



STUDY OF SAFETY AND EFFICACY OF BIMANUAL NEEDLE PHACOFRAGMENTATION IN SMALL INCISION CATARACT SURGERY IN TERTIARY CARE HOSPITAL

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ABSTRACT

We describe a novel technique of Manual small incision cataract surgery of phacofragmentation. In this technique, nucleus fragmentation was done using 20 G needle or 26 G needle with Chang's chopper, by a single experienced surgeon. 75 eyes of 75 patients were operated. Most of surgeries done through less than 3mm incision. For soft nuclei we used 26 G needle (1.28mm bevel edge) and for Hard nuclei we used 20 G needle (3.12mm bevel edge). The major complication was post-operative corneal edema which occurred in 10 eyes (13.33%) which resolved on first follow up of seven days. Zonular dialysis occurred as intraoperative complication in 1 patient for which we place lens in the sulcus. The average refractive astigmatism (+/-SD) was 0.296 +/-0.250 Diopters.

KEYWORDS : Manual small incision cataract surgery, Phacofragmentation, 20 G/26G needle

INTRODUCTION:

Manual Small Incision Cataract Surgery is a preferred technique in developing countries because it is simple and cost-effective. Size of nucleus decides the length of incision required. In our technique a 26 G or 20 G needle used along with Chang's chopper to divide the nucleus in pieces. we have studied Intra-operative and post-operative complications if any, post-operative astigmatism and final visual outcome.

AIMS AND OBJECTIVES:

1. To study efficacy of bimanual needle in the capsular bag phacofragmentation.
2. To evaluate safety of bimanual needle in the capsular bag phacofragmentation.
3. To observe Intraoperative and Postoperative complications.
4. To assess astigmatism postoperatively.

MATERIALS AND METHODS:

Study design: Prospective Observational study

Study area: OPD, Department of ophthalmology

Study population: All the patients having cataract attending ophthalmology OPD those fulfilling the inclusion/exclusion criteria and those who are willing to give written informed consent were included in the study.

Sample size: 75 eyes of 75 patients

Study duration: 18 months

INCLUSIVE CRITERIA: Patients posted for cataract operation having Immature senile cataract grade I, II, III, and IV nuclear sclerosis, and willing to give Written Informed Consent.

EXCLUSION CRITERIA:

1. Weak zonules
2. Patient with pre-existing corneal guttata, hazy cornea
3. Incomplete capsulorrhexis
4. Cataract with associated glaucoma
5. Rigid pupil
6. Patients with pseudoexfoliation
7. Shallow anterior chamber.
8. One eyed pts
9. High myopia

METHODOLOGY:

SURGICAL TECHNIQUE:

- All the surgeries were performed by single surgeon.
- The ocular adnexa was cleaned with 5% povidone iodine, sterile drape was applied.
- Wire speculum was applied and conjunctival wash given.
- Two sideport entries with 15 degree blade were made at 9 and 3 o'clock positions.
- Blue dye is used to stain the capsule.
- Anterior chamber was filled with methylcellulose viscoelastic material.
- Continuous curvilinear capsulorrhexis was done by bent 26 gauge cystitome through side port incision.
- **INCISION:** Bluementhal's truncated incision of size 2.5 to 3 mm (depending on grade of nuclear sclerosis) with 1 mm back cuts was made.
- Three step self sealing tunnel was made.
- A/C entry was done.
- Hydrodissection was performed by injecting Ringer's lactate solution between capsule and cortex with 27 gauge canula.
- This is viscoelastic dependent technique where repeated and copious injection of viscoelastic substance (Hydroxy Propyl Methyl Cellulose 2%) is made at multiple times during surgery.

