A comparative study between small incision suturless non-phaco cataract extraction and conventional phacoemulsification in old age

Thesis
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List of Figures

List of Tables

List of Graphs

List of Abbreviations

AC	**Anterior chamber**
ACM	**Anterior chamber maintainer**
ATR	**Against the role**
AFR	**Aspiration flow rate**
BCVA	**Best corrected visual acuity**
BSS	**Balanced salt solution**
CCI	**Clear lens incision**
CCC	**Continous curvilinear capsulorrhexis**
CS	**Corneal sensitivity**
D	**Diopter**
ECCE	**Extracapsular cataract extraction**
G	**Gauge**
I/A	**Irrigation/aspiration**
IOL	**Intraocular lens**
MHz	**Mega hertz**
mm	**Millimeter**
ms	**Millisecond**
MSICS	**Manual small incision cataract surgery**
MVR	**Microvitroretinal blade**
OVD	**Ophthalmic viscoelastics device**
PCO	**Posterior capsular opacification**
PMMA	**Polymethyl metaacrylate**
pps	**Pulses per second**
SAI	**Surface asymmetry index**
SD	**Standard deviation**
Sec	**Second**
SIA	**Surgically induced astigmatism**
SICS	**Small incision cataract surgery**
SRI	**Surface regularity index**
UCVA	**Uncorrected visual acuity**
US	**Ultrasound**
WTR	**With the rule**

Table of Contents

INTRODUCTION

Various surgical techniques have been used in management of cataract which includes: intracapsular cataract extraction (ICCE), extracapsular cataract extraction (ECCE) and ultrasonic phacoemulsification **(Shepherd, 1997).**

Before the evolution of ultrasonic phacoemulsification extracapsular cataract extraction (ECCE) was the favorable procedure with relatively higher incidence of intraocular infections, slower rate of visual recovery and undesirable higher values of postoperative astigmatism due to the relatively large number of stitches taken **(Meisler et al., 1992).**

With the evolution of ultrasonic phacoemulsification cataract extraction became easier and more efficient, with rapid visual recovery, dramatically lower values of postoperative astigmatism and lower incidence of intraoperative and postoperative complications in general when compared with the conventional extracapsular cataract extraction done before **(Shepherd, 1997).**

However, there are also many disadvantages of ultrasonic phaco-emulsification including being a relatively difficult technique with a long learning curve, expensive, high maintenance equipment and disposables required, the non availability of foldable IOLs specially in developing countries, wasting the 3 mm incision which is then enlarged to 6 mm, in addition to the harmful effect of the ultrasound waves on the sensitive corneal endothelium especially in old age and hard cataracts in which the ultrasonic phacoemulsification is not preferred **(Ruit et al., 2000).**

The costs of ultrasonic phacoemulsification in general make one of the most vital and challenging disadvantages of the procedure as regard poor and developing communities in particular **(Gogate et al., 2003).**

During the early 1980s, when a self-sealing tunnel incision was introduced in the USA in an attempt to provide better healing with less surgically induced astigmatism it became the favored incision technique with various instruments and techniques developed to extract the whole nucleus or cut it into parts, for easy extraction through a smaller self-sealing sclero-corneal tunnel **(Keener, 1991).**

In 1990 this technique is revitalized in developing countries especially India and the sutureless incision was developed utilizing a longer scleral tunnel with linear grooves in the floor of the tunnel in the meridian of the incision. This incision could be stretched to admit the nucleus as well as the implanted IOL and remain unsutured. The corneal entry was described as a one-way valve or corneal lip incision, which enabled the incision to self-seal **(Keener, 1991)**.

Various names have been given to the new technique where the whole nucleus, or the nucleus divided in parts, is removed through a self-sealing tunnel requiring no sutures, e.g.; Small Incision Cataract Surgery (SICS), Manual Small Incision Cataract Surgery (MSICS), Manual Phaco, and Sutureless extracapsular cataract extraction with posterior chamber IOL (ECCE/PC IOL) **(Dada et al., 1998).**

Aim of work

Is to compare between the postoperative outcomes of cataract extraction performed by conventional ultrasonic phacoemulsification and Sutureless extracapsular cataract extraction in old ages with hard, dense nuclear cataracts in which the ultrasonic phacoemulsification is not preferred, being a much easier, safer and less expensive technique, as regard : postoperative visual acuity, duration of visual recovery, wound healing, postoperative surgically induced astigmatism and effect on the cornea.

