Original Article

Comparison of Visual Outcome after Phacoemulsification Versus Extracapsular Cataract Extraction

Chaudhry Nasir Ahmad,[1] **Ateeq Yousif,**[2] **Muhammad Zahid Siddique,**[3] **Hashir Amin Malik**[4]

Abstract

Objective: Cataract is one of the leading causes of blindness throughout the world especially the developing and the third world countries. Phacoemulsification is considered the treatment of choice for the management of cataract however extra-capsular cataract extraction is still one of the most performed surgeries for cataract extraction. The purpose of study was to evaluate and compare the surgical outcome of both the procedures.

Methods: This was comparative study done at institute of Ophthalmology Mayo Hospital Lahore. One hundred patients were selected and divided into two equal groups. Group I patients underwent phacoemulsification with intraocular implant while patients in group II were managed with extracapsular cataract extraction. Evaluation was done on 1st postoperative day, the 1st followup visit (after one week), 2nd follow up visit (after one month) and on third follow up visit (after 8 weeks). On each visit visual acuity was recorded on snellen chart, and amount of astigmatism by retinoscopy.

Results: There were total of one hundred patients with senile cataract divided into two equal groups, 64 were males and 36 were females. Group I were operated by phacoemulsification whereas the group II underwent extracapsular cataract extraction. Although phacoemulsification is superior to conventional cataract surgery regarding visual outcome and early rehabilitation, extracapsular cataract extraction is quite comparable to phacoemulsification and is a good alternative.

Conclusion: Extracapsular cataract extraction is a good alternative to Phacoemusification in areas of low socio-economical status especially in remote areas.

Key words: Phacoemusification, extracapsular cataract extraction, conventional cataract surgery, astigmatism.

Ahmad C.A.[1]
Assistant Professor Eye Unit III
Institute of Ophthalmology
King Edward Medical University, Lahore

Yousif A.[2]
Medical Officer, Eye Unit III
Institute of Ophthalmology
King Edward Medical University, Lahore

Siddique M.Z.[3]
Assistant Professor, Madina Teaching Hospital, Faisalabad

Malik H.A.[4]
Punjab Medical College, Faisalabad

Introduction

Age related cataract is a major cause of blindness in the whole world.[1] As people grow older, the protein fibers in the lens become denser, start to clump together, and form cloudy or opaque areas in the lens. The world Health Organization (WHO) estimates that there are 20 million people blinded by cataract and 80% of

these people live in the poor countries[1]. It is estimated that by 2020 there will be 50 million people blinded by cataract. Cataract surgery is a major health care expense although it is one of the most cost effective of all public health interventions in terms of restored quality of life.

Cataract operations are among the oldest recorded surgical procedures.[2] Couching was standard practice until the mid – eighteenth century. Intracapsular extraction gradually became the favored method of cataract removal even though it left the patient without a lens inside the eye. The first eye surgery performed with an operating microscope was done in Portland, Oregon, in 1948; in the same year, a British ophthalmologist named Harold Ridley implanted the first IOL in the eye of a cataract patient. Between 1948 and the 1980s, manual expression was the standard form of ECCE.[3]

Although phacoemulsification was first introduced in 1967, it was not widely accepted at first because it requires special techniques that take time for the surgeon to learn as well as expensive specialized equipment. Phacoemulsification, in which an ultrasound probe emulsifies the cataractous lens through a 3 mm incision, has become popular in the past decade as the method of choice for cataract surgery, superseding conventional extracapsular cataract extraction (ECCE), which involves removing the lens nucleus through a 7 – 9 mm incision. It is now the technique of choice in the western world[4] and in many centers in developing countries. phacoemulsification is now performed more often in the United States and Europe than "standard" ECCE. The manual expression technique, however, is still widely used in developing countries with large numbers of patients with eye disorders and limited hospital budgets[5]. So the purpose of our study was to compare the visual outcome after phacoemusification and extracapsular cataract extraction.

Objective

To compare visual outcome after phacoemulsification versus extracapsular cataract extraction.

