

AN ADVANCED CATARACT SURGERY BY PHACOEMULSIFICATION: AN INITIAL EXPERIENCE

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ABSTRACT

Phacoemulsification surgery is rapidly emerging as accepted latest surgical technique for the management of cataract. Retrospective analysis of first fifty cases of phacoemulsification surgery performed in our setup were critically evaluated to assess efficacy and adaptability of this procedure in Armed Forces setup. Results of initial twenty five cases were compared qualitatively with subsequent cases. Equipment settings, operative constraints, post-operative complications, effects on induced astigmatism, visual outcome and patient's rehabilitation were critically evaluated. Corneal striate, iris chaffing, posterior capsular rent were noted initial problems. Induced astigmatism was ranging between 0.5 to 1.0 Dioptre with early decay and complete stabilisation within four weeks. In spite of excellent visual outcome, complex technique, steep and long learning curve restricts its application to institutional setup.

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KEYWORDS : Initial experience; Learning curve and how to overcome; Phacoemulsification surgery.

Introduction

During last decade, surgical techniques for cataract have undergone phenomenal revolution resulting ultimate-goal to produce an arthiphakic eye with near normal anatomical and high optical efficiency is just within the reach [1,2].

Phacoemulsification involves ultrasonic fragmentation and aspiration of a cataractous lens through a self sealing small corneal or corneoscleral valve incision followed by intercapsular intra-ocular lens implantation [1-3]. However highly complex surgical technique with long steep learning curve restricted its wide application in common practice [1-5].

In this study, an attempt has been made to evaluate the efficacy and adaptability of phacoemulsification technique in Armed Forces setup. The emphasis was made on intra & post operative complications & final outcome. Factors influencing learning curve were also studied to formulate suggested directives for conversion from conventional ECCE to phacoemulsification technique.

Material and Methods

The study enrolled fifty cases of pre-senile or senile cataract of grade one to three, of forty five years to sixty five years of age and irrespective of sex. All the cases had undergone detailed ocular examination prior to phacoemulsification surgery. Evaluation of hardness of the nucleus was based on slitlamp examination and the

colour [1, 2]. The grading was done as follows:

Grade One	- White coloured	- soft nucleus
Grade Two	- Yellowish white	- semi soft nucleus.
Grade Three	- Yellowish green	- moderately hard nucleus.
Grade Four	- Amber	- hard nucleus
Grade Five	- Brown to Black	- very hard nucleus.

The power of Intra ocular lens (IOL) was calculated by standard methods using SRK-I and II formula. Patients with inadequate pupillary dilatation of less than 5 mm, evidence of associated ocular involvements like glaucoma and iridocyclitis or systemic diseases like hypertension or diabetes-mellitus were excluded from the study. Results of first twenty five cases were compared with subsequent cases to assess learning curve.

Surgical technique

A self sealing corneo-scleral tunnel incision of 5 mm width and 3 mm length, commencing 1.5mm from the limbus was made [3,6]. Continuous curvilinear capsulorhexis of 4 to 5 mm was fashioned [7]. Hydrodissection and hydrodelineation [1,2,7,8] was made to separate the nucleus from the cortex. Nuclear sculpting and quadrant fragmentation was done with the help of phacoprobe (1.2) followed by irrigation and aspiration of residual cortical matter. Inter capsular rigid IOL was the choice IOL. Wound was made secure with 10'0' horizontal where ever required.

Observation

Out of fifty patients included in this study, 30 cases were female and remaining 20 were male of 42 to 65 years of age. Phacopower used and effective time was proportionate to the nucleus hardness and resulted significant reduction in phacoemulsification time in successive cases (Table 1).

Noted pre-operative constraints were iris catching by phacotip in six cases (12%), iris chaffing in five (10%), inadvertent

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TABLE 1

Co-relation of effective phacotime (average) and nuclear grading at different phases of learning period

Nucleus grading	No of cases	% of cases	Phase I (first 25 cases)		Phase II (26-50 cases)	
			Duration	No.	Duration	No.
Grade I	10	20%	2 min 30 sec	6	1 min 40 sec	4
Grade II	25	50%	3 min	15	2 min 30 sec	10
Grade III	15	30%	3 min 30 sec	4	2 min 30 sec	11

posterior capsular rent in eight (16%) cases. Other significant complications were partial zonular dialysis in two and dropping of small lens fragments in three cases. Posterior chamber IOL implantation had to be abandoned in two cases due to large posterior capsular rent of more than 4 mm of size. Anterior chamber IOL implantations was performed in these two cases after anterior vitrectomy and pupillary constriction. However overall complications were considerably less during later phase of the study as shown in Table 2.