Subjects and methods

The subjects of the study will be divided into tow groups:

Group A: ***50*** eyes who will undergo cataract extraction using conventional ultrasonic phacoemulsification.
Group B: ***50*** eyes who will undergo cataract extraction using the small incision sutureless- non phaco technique.

Inclusion criteria:

The study will include subjects above the age of 60 years old with dense nuclear cataract (Grade II,III and cataracta nigra) who agree to have surgery and willing to complete the schedule of postoperative follow up included in the study.

Exclusion criteria:

Patients below age of 60 years old and those with congenital or complicated cataract, patients with nuclear sclerosis, faint nuclear(Grade I) or pure posterior subcapsular opacification, glaucomatous patients, patients with any macular or optic nerve disease, patients with corneal dystrophies or any other severe corneal abnormalities affecting the central 6 mm of the cornea, history of chronic ocular inflammations, history of prior ocular surgeries,

frequent users of any eye drops other than preservative free artificial tears, patients with chronic irritative conditions as trichiasis and entropion, distorted or abnormally dilated pupil, patients who develop postoperative posterior capsular opacification affecting their VA unless treated by YAG laser capsulotomy are all excluded.

Preoperative examination will include:

Objective refraction, evaluation of best corrected visual acuity (BCVA), extraocular examination, full slit lamp examination of the anterior segment, measurement of intraocular pressure (IOP), fundus examination corneal keratometry and pachymetry will be done.

Intraoperative clinical data will include:

The procedure performed in cataract extraction, specifications of the IOL used and intraoperative complications.

Postoperative evaluation will include:

Early and late postoperative complications, objective refraction, UCVA and BCVA, extraocular examination, full slit lamp examination of the anterior segment, measurement of intraocular pressure (IOP), fundus examination, corneal keratometry and pachymetry and follow up of wound healing. Evaluation will be held on 1^{st} day, 1 week, 1 month and 3 months postoperative.

All cases in the study will be performed under the effect of local anesthesia and the 3.2mm incision phacoemulsification in group A will be followed by Irrigation and aspiration (I/A) of the cortex then a foldable IOL implantation in the capsular bag, while the 6.5mm corneo-scleral incision in group B will be followed by delivery of the nucleus in the anterior chamber followed by its extraction using an irrigating vectis and sinski, this is followed by I/A of lens cortex and IOL implantation in the capsular bag.

The data will be collected and analyzed statistically and all cases will be done at Ain shams university hospitals.

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INTRODUCTION

Various surgical techniques have been used in management of cataract which is still considered the leading cause of reversible blindness worldwide that include: intracapsular cataract extraction (ICCE), extracapsular cataract extraction (ECCE) and ultrasonic phaco-emulsification **(Shepherd, 1997).**

Before the evolution of ultrasonic phacoemulsification extracapsular cataract extraction (ECCE) with intraocular lens implantation was the favorable procedure ,to which the shift from intracapsular cataract extraction technique has produced a dramatic improvement in postoperative visual outcomes, with relatively higher incidence of intraocular infections, slower rate of visual recovery and undesirable higher values of postoperative astigmatism due to the relatively large number of stitches taken compared with phacoemulsification **(Meisler et al., 1992).**

With the evolution of ultrasonic phacoemulsification cataract extraction became easier and more efficient, with rapid visual recovery, dramatically lower values of postoperative astigmatism and lower incidence of intraoperative and postoperative complications in general when compared with the conventional extracapsular cataract extraction done before **(Shepherd, 1997).**

However, there are also many disadvantages of ultrasonic phacoemulsification including being a relatively difficult technique with a long learning curve, expensive, high maintenance equipment and disposables required, the non availability of foldable IOLs specially in developing countries and poor populations, wasting the 3 mm incision which is then enlarged to 6 mm if phacoemulsification is done , in addition to the harmful effect of the ultrasound waves on the