. Mean pain score experienced by patients during surgery was 2.86 ± 1.32 with the range of 1 to 7. Maximum patients (30.7%) experienced a score of 03 and none of the patients reported pain score above 07. Maximum pain was experienced at the time of suturing by majority of patients (53.84%). Surgeon's satisfaction score was also assessed and Mean satisfaction score found was 8.24 ± 2.39 with the range of 03-10. Maximum score for surgeon's satisfaction was 10 in 3 cases (5.76%) and score of 8 was found in majority of patients (32.69%).

Conclusion: Thus, ECCE can be safely performed under topical anesthesia that helps in achieving tremendous patient's as well as surgeon's comfort during surgery. *Al-Shifa Journal of Ophthalmology 2024; 20(1): 33-39. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*

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Introduction:

Cataract is the cloudiness of normal crystalline lens that renders people unable to see clearly. It may cause blurred vision, reduced contrast, glare, haloes, and even diplopia that compels people to seek surgical advice. There are various approaches to cataract surgery that has evolved from intra-capsular cataract extraction to extra-capsular cataract extraction and phacoemulsification.¹

Though phacoemulsification and its modifications has largely replaced the older techniques like ICCE (Intra Capsular Cataract Extraction), an ECCE (Extra Capsular Cataract Extraction) due to its potential benefits of small wound, less surgical time, use of ultrasonic vibrations to emulsify the lens, less or no sutures, and

early post-op recovery. But it has certain limitations where extra-capsular cataract extraction is still the method of choice as in hyper-mature cataract, brunescant cataract and in certain centers where phacoemulsification facilities are not available.²

For cataract surgery, the usual anesthesia techniques are general anesthesia, retrobulbar/peribulbar local anesthesia, sub-tenon local anesthesia, intra-cameral local anesthesia and topical use of drops or gels.³ For many decades, retrobulbar/peribulbar with or without facial block remained the gold standard for performing cataract surgeries but the risk of blind needle injection has led to so many reported complications.⁴⁻¹³ To lower the complications associated with needle blocks, the routine phacoemulsification procedures are now done under topical anesthesia by many ophthalmologists. Topical anesthesia is preferred because it provides sufficient patient comfort with lower incidence of complications compared to other types of anesthesia.¹⁴ Though topical anesthesia is becoming the method of choice in phaco cases where sutureless and small incision makes it easy to perform but extra-capsular cataract extraction is still done under local anesthesia almost everywhere.

In our study, we have devised specific pattern of using topical anesthesia in the form of drops for extra-capsular cataract extraction to avoid the complications associated with peri-bulbar/retrobulbar. This study is unique in the sense of its specific pattern of using topical anesthesia drops and also because limited data is available for doing ECCE surgery under topical anesthesia.

Materials and Methods:

After getting approval from ethical review committee, a written informed consent with demographic information was collected from each patient before participating in this study. Patients of either gender, between 40-80 years of age, with hyper

mature and brunescant cataracts under topical anesthesia were included in this study. Patients with early/immature cataract, mentally handicapped patients, patients with lower pain threshold, glaucoma and uveitis patients, patients with previous intra-ocular surgery were all excluded from this study. This prospective interventional quasi-experimental study included 52 patients (sample size was calculated using WHO formula and values taken from Junejo, et al., 2016 study) and it was conducted at eye department of Gomal Medical College, D.I. Khan from January 2022 to Dec 2022.

All patients underwent routine ophthalmic examination including uncorrected visual acuity (UVA), best corrected visual acuity (BCVA), Slit lamp biomicroscopy including cataract grading, Goldmann Applanation tonometry, and Fundus evaluation. Biometry of the respected eye was done to determine intra-ocular lens power. Patients were counselled regarding the surgical technique of extra-capsular cataract extraction and type of anesthesia used during the procedure.