NUCLEAR FRAGMENTATION:

Chang's horizontal chopper is inserted through a sideport at 3 o'clock position and equator of nucleus is hooked. 20 gauge needle (having length of bevelled edge of 3.48 mm) for NS IV and above / 26 gauge needle (having length of bevelled edge of 1.21 mm) for soft cataracts, inserted through main incision, just anterior to capsulorrhexis margin, obliquely toward the core of endonucleus, under direct microscopic observation and under copious viscoelastics, used to pierce into core of endonucleus, not exceeding the bevel of the needle & then Chang's chopper is brought towards needle to produce nuclear crack. [Fig. 1] In hard and leathery cataract a complete full thickness nuclear crack may not develop, so the nucleus rotated 180 degree & the same maneuver is repeated. At times to completely separate the nuclear fragments posteriorly due to finer attachments, 2 seibel choppers were inserted into the cleavage plane at deeper level to completely separate the fragments from one another. Nucleus rotated 90 degree &

maneuvre is repeated to produce pie shaped nuclear fragments.

- Fragments are then subluxated in AC & under cover of copious viscoelastic substance, removed using microvectis.
- Residual cortex was removed by using the irrigation and aspiration Simcoe canula.
- The capsular bag and and anterior chamber was filled with viscoelastic material.
- Acrylic hydrophilic foldable lens was implanted.
- Viscoelastic material was removed from AC.
- AC reformation was done with Ringer Lactate solution.
- Wound was checked for self-seal ability by applying pressure on cornea and external lip.
- Subconjunctival injection of Antibiotic-steroid was given.
- Pad and bandage was done.

OBSERVATIONS & RESULTS:

Total 75 patients were operated, 49 males 26 females.

Table 1: Visual acuity:

VA	DAY 1	DAY 7	DAY 30	DAY 40
6/6-6/12	37 (50%)	48 (65%)	60 (80%)	75 (100%)
6/18-6/36	27 (35%)	27 (35%)	15 (20%)	-
6/60-FC4M	11 (15%)	-	-	-
FC3M -PL	-	-	-	=
TOTAL	75	75	75	75

Table 2: Post-operative Corneal edema Day 1 [SLIT LAMP GRADINGS)

POD 1 Corneal edema	No (%)	Total
Grade 0	65 (86.67%)	65
Grade 1	6 (8%)	6
Grade 2	4 (5.33%)	4
Grade 3	0	-
Grade 4	0	-
Toatl	75	75

Table 3: Post-operative Corneal edema (Day 7)

POD 7 Corneal edema	No (%)	Total
Grade 0	75 (100%)	75
Grade 1	-	
Grade 2	-	
Grade 3	-	
Grade 4	-	
Total	75	75

Table 4: Post operative Astigmatism

No. of eyes	Total 75	%
no astigmatism	18	24 %
ATR Astigmatism	15	60 %
WTR Astigmatism	12	16%

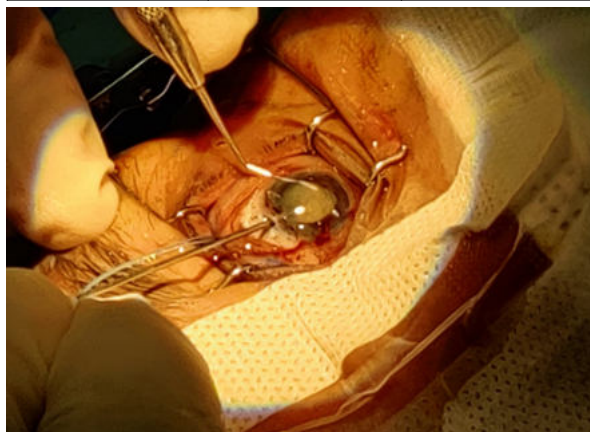


Fig.1.Phacofragmentation using 20 G needle & Chang's chopper

Total 75 patients were operated, 49 males 26 females.

1]VISUAL OUTCOME: Best corrected visual acuity (BCVA) of 6/6 to 6/12 was achieved by 80% of study population on day 30 post-operatively. While study done by Pipat Kongsap⁽¹⁾, Best corrected visual acuity(BCVA) of 20/40 or better was achieved in 83 eyes (87.37%) at the end of first post operative week and this result remained stable to 85 eyes (89.48%) at the end of six months. In study done by Praputsorn Kosakarn⁽²⁾, The postoperative visual acuity was better than 20/40 in 79.2% of the cases in which technique of Double nylon loop was performed. So, our study is comparable with study done by Pipat Kongsap⁽¹⁾

2] AVERAGE ASTIGMATISM: In our study, Mean astigmatism found to be 0.296+/-0.250 Diopters (D) , while study done by Francisco J Gutierrez-Carmona⁽³⁾ Mean 57 postoperative astigmatism was 0.77 diopters (D) at 7 days, 0.47 D at 1 month, and 0.21 ± 0.22 D at 3 months. The study done by dr.Bhatti⁽⁴⁾ average astigmatism was found to be 0.45 D for the MSICS prechopping technique. Our study results are comparable with study done by Francisco J Gutierrez-Carmona⁽³⁾ .

