

## OUTCOME OF SUTURELESS MANUAL EXTRA CAPSULAR CATARACT EXTRACTION

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**Background:** Cataract surgery is constantly evolving. Purpose of this study was two folds: to estimate visual outcome and evaluate safety and efficacy of sutureless manual extra-capsular cataract extraction. **Methods:** This was a prospective, interventional case series, using sutureless manual extra capsular cataract surgery technique from June 2004 to January 2007 at Khyber Institute of Ophthalmic Medical Sciences, Hayatabad Medical Complex Peshawar. Patients included in the study were those having operable cataracts. All those having corneal co-morbidities extensive enough to block visualisation of posterior segment details, chronic adenexal diseases, long standing glaucoma, advanced diabetic eye disease and retinal detachment evident on B-Scan ultrasonography were excluded from the study. After thorough examination and investigation all the patients were operated upon by a single experienced surgeon using the same technique. Their visual outcome was analysed. The patients were followed for a period of six weeks. **Results:** A total of 1500 cataract surgeries were carried out, of which 1211 (80.74%) patients completed six weeks of follow up. Seven hundred and fifty seven (62.51%) had an uncorrected good visual acuity (6/6–6/18) on 1<sup>st</sup> post-op day, 1131 patients (93.40%) had an uncorrected visual acuity of 6/6–6/18 on 6<sup>th</sup> week follow up. Mean surgically induced astigmatism at 6 weeks was 0.3 dioptres. **Conclusion:** Sutureless manual extra capsular cataract surgery is a safe and effective technique. It offers faster wound healing and quick rehabilitation of cataract patients at any level of community eye care setting.

**Keywords:** Sutureless cataract extraction, visual outcome, astigmatism.

### INTRODUCTION

Despite improvements in the microsurgical techniques and effective surgical interventions which restore sight at low cost, age related cataract remains the principal cause of blindness globally.<sup>1</sup> Pakistan is a developing country, situated in the Eastern Mediterranean region and is the sixth most populous country in the world.<sup>2</sup> Revised estimates indicate that there are currently 37 million people who are blind worldwide. Latest estimates of the prevalence of blindness among individuals of all ages in Pakistan is 0.9%. The estimated number of blind individual of all ages in Pakistan in 2003 was estimated to be 1.25 million.<sup>3</sup>

Cataract accounts for the most common cause (51.5%) of avoidable blindness in Pakistan.<sup>4</sup> Using population projections for the whole population of Pakistan, the number of blind people in Pakistan will increase to 2.4 million by the year 2020. The vast majority of the cataract blind people live in the developing world, in countries with limited resources. Many countries even today are not able to cope with the new cases leading to rapidly growing backlog of cataracts. To manage the large backlog of cataract blindness effectively, high quality and high volume surgery is needed in community eye care settings. Cataract surgery has undergone significant changes beginning with the abandonment of intra capsular surgery and continuing with the advent of intra ocular lenses and continuing variations in extra capsular lens removal. Modern day

surgery demand shorter post-operative recovery time and high quality vision. The use of smaller incision with the advantages of faster rehabilitation, less astigmatism and better post-operative vision without spectacles led to phacoemulsification becoming the preferred technique where resources are available.<sup>5</sup>

Although phacoemulsification has become the biggest surgical achievement of the last two decades, majority of surgeons in developing countries, including Pakistan, are still not practicing it. One of important reasons for this is that the technique has a long and risky learning curve and secondly it requires expensive and complex equipments.<sup>6</sup>

Innovations that are equally effective and safe, are, therefore, urgently needed in the surgical management of cataract in the developing world.<sup>7</sup>

Sutureless manual extra-capsular cataract extraction (SMECE) is quite exciting and interesting. It offers the advantages of early wound stability, minimal surgically induced astigmatism and fast visual rehabilitation with low complications rate.

### MATERIALS AND METHODS

This was a prospective interventional case series study, conducted at Khyber Institute of Ophthalmic Medical Sciences from June 2004 to January 2007. The study was approved by Research and Ethical Committee and included 1500 patients. After obtaining a written consent all patients with operable cataracts in one or both eyes affecting their routine activities were

included in the study. All those having chronic adenexal diseases, corneal co-morbidities extensive enough to block visualisation of posterior segment details, long standing glaucoma, advanced diabetic eye disease and retinal detachment evident on B-Scan ultrasonography were excluded from the study.

Thorough pre-operative evaluation of anterior and posterior segment was done using Bio-microscopy and Ultrasonography techniques. Systemic evaluation including blood pressure check up and diabetes screening were done. Blood samples of all patients were tested for hepatitis B and C virus.