After dilating the operating eye with Mydriacyl 1% eye drops, topical anesthesia was acquired by proparacaine hydrochloride 0.5% eye drops (Alcaine, Alcon Pharmaceuticals), 2 drops were instilled 3 minutes apart before starting the surgery. After using povidone iodine 5% solution and draping the eye, 3rd drop of topical anesthesia was instilled before giving partial thickness clear corneal incision from 10 O'clock to 2 O'clock position. After getting entry into anterior chamber with full thickness stab incision at 11 O'clock position, AC maintained with viscoelastic gel and capsulotomy done via cane opener technique. 4th drop of topical proparacaine was instilled either before converting partial thickness into full thickness corneal incision or just before the nucleus delivery. 5th and mostly the last drop was used just before suturing. After an irrigation and aspiration of cortical matter, rigid PMMA intraocular lens inserted and

corneal incision sutured with interrupted nylon 10/0 sutures. All surgeries were performed by a single ophthalmologist.

During the procedure, patients were asked about the level of pain from 0 to 10 based on numerical rating scale (NRS) and maximum pain was experienced at which step of surgery. Similar numerical scale from 0-10 was used to determine the surgeon's satisfaction level during surgery. All these information along with demographic details were recorded on specially designed proforma. If the patient had met any per-op complication that was also recorded.

Data was analyzed using SPSS v 25. Categorical variables were recorded as frequency and percentage while numerical data as Mean \pm SD and range.

Results:

52 patients were included in our study. Out of which 24 (46.1%) were male and 28 were female (53.8%). Right eye was operated upon 32 cases (61.5%) and left eye in 20 cases (38.4%). Mean age noted was 60.7 \pm 6.5 years with range of 40-80 years.

Mean intraocular lens (IOL) power determined was 23 \pm 4.2 D with the range

of 18 -29 D. Mean Axial length (AL) recorded was 24 \pm 1.2 mm with the range of 17.6-27.3 mm. Mean pain score experienced by patients during surgery was 2.86 \pm 1.32 with the range of 1 to 7. Maximum patients (30.7%) experienced a score of 03 and none of patients reported pain score above 07.

Patients were also asked for maximum pain felt at which step of surgery. Maximum pain was experienced at the time of suturing by majority of patients (53.84%) and among them who experienced pain during suturing, 71.42% have pain while taking scleral bite during suturing. 2 patients (3.84%) reported pain during all steps.

Surgeon's satisfaction score was also assessed for every patient during ECCE surgery. Mean satisfaction score was 8.24 \pm 2.39 with the range of 03-10. Maximum score for surgeon's satisfaction was 10 in 3 cases (5.76%) and score of 8 was found in majority of patients (32.69%). Surgeon didn't encounter any major complication like positive vitreous pressure or excessive eye movements.

Table 1: Demographic variables

Groups	Total number of patients	Percentage
40-60 years	20	38.4%
61-80 years	32	61.5%

Table 2: Types of cataract for ECCE

Type of cataract	Frequency	Percentage
Mature cataract	07	13.4%
Hypermature cataract	27	51.9%
Brunescent cataract	18	34.6%

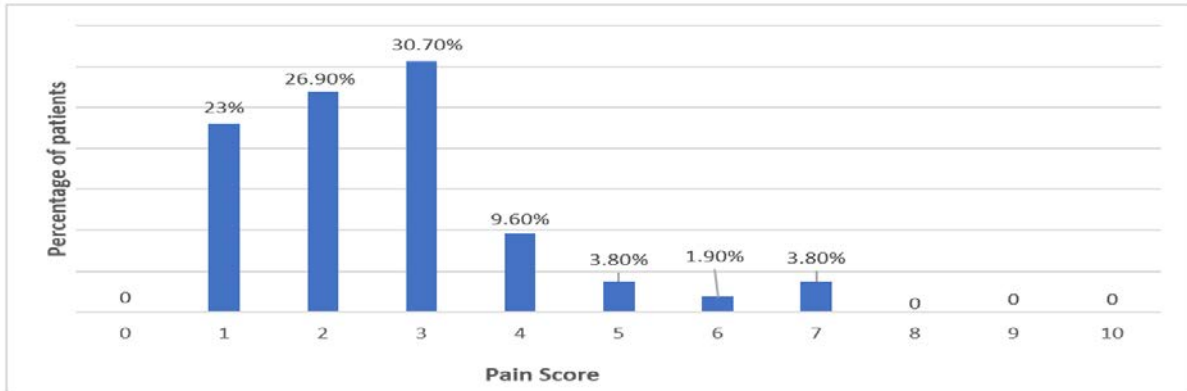


Fig 1: Column chart showing percentage of patients experiencing different pain scores

