An overview of complications of MSICS

N. Lakshmi Chowdary1,*, B. Pradhan2

1Professor and Head, 2Post Graduate Dept. of Ophthalmology, NRI Medical College & General Hospital, Guntur, Andhra Pradesh, India

*Corresponding Author: N. Lakshmi Chowdary
Email: laxmiye@gmail.com

Abstract
Introduction: Taking into consideration the wide spectrum of complications that follow MSICS and their influence on visual outcome, a sincere effort has been made in this study to critically analyze the incidence and the nature of various intraoperative, early and late post-operative complications among the total number of cataract extraction carried out.

Materials and Methods: A Prospective observational study of 500 cases that had undergone MSICS after a thorough preoperative ocular evaluation including detailed history and clinical examination and these cases were studied for a period of 2 years and all the intraoperative, early and late post-operative complications were noted.

Results: The commonest intraoperative complications were premature entry with iris prolapse (5%) followed by zonular dialysis (3%), commonest early post operative complications were SK (20%) and corneal edema (17%) and the commonest late post operative complications were PCO(18%) followed by astigmatism in 9% of the cases.

Conclusion: SICS gives best corrected postoperative visual acuity of 6/6 or 6/9 in a greater proportion of patients and it has all the inherent advantages of the sutureless cataract surgery in terms of universal applicability, greater wound stability, lesser complications and early visual rehabilitation.

Keywords: Cataract surgery, Complications of MSICS, MSICS, Phacoemulsification.

Introduction

The commonest cause of blindness in the world is due to cataract and its incidence is about 55% of all causes of blindness in India.1 An estimated 4 million people become blind because of cataract every year,2 which is added to a backlog of 10 million operable cataracts in India, whereas only 5 million cataract surgeries are performed annually in the country.3 Thus, a technique of cataract surgery that is not only safe and effective but also economical and easy for the majority of ophthalmologists to master is the need of the hour. The quality of vision and the patients comfort and acceptance of correction of the surgically induced hypermetropia by way of aphakic spectacles or contact lenses is not optimum. Ridelley’s work has paved the research and development of intraocular lens implantation. The classical extra capsular technique employs a large incision into the eye that requires several sutures and the visual rehabilitation is delayed to about 6 weeks. Advances in cataract surgery have been possible due to better visualization with the help of operating microscopes. These have been three fold, lens removal technique, incision and IOL design, each being interdependent.4,5 Though phacoemulsification provides rapid visual rehabilitation, its application to the community need is limited by cost, long learning curve, dependence on machine and trained personnel. In the view of community need, Manual Small Incision Cataract Surgery (MSICS) was developed which offers several advantages including better safety and earlier visual rehabilitation. MSICS to be more effective,6 and economical7 than ECCE and almost as effective as6 and more economical than phacoemulsification. We feel that a study and careful analysis of the results is essential for our population, in view of prevailing illiteracy, ignorance, low socioeconomic status. With this view we have taken a study of the complications in MSICS.

Materials and Methods

This prospective study was taken up after taking the approval of institutional ethics committee. 500 eyes of 500 patients who met the below criteria were included in the study.

Inclusion Criteria
1. Patient admitted in opthalmology ward undergoing Cataract Surgery [SICS]
2. Patients who are diagnosed with Senile Cataract

Exclusion Criteria
1. Paediatric cataracts
2. Traumatic cataracts
3. Complicated cataracts

Pre-Operative Examination and Investigations:

Visual acuity of 6/60 was found in 70% cases, most of it were the cases of IMSC and nuclear cataract. All patients fulfilling the inclusion criteria were subjected to thorough ocular examination which includes detailed history and clinical examination.

1. Complete ocular examination was done which included visual acuity, unaided and best corrected, complete and detailed slit lamp examination, fundus examination, B scan when needed, IOP measurement, NLD patency, Keratometry, A-Scan biometry, xylocaine sensitivity test and IOL power calculation.
2. Investigations were done which included: Blood pressure, blood sugar level & urine examination.
All patients were subjected to detailed general and physical examination and preoperative fitness was
taken from physician whenever needed.
3. Preop Preparation: The patients were explained
about the surgery advantages and disadvantages
of posterior chamber intra ocular lens implantation
(Health Counseling) and written consent was
obtained from all cases. The day before surgery
each patient was instructed to have scrub bath
including face and hair and the following drugs
were given
a. Topical antibiotic eye drops Q.I.D for 3 days
before surgery.

b. Anxiolytic drugs like Tab. Diazepam 5 mg at bed
time. IOP lowering drugs like Tab. Diamox 250mg
1 tab at bed time.