Methods

– 100 patients including 64 males and 36 females presenting in institute of ophthalmology Mayo Hospital, Lahore with Senile Cataract were included in the study. They were randomly divided into two study groups. 50 patients (Group 1) underwent phacoemulsification with posterior chamber intraocular lens, and the other 50 patients (Group 2) underwent extracapsular cataract extraction with posterior chamber intraocular lens. All the surgeries were performed by the same surgeon. All the patients were subjected to pre-op and post-op Visual acuity, IOP, slit lamp and fundus examination. Visual acuity was ta as taken as main determinant of visual outcome.
– In Group 1, after aseptic measures and draping, a stab incision 3.2 mm given at 12 o'clock on the limbus and 2 side ports made at 3 o'clock and 9 o'clock. Visco-elastic substance injected in the anterior chamber. Capsulorrhexis and hydrodissection done. Phaco probe inserted in the anterior chamber and cataract extracted with divide and conquer technique. After removing the cortical matter, the wound extended with 5.5 mm phaco knife. The intraocular lens placed in the bag, viscoelastic substance removed and anterior chamber formed with balance salt solution. Hydration of the wound done and coutella applied.
– In Group 2, after aseptic measures and draping, a limbal incision given from 2 o'clock till 10 o'clock. Anterior chamber formed with viscoelastic substance, capsulotomy done and cataract extracted. After irrigation and aspiration with simco cannula intraocular lens placed in the bag and wound closed with interrupted 10 – 0 monofilament suture. Sterilized eye pad applied after removal of viscoelastic substance and formation of anterior chamber with balanced salt solution.
– Patients were examined on first post-operative day, on first follow up visit at 1st week, on 2nd follow up visit at 4th week, removal of stitches in patients of Group 2 at 6th week and final visit at 8th post-operative week. Visual acuity taken along with refraction done for amount of astigmatism.

Inclusion Criteria

– Patients in age range 40-60 years.
– Unilateral / bilateral senile cataract.
– Immature / mature cataract.
– Patients willing for follow-up.

Exclusion Criteria

– Patients with corneal opacity.
– Complicated cataract.
– Lens induced glaucoma.

Results

Table 1: Baseline characteristics.

	Group –I	Group – II
Average age	58.52 year	57.12 years
Gender (male)	72%	56%
Female	28%	44%

Table 2: Preoperative visual acuity.

Vision	Group – I	Group – II
HM +	8 (16%)	10 (20%)
CF	7 (14%)	12 (24%)
6/60 – 6/36	20 (40%)	17 (34%)
6/24 – 6/18	10 (20%)	7 (14%)
6/12 – 6/6	5 (10%)	4 (8%)

Table 3: Postoperative uncorrected visual acuity on 1 post-operative day.

Vision	Group –I	Group – II
6/6 – 6/18 (Good)	29 (58%)	17 (34%)
6/24 – 6/60 (borderline)	18 (36%)	29 (58%)
< 6/60 (Poor)	3 (6%)	4 (8%)

Table 4: Postoperative uncorrected visual acuity on 1st follow-up visit (1 week after surgery).

Vision	Group –I	Group-II
6/6 – 6/18 (Good)	35 (70%)	22 (44%)
6/24 – 6/60 (borderline)	13 (26%)	24 (48%)
< 6/60 (Poor)	2 (4%)	4 (8%)

Table 5: Postoperative uncorrected visual acuity at 2nd visit (5th week).

Vision	Group –I	Group – II
6/6 – 6/18 (Good)	41 (82%)	31 (62%)
6/24 – 6/60 (borderline)	9 (18%)	17 (34%)
< 6/60 (Poor)	0 (0%)	2 (4%)

Table 6: Postoperative corrected visual acuity on at 8th week follow up (After removal of stitches in Group 2 patients).

Vision	Group –I	Group – II
6/6 – 6/18 (Good)	49 (98%)	42 (84%)
6/24 – 6/60 (borderline)	1 (2%)	8 (16%)
< 6/60 (Poor)	–	–

Table 7: Astigmatism after surgery post-operative day 1.

Astigmatism (Diopters)	Group – I	Group – II
0 – 0.50	3 (06%)	1 (2%)
0.75 – 1.50	31 (62%)	9 (18%)
1.75 – 2.25	16 (32%)	13 (26%)
2.50 – 4.00	–	21 (42%)
> 4.25	–	6 (12%)

Table 8: Astigmatism after surgery at 8th week post-op.

