

Role of Systemic Antibiotics in Phacoemulsification Cataract Surgery

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Abstract

Introduction: Phacoemulsification under topical anesthesia is a preferred mode of cataract extraction. In recent years, the trend has changed toward using topical drops and intracameral antibiotics instead of systemic antibiotics in phacoemulsification cataract surgery.

Objective: To analyze the role of systemic antibiotics in phacoemulsification cataract surgery.

Materials and Methods: The present study is randomized controlled trial study which was conducted at Tertiary Eye Care Centre. A total of 100 subjects underwent cataract surgeries with phacoemulsification technique during one-quarter (April-June 2016). Surgeries were done by phaco technique.

Outcome Measures: The post-operative best-corrected visual acuity (BCVA) along with grades of congestion and discharge was compared among various groups. In addition to this, A/C reaction cells and flare along with corneal edema and vitritis were noted in two groups. Endophthalmitis was an important criterion, which was not seen in either group in any case.

Results: BCVA in the two groups was comparable after 1 month. In no case, endophthalmitis was seen. Cells and flare on the first post-operative day were seen in both groups but was insignificant.

Conclusion: It can be very well concluded that even with no antibiotic coverage the BCVA and rate of complications are nearly same if done by phacoemulsification technique but to be on safer side always use intracameral antibiotic in all cases where no systemic antibiotics are given

Key words: Antibiotics, Cataract, Phaco, Systemic, Topical

INTRODUCTION

Phacoemulsification has become the preferred method of cataract extraction worldwide because the complication rate in the expert's hands is minimal and the technique provides an almost quiet eye early postoperatively and an early visual rehabilitation.¹ However, for the masses especially in developing countries, the manual small incision cataract surgery (SICS) offers the advantage of sutureless cataract surgery at a low cost.² The smaller

incision of phacoemulsification compared to extracapsular cataract extraction (ECCE) renders the operation safer since decompression of eye is avoided. In addition, the procedure is associated with little induced post-operative astigmatism and early stabilization of refraction (usually 3 weeks for 3 mm incision). Post-operative wound-related problems such as iris prolapse are almost eliminated. One disadvantage of phaco is that it requires complex machinery to break up the lens nucleus and remove it through a small incision.³ In the recent years, trend has changed toward using topical drops for anesthesia.⁴⁻⁷ Furthermore, the majority of doctors use systemic antibiotics in developing countries. Many studies have been done on phacoemulsification, but this study focuses on the need of systemic antibiotics in the pre- and post-operative period of phacoemulsification. To the best of my knowledge, it is the first study to evaluate the need of systemic antibiotics in phacoemulsification.

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MATERIALS AND METHODS

Study Place

Rohilkhand Medical College and Hospital (Tertiary Eye Care Center).

Study Period

It is 3 months from April to June 2016.

Inclusion Criteria

Randomly 100 patients who came in OPD were included in the study.

Exclusion Criteria

Complicated cases having high blood pressure, diabetes, and severe asthma and non-cooperative patients.

METHODOLOGY

A total of 100 consecutive patients undergoing phacoemulsification were included in this study during 3 months. Certificate from the Ethical Review Committee was taken before conducting this study.

All confirmed cases were grouped into two categories on a randomized basis. A total of 45-50 cases were taken in each group.

Group A: It was a control group receiving a standard protocol of systemic antibiotics ciprofloxacin (500 mg) twice daily for 5 days. Along with this, anti-inflammatory drugs were also started.

Group B: This group received no systemic antibiotics only anti-inflammatory were given, and phacoemulsification was done under local anesthesia.

Following post-operative parameters were used for testing efficacy:

- Grades of congestion
- Discharge
- A/c reaction (cells and flare)
- Corneal edema
- Vitreous cells and vitritis
- Membrane formation
- Endophthalmitis.

Pre-operative data collection for each eye included the patient's age and gender, pre-operative acuity (UCVA and BCVA, i.e., uncorrected and best-corrected visual acuity, respectively) details of slit lamp examination of the anterior segment and preexisting ocular conditions likely to influence either the operative course or the final visual acuity. The intraocular pressure (IOP) was recorded

in all the cases by schiottz tonometry. The posterior pole was examined with slit lamp biomicroscopy using +90D or +78D lens. Indirect ophthalmoscopy was done to evaluate the retinal periphery. The status of another eye was similarly documented. In the case of nonvisibility of the posterior segment, B-scan was performed for the eye. Axial length measurement and keratometry were done and the SRK-2 formula was used to calculate the intraocular lens (IOL) power required. The systemic status of the patient was evaluated to ensure fitness for surgery under local anesthesia. Operative data included the name of the consultant, date of surgery, technique of surgery employed including the details of each step and the details of IOL implanted. The occurrence of any intraoperative complications was documented with details of subsequent management. All surgeries were phacoemulsification surgeries.