On the day of surgery, morning the patients were
following drugs.
1. Tab. Ciprofloxacin 500 mg (1 stat)
2. Tab. Diamox 250 mg (1 stat)
3. Adequate mydriasis was obtained with 10%
phenylephrine, 1% Tropicamidine eye drops and
NSAID eye drops / every 15 minutes 4-5 times
before surgery.

Surgical Technique: All the surgeries were performed
by different surgeons and the incision was superior in
all the cases. All the observations were noted. Post-
operatively eyes were patched after giving
subconjunctival injection of gentamycin and
dexamethasone. All the study participants were
observed for the occurrence of any intraoperative
complications while undergoing Small Incision
Cataract Surgery with their subsequent management

Post-operative Treatment: The first post-operative
dressing was done on the day following surgery and eye
is inspected for any post-operative complication under
slit lamp biomicroscopy. Naked eye vision and vision
with pin hole recorded. Fundus was examined with
direct ophthalmoscopy. All Patients were put on routine
regime of a. Steroid antibiotic drops / 1 drop / 6times
/day, b. Cycloplegic drops (1% Cyclopentolate) / 1drop
/2 Times a day, c. Tab. Ciprofloxacin 500mg bd for 5
days, d. Tab. Combiﬂam 500mg Bid for 3 days e. Tab.
Rantac 150 mg bd for 5 days. Whenever there is post-
operative corneal edema and striate keratopathy, the
patients were given hourly topical steroids, 0.50%
timolol maleate eye drops twice daily and
acetazolamide 250 mg bd for 2 days. Whenever there is
post-operative Uveitis the patients were given
subconjunctival dexamethasone injection, topical
steroids, systemic steroids and NSAID eye drops and
cycloplegic-mydriatic eye drops. Discharge: Patients
without post-operative complications were discharged
on 2nd post-operative day. Patients with post-operative
complications were discharged after treating the
complications. On the day of discharge visual acuity
with pin hole and naked eye vision recorded. Slit lamp
biomicroscopy of anterior segment & fundus
examination with direct ophthalmoscopy was done.
Post-operative Follow up: The patients were instructed
to attend the hospital on OP days as follows:
First follow up visit: After 1 Week
Second follow up visit: After 3 Weeks
Third follow up visit: After 6 Weeks and after that
every three months

In every visit the following tests were routinely done:
Visual acuity, slit lamp biomicroscopy, fundus
examination & retinoscopy was done 4 weeks after
surgery. Patients with high astigmatism, tight suture
was removed. Intra Ocular pressure recording done
after 6 weeks and after 3 months in cases with corneal
edema due to raised IOP. After 6 weeks retinoscopy
was done for all cases and necessary correcting glasses
were prescribed.

Results
The commonest type of cataract seen was
immature senile cortical cataract seen in 44% of cases
followed by nuclear cataract in 41% of cases. This is
again in conformity with incidence of senile cataract,
the percentage of which raises with age (Table 1).

| Table 1: Types of cataract, age & sex distribution |
| Age | IMSC | MSC | NC | Total |
|------|------|-----|-----|-------|
|      | Males | Females | Males | Females | Males | Females | Males | Females |       |
| 45-54 | 10   | 40  | 0   | 0   | 25   | 20  | 95   |
| 55-64 | 20   | 60  | 10  | 5   | 30   | 35  | 160  |
| >64   | 55   | 35  | 40  | 20  | 40   | 55  | 245  |
| Total | 85   | 135 | 50  | 25  | 95   | 110 | 500  |

The preoperative VA was appreciation of Hand
movements (HM) or less in 20% cases, most of it were
mature cataracts. The visual acuity ranging from
counting fingers to greater than 6/60 in 50 patients
before surgery.