Keratometry and Intra Ocular Lens (IOL) powers were calculated using Helm Holtz keratometer and a Storz A-scan. All variables were entered into a specially designed proforma. All surgeries were performed under peribulbar anaesthesia using a mixture of lignocaine 2% with adrenaline and bupivacaine.

A standardized technique of SMECE mentioned in a study<sup>6</sup> was adopted for all the patients. The technique included fornix based conjunctival flap, a frown scleral incision of 5.5–6.5 mm in length at 12 O'clock about 1.5–2 mm behind the limbus, fashioning a self sealing tunnel with crescent knife and two side ports entries with 3.2 mm keratome.

It was followed by envelop/continuous curvilinear capsulotomy with cystitome, completing the tunnel incision into the anterior chamber with 3.2 mm keratome, nucleus removal after hydrodissection, cortical matter aspiration, intra ocular lens implantation and closing of the conjunctival flap with bipolar cautery. Combination of broad spectrum antibiotics and steroids eye ointment were put after completion of the procedure and eye pad applied. Patients received topical antibiotic and steroid eye drops for a minimum of 6 weeks. Follow up was done at 1<sup>st</sup>, 4<sup>th</sup> and 6<sup>th</sup> week after surgery. Visual acuity measurement and keratometry were done during each visit. All entries were made into a specially designed proforma, and the data was analysed by an epidemiologist using SPSS software.

**RESULTS**

Out of the 1500 patients, 1211 (80.74%) completed 6 weeks of follow up. Two hundred and eighty-nine (19.26%) patients were lost to the follow up. Of the 1211 patients 618 (51%) were male and 593 (49%) were female. Mean age of the sample was 57.7±12.2 years (Table-1). More than 88% of the patients had a pre-operative presenting visual acuity of less than 6/60. In the remaining it ranged between 6/18 to 6/60 (Table-1).

Eighty-eight percent of the subjects had mature cataracts. The remaining had cortical cataracts in 6%, posterior sub capsular in 5% and nuclear sclerosis in 1% of cases. The most common

comorbidities were diabetic retinopathy 3%, age related macular degeneration and glaucoma in 2% each. Of the total 1211 patients having laboratory investigations, 2.7% each were positive for HBs and HCV. Five percent had a blood pressure more than 140/90 mm Hg while 4.5% were diabetic.

Ninety-seven patients (7.88%) had some intra-operative or immediate post operative complications with hyphaema being the most common complication occurring in 51 cases (4.2%) (Table-2).

An uncorrected visual acuity of 6/6–6/18 was obtained in high proportion of patients at discharge, first week and 6 weeks follow up (Figure-1). Pre- and post-operative keratometry were compared in all patients after 06 weeks follow up. Mean surgically induced astigmatism was found to be 0.30 D (Table-3).

**Table-1: Pre-operative visual acuity (n=1211)**

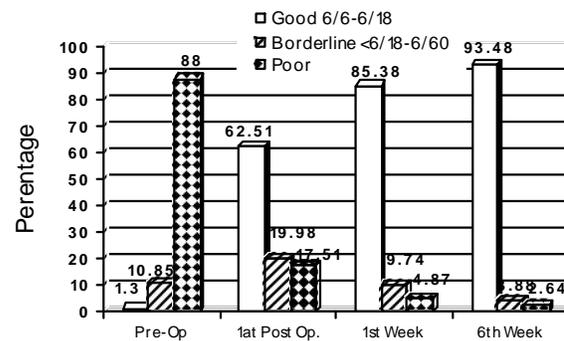
Visual Acuity	Number of cases	Percentage
6/6–6/18 (Good)	12	1
<6/18–6/60 (Border Line)	133	11
<6/60 (Poor)	1066	88

**Table-2: Operative/Immediate Post operative Complications (n=97)**

Type of Complication	Number of cases	Percentage
Hyphaema	51	4.2
Striate Keratopathy	25	2
Iridodialysis	20	1.6
Endophthalmitis	1	0.08

**Table-3: Pre- and Post-operative Astigmatism**

	Mean	Std. Deviation
Pre Operative	1.0465	1.67572
Post Operative	1.3145	1.85039



**Figure-1: Pre- and Post-operative Visual Acuity**

**DISCUSSION**

Sutureless manual extra-capsular cataract extraction (SMECE) also known by the name of manual small incision cataract surgery (MSICS), small incision cataract surgery (SICS) or scleral tunnel surgery (STS) has contributed considerably in accelerating wound healing, short hospital stay and quick rehabilitation. In a developing country like Pakistan where cataract backlog is still a socioeconomic problem, procedures like phaco-emulsification remains an expensive modality of

management and majority of the people find it non-affordable. SMECE promises to be a valuable and an effective alternative in this regard.<sup>8</sup>