Steps of Surgery

All the prophylactic measures such as pre-operative lash trimming irrigation of lacrimal drainage system with antibiotic, antiseptic preparation of the operative site using povidone iodine were used in both the groups.

After cleaning and draping the eye, a wire speculum was applied. A paracentesis was made at 10⁰ clock position with microvitrectomy blade. Trypan blue was used viscoelastic was injected into the anterior chamber. Whenever the capsulorhexis threatened to extend to the periphery, it was converted to a can opener capsulotomy. 7-10 cases were converted to the SICS technique where capsulotomy was done. Phaco was performed using peristaltic Chakshu machine. Standard divide and conquer technique was used. A clear corneal incision with 3.2 mm keratome blade was made. A second paracentesis was made at 2⁰ clock position hydro dissection, and hydro delineation was performed after confirming the free rotation of the nucleus. A four-quadrant technique was used during trenching each quadrant was then emulsified and aspirated; cortical matter was cleaned using automated irrigation and aspiration. Anon-foldable poly methyl metha acrylate posterior chamber IOL with 5.25 mm optic was implanted into the capsular bag under viscoelastic. Viscoelastic was removed using automated irrigation and aspiration. The wound was checked for absence of leak and if present was sutured. Conjunctival flap repositioned over the incision. Intracameral antibiotic cefuroxime 0.25 ml was given in all patients at the end of surgery. Speculum was removed and eye was patched after instilling a drop of antibiotic.

Post-operative data were documented on the 1st day after the 1st week and finally at 4-week visit. Prednisolone acetate 1% eye drops with antibiotic combination were given 1 h for initial 2 days and then 6 times daily for 1st week. From

the 2nd week onward, antibiotic steroid combination was tapered over the next 4 weeks. On each of the visits UCVA and pinhole, improvements were noted along with slit lamp examination of the anterior segment along with fundus examination.

RESULTS

A total of 100 cataract surgeries were done by phacoemulsification cataract extraction. Patients were divided into two groups: Group A consisted of patients who underwent phaco with antibiotic coverage and Group B consisted of patients who underwent phaco without antibiotic coverage. Patients were followed up postoperatively on day 1 at 1st week and finally at 4th-week visit. BCVA and pinhole visual acuity were noted in all the visits, and final BCVA is shown in Table 1 and Figure 1. Grading of cells was performed with 2 mm long and 1 mm wide slit beam with maximal light intensity and magnification. The findings are recorded in Table 2. Cells and flare decreased subsequently in week's period of time. Cells and flare were seen in 12 eyes in Group A (6%) and 13 cases in Group B (6.5%). Vitreous cells were seen in 2 cases (1%) in Group A and 3 cases in Group B.

Table 1: BCVA (after 1 month)

Groups	6/60-6/36	6/36-6/18	6/18-6/12	6/12-6/6
Group A	2	10	15	18
Group B	1	13	17	15

BCVA: Best-corrected visual acuity

Table 2: Grading of anterior chamber cells in Groups A and B

Grade	Number of patients			
	Parameters			
	AC cells		Flare	
	Group A	Group B	Group A	Group B
0.5+	2 cases	3 cases	Nil	Nil
1+	1 case	2 cases	2 case	2 case
2+	2 cases	2 cases	1 case	2 case
3+	0	0	3 case	2 case
4+	Nil	Nil	1 case	0

Table 3: Parameters in cataract surgery in two groups

Parameters	Group A	Group B
Congestion	10	12
Discharge (watery)	2	1
Corneal edema	7	10
Cells (anterior chamber)	5	7
Flare (anterior chamber)	7	6
Vitreous cell and vitritis	2	2
Endophthalmitis	0	0

The mean age of the patients in both the groups was comparable.

There was no statistically significant difference in the age distribution or gender distribution in the two groups. Grades of congestion were noted in two groups. 10 patients in Group A and 12 patients in Group B had slight to moderate congestion (grading according to the BRIEN HALDEN VISION INSTITUTE). The discharge was watery in 2 patients in Group A and 3 patients in Group B; 1 patient had mucopurulent discharge which was well managed with higher antibiotics postoperatively. This patient was from Group B. Corneal edema (striate keratitis) was seen in 7 patients in Group A and 10 patients in Group B. Cells in the anterior chamber were seen in 5 cases in Group A and 7 cases in Group B. Flare was seen in 7 cases in Group A and 6 cases in Group B.