Premature entry with iris prolapse was the most
common complication seen in 5% of cases, followed by

Zonular dialysis in 3% of cases. PCR, DM tear, Button
holing each of which was seen in 2% of cases. Superior
and inferior dialysis each in 1% of cases (Table 2)
Table 2: Incidence of intra operative complications

| Intra op complications | No. of cases | %  |
|------------------------|--------------|----|
| DM tear                | 10           | 2  |
| PCR                    | 10           | 2  |
| Button hole            | 10           | 2  |
| Premature entry        | 25           | 5  |
| Iris prolapse          | 25           | 5  |
| Zonular dialysis       | 15           | 3  |
| Superior Iridodialysis | 5            | 1  |
| Inferior Iridodialysis | 5            | 1  |

SK was the most common early post-operative complication seen in 20% of cases, corneal edema in 17% of cases, Iritis in 9% of cases, Iris prolapse, retained lensmatter, hyphema, decentered IOL each of which in 2% of the cases (Table 3).

Table 3: Incidence of early post-operative complications

| Early postop complications | No. of persons | %  |
|----------------------------|----------------|----|
| Striate ketopathy          | 100            | 20 |
| Corneal edema              | 85             | 17 |
| Iritis                     | 45             | 9  |
| Iris prolapse              | 10             | 2  |
| Retained cortical matter   | 10             | 2  |
| Hyphema                    | 10             | 2  |
| Decentred IOL              | 10             | 2  |

Fig. 1

PCO was the most common delayed post-operative complication seen in 18% of cases, astigmatism in 9% of cases, pupillary capture in 2% of the cases and corneal decompensation in 1% of the cases (Table 4).

Table 4: Incidence of delayed post-operative complications

| Delayed postop complications | No. of persons | %  |
|------------------------------|----------------|----|
| Posterior capsular opacity   | 90             | 18 |
| Astigmatism                  | 45             | 9  |
| Pupillary capture            | 10             | 2  |
| corneal decompensation       | 5              | 1  |

Incidence of delayed postop complications

Post-operative visual outcome was borderline in 23% cases and good in 77% cases (Table 5).

Table 5: Post-operative visual outcome

| Postop visual outcome | No. of cases | %  |
|-----------------------|--------------|----|
| Boarder line          | 115          | 23 |
| Good                  | 385          | 77 |
| Poor                  | 0            | 0  |
| Total                 | 500          | 100|

Discussion

Incidence of intraoperative complications in our study was 14% when compared to that of Mrunal Sureshpatil et al., in which 8.8% cases had intraop complications.

Post-operative complications were seen in 24% of the cases when compared to Shamma Iqbal et al., in which 11% cases had post operative complications. PCR was seen in 2% of cases in our study (1MC and 1 NC), Mrunal Sureshpatil et al., found it in 2.4% of cases, Gogate et al., in 5.2% of the cases and Khanna RC et al., in 6.9% of the cases. Posterior capsule rupture most commonly occurred during irrigation aspiration & due to extension of capsulorrhexis. As soon as the complication was noted, bridle sutures released, aspiration reduced & anterior chamber was filled with viscoelastic material. In 10 cases which had vitreous loss, so open sky vitrectomy was performed & PCIOL was implanted in ciliary sulcus in 5 cases. In the other cases IOL was placed in AC.

Premature entry was seen in 5% (10 MC’s,10 IMSC, 5 NC) of the cases in our study, Mrunal Sureshpatil et al., found it 1.2% of the cases, Yasir Iqbal et al., in 3% of the cases and Schroeder et al., in 1.5% of the cases.

Superior iridodialysis was seen in 1% of the cases in our study whereas MrunalSureshpatil et al. noticed it in 0.4% of the cases and Gogate et al., in 0.5% of the cases and Zamanmir et al., in 1.6% of the cases.

In our study it was due to premature entry and inferior iridodialysis has also occurred in our study (1%) which was during nucleus delivery with wire vectis. In both the cases it was small and no treatment was required. Improper construction of the scleral...
tunnel can lead to either button holing, if the tunnel is too shallow or premature entry, if the tunnel is too deep. The premature entry into the anterior chamber makes the tunnel less self-sealing therefore in such cases suturing was done using 10-0 nylon suture to close the wound at the end of surgery.

Iris prolapse was seen in 5% of the cases in our study, Yasir Iqbal et al., found it in 3% of the cases, Balmer et al., in 0.5% of the cases and Kongsp et al., in 7.3% of the cases. Iris prolapse was seen in (5%) our study. Iris prolapse occurred during the delivery of nucleus in 1 case and in the other cases it was due to premature entry. In both the cases sutures were applied at the end of the procedure.