3] COMPLICATIONS:

a) Corneal edema: In our study, After surgery, 10 eyes (13.33%) had corneal edema which resolved in day 7 post-operative period. While that of study done by Francisco J Gutierrez-Carmona⁽³⁾ , 5 eyes (10 %) had corneal edema, which resolved in post-op 1 week follow up which goes hand in hand with our study. No patient had severe corneal edema. While study by Praputsorn kosakarn⁽²⁾, the postoperative complications were corneal edema in 1 eye (0.8%) out of 120 eyes of 120 patients. The rate of corneal edema was less than that in other studies (10% to 10.19%). While in the study done by Pipate kongsap⁽¹⁾ the most significant post operative complication was transient corneal edema located at the corneal wound, which developed in seven eyes (7.37%). In our study percentage of corneal edema was found to be more than other studies described above

b) Zonular dialysis In our study intraoperative Zonular dialysis had occurred in 1 patient (1.33%). Lens was places in sulcus. Zonular dialysis was not found in other studies.

c) Posterior capsule rupture No patient had intra-operative posterior capsule rupture in our study. While study done by Pipate kongsap⁽¹⁾ intra-operative posterior capsule rupture was found to be (2.11%). So our study outcome was superior than study done by Pipate kongsap⁽¹⁾

d) Capsulorhexis tear No patient had intraoperative capsulorhexis tear in our study. While study done by Pipate kongsap⁽¹⁾ intraoperative capsulorhexis tear was found to be (2.11%).

e) Hyphema No patient had post- operative Hyphema in our study, because there was no handling of iris, ciliary body intraoperatively. Study done by Francisco J Gutierrez-Carmona⁽³⁾ , in 2 cases (4%) of slight transient intracameral bleeding in the anterior chamber occurred. While study by Praputsorn kosakarn⁽²⁾, the postoperative hyphema occurred in 1 eye (0.8%) out of 120 eyes of 120 patients. Our study results are comparable with above studies

f) Post operative iritis, ocular hypertension No patient had post operative iritis, ocular hypertension in our study. Study done by Francisco J Gutierrez-Carmona⁽³⁾. After surgery, 2 (4%) had iritis, and 3 (6%) had ocular hypertension. Our study is superior regarding these complication than study done by Francisco J GutierrezCarmona⁽³⁾ .

g) Intra-operative iris prolapse No patient had intra-operative iris prolapse in our study. While study done by

Pipate kongsap⁽¹⁾ intra-operative iris prolapse found to be (7.37%). Our study is superior than study done by Pipate kongsap⁽¹⁾ regarding intra operative iris prolapse.

Summery & conclusion:

Manual sutureless cataract surgery of phacofragmentation using 20 G needle or 26 G needle with foldable intraocular lens was performed by a single experienced surgeon . Most of surgeries done through less than 3mm incision. For soft nuclei we used 26 G needle (1.28mm bevel edge) and for Hard nuclei we used 20 G needle (3.12mm bevel edge). The major complication was post-operative corneal edema which occurred in 10 eyes (13.33%) which resolved on first follow up of seven days. Zonular dialysis occurred as intraoperative complication in 1 patient for which we place lens in the sulcus. Manual sutureless cataract surgery of phacofragmentation using 20 G needle or 26 G needle with foldable intraocular lens when performed by an experienced surgeon was a safe procedure with good visual recovery and no need for a phaco machine. Hence this novel surgical technique is safe and efficient and is a Cheapest viable option⁽⁵⁾ for achieving "In the bag phacofragmentation".

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