TABLE 2

Comparative evaluation of incidence of intra operative complications and different phase of learning curve of phacoemulsification surgery

Intra operative complications	Phase I (1-25 cases)		Phase II (26-50 cases)	
	No. of cases	%(Total cases)	No. of cases	%(Total cases)
Iris catching	5	10%	1	2%
Iris chaffing	4	8%	1	2%
Inadvertent posterior capsular rent	5	10%	3	6%
Partial zonular dialysis	2	4%	Nil	—
Small lens fragment drop	2	4%	1	2%

The significant post-operative complications were persistent and moderate corneal striate for seven to ten days in six (12%) cases. Macular oedema was seen in four cases with decline in second phase of study (Table 3).

TABLE 3

Comparative evaluation of incidence of post-operative complications and different phase of learning curve of phacoemulsification surgery

Post-operative complications	Phase I (1-25 cases)		Phase II (26-50 cases)	
	No. of cases	%(Total cases)	No. of cases	%(Total cases)
Moderate corneal striate	5	10%	1	2%
Macular oedema	3	6%	1	2%
Early posterior capsular opacification (PCO)	6	12%	2	4%

Ninety two percent cases achieved 6/9 or better visual acuity whereas remaining had 6/12 visual acuity. None of the patients in

this study were observed to have gross irreversible or permanent structural or functional damage in the operated eye.

Discussion

Phacoemulsification has definitive superiority in terms of visual acuity and early rehabilitation over conventional Extracapsular lens extraction surgery (ECCE) which required 9 to 10 mm long corneo-scleral incision secured with multiple sutures [1-5]. Such incision is prone to have several problems like wound gaping and considerable post-operative altered configuration of anterior segment of eye, leading to significant and unstable astigmatism upto period of one year or more [2-6]. In contrast, sclero-corneal valve incision had produced very minimal induced astigmatism of 0.5 to 1.0 dioptre with quick decay and stabilization upto 95% within the period of 5 to 6 weeks. There were no significant variation in astigmatic pattern at any stage of study with or without application of single horizontal suture, as mentioned in other studies also [4-6]. Scleral tunnel along with corneal-valve incision offers the most secure and stable incision ever designed before [2,5]. Ideal tunnel is of 2.5-3.5 mm of width, however a well constructed 5 mm tunnel is equally effective and obviates the problems of large incision. We did not notice any incision related complication in our series and observed excellent valve construction with adequate maintenance of anterior chamber at every stage of surgery as well as during post-operative period. Our observations were commensurate with other studies also and remained key point of success.

Good, curvilinear capsulorrhexis along with hydro procedures facilitated intralenticular phaco emulsification under stable capsular bag, thus minimizing risk of nucleus fragment related complications like corneal endothelium damage, posterior capsular tear and vitreous prolapse as evident in other studies also [1,2,7,8]. Less than 4 min of phaco time is being considered as safe zone in any circumstances or nuclear hardness [2]. We could reduce phaco energy and time by combination of low phaco power with high-suction along with phaco fragmentation technique like chopping as evident from Table 1. This had further minimised risk of inadvertent complications by frequent changes in the position of phacoprobe [5,11,12]. Our observations commensurate with the findings of other workers [5,10,11].

Inspite of meticulous attention, relatively higher incidence of intra operative or post-operative complications are expected to occur during the learning period and one might be forced to convert Phacoemulsification procedure into conventional ECCE surgery so as

to avoid sight threatening complications [1,2,5]. In our study incidence of such complications was less than 10% in first twenty five cases with further reduction upto 2% except 6% of small posterior capsular rent seen in subsequent twenty five cases. This incidence was significantly low as compared to other studies [1,2,5]. Phacoemulsification is an intralenticular procedure based on high tech machine, need highest degree of skill and dexterity from the surgeon leading to ultimate excellent outcome. However conversion to phacoemulsification has to be slow, stepwise and under the able supervision of a skilled phacosurgeon.

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