Zonular dialysis was seen in 3% (2MC, 1NC) of the cases in our study, Mrunalasureshatipal et al., noticed it in 0.8% of the cases and Khanna RC et al., in 3.8% of the cases. In our study it occurred mostly commonly due to weak zonules and small capsulotomy and in 5 cases it was due to a hard nuclear cataract.

DM tear was seen in 2% of the cases in our study, Mrunalasureshatipal et al., found it in 1.2% of the cases, Khanna RC et al., in 1.3% of the cases and Schroeder et al., in 0.7% of the cases. In our study it occurred probably due to faulty instrumentation. In all of these cases, air bubble was injected into the AC and sutures were applied.

Striate keratopathy in our study was seen in 20% of the cases where as Ratnakumar et al., found it in 21% of the cases.

Corneal edema in our study was seen in 17% of the cases where as Ratnakumar et al., found it in 19.5% of the cases. The commonest complication detected in early post-operative period was involvement of the cornea. This can be due operative technique or due to transient rise of intraocular pressure due to presence of the visco elastics substance. These patients were given hourly steroids, 0.5% timolol maleate drops and acetazolamide 250mg B.i.d for 2 days. Some of them required 5% NaCl 5 times a day. In all these cases, cornea got cleared in 3 days. Though it was a common complication, it didn’t interfere with the final visual outcome.

Postoperative iritis was seen in 9% of the cases in our study whereas Ratnakumar et al., has noticed it in 3.5% of the cases. It most commonly occurred due to iatrogenic trauma to iris. It was brought under control with the help of systemic steroids and local steroids, NSAID eye drops and Cycloplegics.

Retained cortical matter was seen in 2% of the cases in our study where as Ratnakumar et al., has noticed it in 0.8% of the cases. In 5 cases it was small and fluffy and it was left behind, it got absorbed in a week and in the other case it was washed away on the 2nd POD.

The surgeon has to be extra careful with these structures, as postoperative inflammation and corneal edema can be all too common. More attention needs to be paid to cortical wash and capsular polishing, as PCO may be the only factor for suboptimal visual acuity in the future.

In our study, visual outcome of 6/18 or better was seen in 89% of cases, whereas as in Ravindra et al., it was seen in 80.7% of the cases, Venkatesh et al., in 94.4%, Kapoor at al., in 79.9% and Shirma Iqbal et al., in 93.3% of the cases.

Conclusion
MSICS has become an accepted and established procedure with more number of people accepting for this surgery. It is being performed in more than 85% of people undergoing surgery for cataract in our hospital.

The commonest cause of cataract is senile cataract and the most common type is senile immature cortical cataract (44%) followed by Nuclear cataract (41%).

There is less significant difference between sex (M:F = 46:54).

Most of the cataracts were seen in 6th decade and above.

The commonest intraoperative complications were premature entry with Iris prolapse (5% followed by zonular dialysis (3%).

The commonest early post op complications were SK (20%) and Corneal edema (17%) but they responded well with steroids.

The commonest late post op complications were PCO (18%) but it was satisfactorily treated with Nd-YAG Capsulotomy.

A significant astigmatism of greater than 1.5 D was seen in 9% of the cases, but the visual outcome with glasses was satisfactory.

Post-operative visual outcome was 6/18 or greater in 89% of cases.

Summary
1. MSICS is a safe surgery. The surgeon has to be extra diligent in tunnel construction as the tunnel size is larger. An excellent self-sealing incision is vital for wound architecture on which the safety and lowered astigmatism potential rests.
2. The incidence of posterior capsular rent and zonular dialysis is low, and in case of vitreous disturbance, it should be managed carefully.
3. In MSICS, the prolapse of nucleus into the anterior chamber and its delivery through the tunnel involve manipulations very close to the iris and cornea.
4. SICS gives best corrected postoperative visual acuity of 6/6 or 6/9 in a greater proportion of patients.
5. This technique has all the inherent advantages of the sutureless cataract surgery in terms of universal applicability, greater wound stability, lesser complications and early visual rehabilitation. This surgery is useful in high volume cataract surgery at lower cost which is the need of the hour in the developing world.
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