In the present study of 1211 cases, the most common cataract subtype was mature (white) cataract in 1066 (88%) which is higher than Hennig *et al*<sup>9</sup> study in which it constituted 72.8% of the total 500 patients. In another study conducted by Lewis *et al*<sup>10</sup> nuclear cataracts predominated as the subtype presenting before surgery with pure nuclear and nuclear mixed with other subtypes accounting for nearly 90% of the opacities. Majority of patients in our study reported late for surgery with the wrong belief that cataract surgery is only successful when cataract gets mature. The nucleus size is relatively big in these patients. So any technique which involves multiple manipulations for fragmenting the nucleus makes the surgery more difficult with an increased risk of trauma to both the uveal and corneal tissues. We extracted the nucleus enmass through a 5.5–6.5 mm sclero-corneal tunnel using hydro or visco expression technique without fragmenting the nucleus in anterior chamber, thus minimizing the possibility of trauma to ocular tissues.

In our study, 88% of the subjects had a pre operative visual acuity of less than 6/60 showing that majority of the patients had mature cataracts and presented late for surgical intervention.

Only 8% of the patients included in our study had some kind of comorbidity like corneal opacities, glaucomatous neuropathy, age related macular degeneration and diabetic retinopathy. The prevalence of ocular comorbidity can be well compared with 28% comorbidity of cataract patients in United Kingdom<sup>11</sup> and 8.2% of patients at Kikuyu.<sup>12</sup>

SMECE is a very safe technique and complications rate is very low when operated by a skilled surgeon. In the present study only 97 (7.88%) patients had some complications. The most common intra operative and post operative complications were hyphaema and accidental iridodialysis. These complications occurred in the initial stages of the study and these complications did not affect the final unaided visual acuity after 6 weeks. Post operative hyphaema was transient and absorbed completely in all case on 4<sup>th</sup> post operative day. Hyphaema occurred in only 51 (4.2%) of study subjects which can better be compared with other international studies ranging from 9.4%<sup>9</sup> to 34%<sup>13</sup>. Presence of perforating vessels in the scleral tunnel area is the most common reason for post operative hyphaema. Iridodialysis was the second most common complication occurring in 20 (1.6%) of the cases which is a bit higher than in a study conducted by Gogate.<sup>14</sup> The presence of mild striate keratopathy in only 2% of case was because of less instrumentation and removal of nucleus by hydro or visco expression.

Uncorrected visual acuity of 6/6–6/18 was achieved at the end of first post operative week in 85.38% of patients. At the end of 6<sup>th</sup> week follow up the uncorrected visual acuity of 6/6–6/18 was reported in 93.48% of patients. The results of visual rehabilitation in our study can be compared well with Pratab<sup>13</sup> and Hennig<sup>9</sup>; their results show uncorrected visual acuity of 6/6–6/18 in 80% and 76.8% respectively after 3 and 6 weeks of follow-up. This visual outcome seems much better than another study of sutureless cataract surgery in Nepal<sup>7</sup> and Ghana<sup>16</sup>, showing that only 58.3% and 72% of eyes obtained an uncorrected vision of 6/6–6/18 at 8<sup>th</sup> week follow up.

In our study the surgically induced astigmatism at 6<sup>th</sup> week follow up was found to be 0.3 D. Astigmatism induced in SMECE can be compared with other studies. Burgansky *et al*<sup>17</sup> have shown that mean induced astigmatism was 0.6 D for 6 mm incision, while Kimura<sup>18</sup> have shown that the mean induced astigmatism was 0.41 D after small incision surgery. Because of superior location of incision, both gravity and eye blink tend to create a drag on incision leading to a small amount of against the rule astigmatism. Our study shows that there is no major effect of surgically induced astigmatism on final visual outcome and the wound is quite stable without any apparent deformity or scarring at the limbus.

## CONCLUSION

SMECE is a non-phaco and sutureless technique which provides rapid visual recovery and return to normal life the day after surgery. It offers an enhanced safety, stability and faster wound healing without suture related problems. The final visual outcome of SMECE is encouraging with a less incidence of intra & post operative complications. However, our conclusions need to be validated with a larger study and longer follow-up.

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