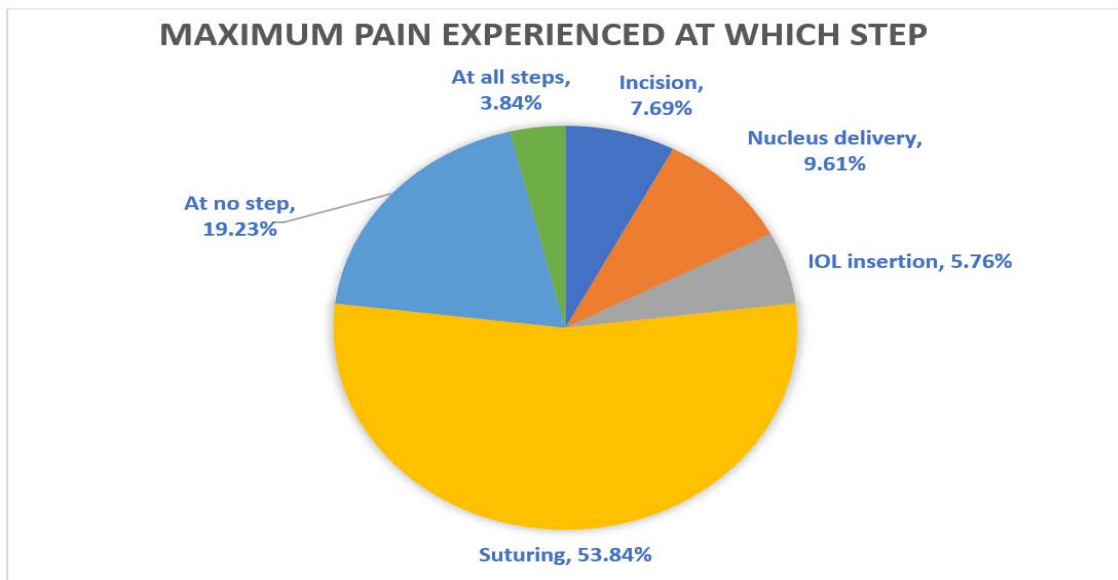


Fig. 2: Pie chart showing percentages of max. pain experienced at different steps