Astigmatism (Diopters)	Group – I	Group – II
0 – 0.50	11 (22%)	4 (8%)
0.75 – 1.50	37 (78%)	24 (48%)
1.75 – 2.25	2 (4%)	19 (38%)
2.50 – 4.00	–	3 (6%)
> 4.25	–	–

Results

Out of 50 patients undergoing phacoemulsification (Group 1) with posterior chamber intraocular lens, 35 patients, on 1st follow up visit, had VA in the range of 6/6 and 6/18 (58%) while 13 patients (26%) had VA in range of 6/24 and 6/60. On second follow up visit 41 patients (82%) had VA 6/18 or better while only 9 patients (18%) had VA in range of 6/24 and 6/60. At 3rd post operative visit, 49 patients (98%) had VA better than 6/18 or better after correction and only I patient (2%) had VA worse than 6/18.

In Group 2, 22 patients (44%) had VA of 6/18 or better while 24 patients (48%) had VA in range of 6/24 and 6/60. The VA improved in patients and on 2nd Follow up visit 31 patients (62%) had VA of 6/18 or better while 17 patients (34%) had VA between 6/24

and 6/60. Only 2 patients (4%) had visual acuity worse than 6/60. The patients had removal of stitches after a month and on their 3rd post operative visit, 42 patients (84%) had VA better than 6/18 and only 8 patients (16%) had VA in range of 6/24 and 6/60.

Discussion

Cataract is the leading cause of blindness in Pakistan contributing to 66.76% of the total 1.78% blindness. All the four provinces show almost similar percentage of blindness due to cataract i.e. 70% in Punjab, 73.60% in Sindh, 57.10% in Baluchistan and 70% in NWFP.

Visual rehabilitation after cataract surgery has progressed through the eras of couching, intra capsular cataract extraction (ICCE), extra-capsular cataract extraction and extra-capsular cataract extraction with intraocular lens. Increased dependence on technology during and after the surgical procedures adds to the complexities. Even after the implantation of an accurately calculated IOL implant some patients are still not satisfied because of surgically induced astigmatism (SIA).[6] With advent of phaco technique, which allows the removal of the cataractous lens through a 3.2 mm self sealing incision the cataract surgery has achieved a level it deserves and would help to establish and maintain the elusive goal of excellence[4] in the rehabilitation of cataract patients. Phacoemulsification has been established as a safe, atraumatic and widely accepted method in the developed countries. The hospital stay has been reduced from 2 to 3 days to a few hours. Of course, the precautions and limitations have not disappeared, but they are certainly less restrictive than they were a decade ago with each successive day, we are introduced to development aimed at better, less limiting results for the cataract patients. Astigmatism neutrality and rapid stabilization of wound are major goals of phacoemulsification surgery.[4]

ME Arriaga and J Lozano in a comparative retrospective study concluded that both techniques, phacoemulsification and conventional cataract extraction showed similar visual outcomes at 8th week after surgery.[7] Minimal residual astigmatism was observed in 84% of cases treated with phaco-emulsification, meanwhile in ECCE technique, 36% showed a higher astigmatism. Phacoemulsification is believed to reduce surgically induced astigmatism[9] and enables stable refraction, visual rehabilitation and daily activities.

Naseer Raja and Muhammad Khizar Niazi in a comparative study on 232 patients concluded that phacoemulsification, though appealing with its fast visual recovery, is clinically superior to extra-capsular surgery only in the initial four to six months[5]. Extra-capsular surgery if performed by expertise has equally good results and has fewer complications as compared with phacoemulsification.[8]

Suzann Pershing and Abha Kumar also showed that Manual extracapsular cataract extraction (especially small-incision versions) occupies an important place in modern cataract surgery, and, while not a replacement for phacoemulsification in Western countries, should be part of a cataract surgeon's overall skill set.

In this study both groups achieved equally good postoperative visual outcome (98% in group I versus 84% in group II) with best possible correction at 8 weeks. However, there was a difference in uncorrected visual acuity.[8]

The average astigmatism for extra-capsular cataract surgery was 2.5 D cylinder and 1.0 D for phacoemulsification in the medical research council trial in the United Kingdom. This correlates with the results of this study.

Conclusion

Although the phacoemulsification technique gives better uncorrected visual acuity in a slightly larger proportion of patients till the 8th week, extra-capsular cataract extraction is comparable and nearly as effective, particularly after 8 weeks of surgery. Also it does not need the capital investment and recurring expenditure of a phaco-emulsification, so is a good alternative in remote rural areas of Pakistan where cataract population is high but near to the poverty line. This is the way we can provide our people quality vision care, facility at affordable price and at their door steps.

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