One case had membrane formation in the post-operative period, which was well managed by dilator anti-inflammatory and antibiotic coverage. Vitritis was seen in 2 cases in both the groups, which was controlled by steroids. In no case, endophthalmitis was seen in either group. Table 1 illustrates the post-operative visual acuity in the two groups. IOL was implanted successfully in all the cases. 8-10 cases were converted to SICS due to the extension of capsulorhexis. Better visual acuity was seen in group A due to younger age group pts. 5 cases in group A and 4 cases in group B converted to SICS are not included in BCVA.

DISCUSSION

Age-related cataract is a leading cause of reduced vision in both developed and developing countries (FRIEDMAN 2004, AND ESNIKOFF 2004). Surgery for cataract involves removal of opaque lens and replacement with IOL. To date, a number of techniques have been used for cataract surgery, however, phacoemulsification is most common method. Many surgeons have also used other methods such as intra and ECCE phaco section and sandwich and phaconit. Over the year, the techniques of cataract surgery have evolved into a safe and successful procedure for visual rehabilitation.

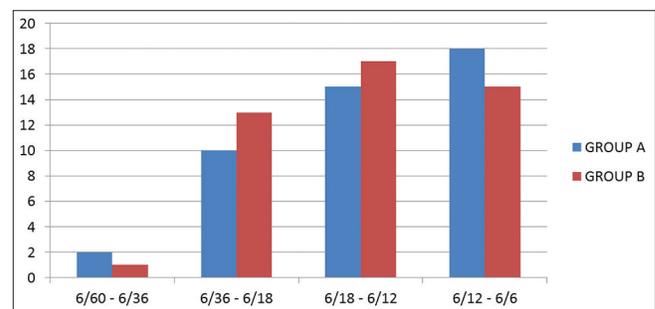


Figure 1: Best corrected visual acuity in two groups

Corneal Edema

Post-operative corneal edema can localize or diffuse. Post-operative edema in upper half of cornea near the main section indicates intraoperative trauma. Factors that predispose are mechanical endothelial trauma, prior endothelial disease or cell loss, excessive post-operative inflammation, and elevation of IOP (Reddy).

Aqueous Cells

Aqueous cells indicate disease activity and their number reflects disease severity. Grading of cells is performed with a 2 mm long and 1 mm wide slit beam with maximal light intensity and magnification. Improvement of inflammation is defined as either a two-step decrease in the level of activity or a decrease to inactive and worsening is defined as a two-step increase in a level of activity or an increase to a maximum grade.³ In our study, the improvement was seen in a week's period in 12 cases of edema.

Aqueous Flare

Aqueous flare reflects the presence of protein due to a breakdown of blood-aqueous barrier. Flare may be graded by laser interferometry using a flare meter or clinically by observing the degree of interference in the visualization of iris using the same settings as for cells. In our study, flare improved in 12 cases except in 1 case where membrane formation occurred³ which was improved in 15-day period.

Endophthalmitis

Endophthalmitis is a potentially vision-threatening complication of cataract surgery but may also occur following ocular procedure, trauma to the eye, metastatic systemic infection, and systemic inflammatory disorder.⁸⁻⁹ Typically, post-operative endophthalmitis is caused by the perioperative introduction of microorganism into the eye.¹⁰ The primary source of this intraocular infection considered to be bacteria from the patient ocular cornea, conjunctiva, lacrimal gland, blepharitis, and extraocular muscles.¹¹ However, contamination of sterilize instrument disposable supplies, prepared solution, the surgical field, or intraocular lens have been reported. Epidemic cluster of endophthalmitis has resulted from these types of external contamination.^{12,13}

With the advent of intracameral antibiotics and proper betadine painting of eye at least for 4-5 min, the rate of incidence of endophthalmitis has decline a lot. Most series report on an incidence rate ranging 5-4% in different studies worldwide.^{14,15}

In our study, none of the patients had endophthalmitis.

As number of patients were not large, so certain clinical signs and outcome cannot be generalized. Post cataract

surgery endophthalmitis is very uncommon but very serious complication of cataract surgery. There are several series on the epidemiological study of endophthalmitis from the India.

The rare nature of endophthalmitis makes randomized controlled trails difficult to conduct because of the very large sample sizes needed to make statistically valid comparisons. Thus, few trials have been conducted, and all that we are aware of are included here.

The antibiotic of choice has varied across studies of intracameral injections, with moxifloxacin, vancomycin, and cefuroxime all showing a reduction compared to no antibiotic injection (Table 3).¹⁶

CONCLUSION

Many studies have been done on phacoemulsification, but this study focuses on the role of antibiotics in pre- and post-operative period of phacoemulsification. There is no significant difference in BCVA and rate of complications in the two groups. Only limitation being the small size of the study group and short period of the study.

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