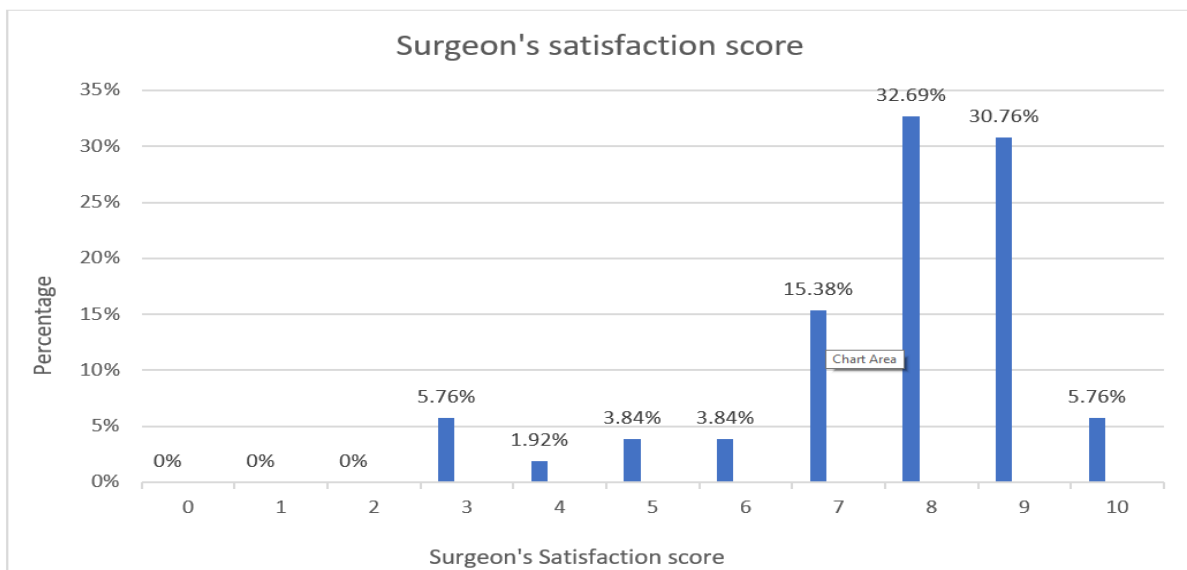


Fig.3: Column chart showing percentage of surgeon's satisfaction score during surgery 36

Discussion:

Cataract is most performed procedure when it comes to ophthalmic surgeries. During surgery, the surgeon as well as patient should be comfortable to have better post-op results while keeping the complications at minimum. Thus, the use of topical anesthesia allows the surgeons to eliminate the risks associated with needle injection and facilitate the patients who have needle phobia.

In our study, females were slightly more than males (53.8% versus 46.1%) and the mean age was 60.7 years. Higher female participation suggest that females tend to present later in the course of disease with mature cataracts and may be afraid of injections into the eyes. One similar study conducted in the same country reported mean age of 60.5 years with more male percentage than that of female.¹⁵ This suggests that mean age of patients who come for cataract surgery remained almost same over the past decade.

Pain score was determined from every patient during surgery in our study. Mean pain score experienced by patients during surgery was 2.86 ± 1.32 and maximum patients (30.7%) experienced a score of 03 and none of patients reported pain score above 07. Salahuddin conducted a similar study where phacoemulsification was done under topical anesthesia rather than ECCE and he reported mean pain score of 1.52 with range from 1-7, the results of which are comparable to our study.¹⁶ Mean pain score from another similar study conducted in Turkey was 3.05 that was slightly higher than what reported in our population.¹⁷ Patients were also enquired about maximum pain felt at which step and majority reported the maximum pain during suturing and that too while taking the scleral bite, the results are consistent with a similar study conducted by Abdul-Hamid.¹⁵ In our study, we just determined the efficacy of topical anesthesia in ECCE without any comparison with peri-bulbar

block. Previously few researchers compared the topical versus peri-bulbar block in phacoemulsification cases and reported variable results.^{18,19}

At one end, we determined the patient's perspective and on the other end we also kept in mind the surgeon's comfort that was determined in terms of surgeon's satisfaction score. Mean satisfaction score in our study was 8.24 ± 2.39 with the range of 03-10. One study conducted in Jeddah for the use of topical anesthesia in phacoemulsification cases, reported that surgeon was very comfortable in 95% patients and in only 5% patients, mild discomfort was noted due to excessive movement of eyes that too controlled by vocally engaging the patients.²⁰

So far, we have discussed the results of our study with those studies where topical anesthesia was used in phacoemulsification cases because very limited data is available for the use of topical anesthesia in extra-capsular cataract extraction cases. Thus, this study will help surgeons in building up the courage to carry out ECCE under topical anesthesia and thereby reducing the risk of complications associated with peri-bulbar or sub-tenon anesthesia.

The limitations of this study being single-centered, non-comparative, and having small sample size. Future endeavors will be done to target these limitations.

Conclusion:

In the light of above-mentioned results and discussion, we conclude that extra-capsular cataract extraction can be safely performed under topical anesthesia that helps in achieving tremendous patient's as well as surgeon's comfort during surgery.

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