

Intraoperative and Early Postoperative Complications of Manual Sutureless Cataract Extraction

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ABSTRACT

Objective: To determine the intraoperative and early postoperative complications of manual sutureless cataract extraction.

Study Design: Case series.

Place and Duration of Study: Redo Eye Hospital, Rawalpindi, Pakistan, from January 2009 to December 2010.

Methodology: Three hundred patients of cataract through purposive non-probability sampling were selected. The patients underwent manual sutureless cataract surgery (MSCS) by single experienced surgeon and intraoperative complications were documented. The surgical technique was modified to deal with any intraoperative complications accordingly. Patients were examined on the first postoperative day and on the first postoperative week for any postoperative complications. The data was entered in Statistical Package for Social Sciences (SPSS) version 13.0 and the results were calculated in frequencies.

Results: Among the 300 cases, 81.3% surgeries went uneventful whereas 18.6% had some complication. The common intraoperative complications were superior button-hole formation in 5%; posterior capsular rent in 5% and premature entry with iris prolapse in 3% cases. Postoperatively, the commonly encountered complications were striate keratopathy in 9.6% and hyphema 9%. At first week follow-up, 4% had striate keratopathy and 0.6% had hyphema. Striate keratopathy resolved with topical medication on subsequent follow-up. A total of 9 cases (3%) underwent second surgery: 2 cases for lens matter wash, 2 cases for hyphema and 5 cases needed suturing of wound for shallow anterior chamber due to wound leak.

Conclusion: Superior button-hole formation, posterior capsular rent and premature entry were the common intraoperative complications of MSCS whereas the common early postoperative complications were striate keratopathy and hyphema.

Key Words: *Cataract. Sutureless. Extraction. Complications.*

INTRODUCTION

In the last two decades, ophthalmic surgery has seen tremendous development. The cataract surgeons have shifted from the conventional extracapsular cataract extraction (ECCE) to newer techniques, a sophisticated phacoemulsification and a variant of ECCE, manual sutureless cataract surgery (MSCS). In the developed countries, there is emphasis on cataract surgery by phacoemulsification.¹ However, it is expensive and requires high level of surgical training.² For the developing countries which cannot afford such expensive technology for the masses, manual sutureless cataract surgery (MSCS) is a simple and effective technique.^{3,4}

MSCS was developed much later than phacoemulsification and hence, it is a relatively younger technique. Being a variant of cataract surgery, MSCS also has intraoperative and postoperative complications but limited information exists regarding the complications associated with this procedure.

The purpose of this study was to determine the intraoperative and early postoperative complications related to the newly evolved technique.

METHODOLOGY

This observational study was performed over a period of 2 years, from January 2009 to December 2010 in a tertiary care hospital. Three hundred patients of cataract through purposive non-probability sampling were selected. Pre-operative examinations like visual acuity, detailed slit lamp examination, intraocular pressure measurement by Goldman's applanation tonometry, indirect ophthalmoscopy, A-scan and keratometry were carried out for all cases. The patients were explained the planned operative procedure and written consents were taken from them before the surgery.

Criteria were patients diagnosed with senile uncomplicated cataract and pupil diameter equal or greater than 7 mm after mydriasis. Exclusion criteria were history of ocular pathology, glaucoma, uveitis, high myopia, PEX, or corneal pathology, traumatic, subluxated and posterior polar cataract, previous ocular surgery, diabetic retinopathy and patients with Fuchs' dystrophy and any ocular surface disease.

All the cases were operated by the single surgeon having expertise in the technique. Five percent povidone

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Iodine was instilled in the conjunctival sac after local injection. Temporally, the conjunctiva was undermined and bleeding vessels were gently electrically cauterized. A partial thickness 6 - 6.5 mm straight external scleral incision was given with 3.2 keratome knife 2 mm behind the limbal blue line. Scleral tunnel was constructed using the keratome knife and extended upto 1 mm into clear cornea. The anterior chamber was accessed and the internal corneal incision was extended for about 0.5 mm more than the external scleral incision. A can opener capsulotomy was made with the help of a cystitome after filling anterior chamber with a viscoelastic substance. The nucleus was rotated, picked up by a bent cystitome, displaced into the anterior chamber and expressed through the corneoscleral tunnel by viscoexpression. The remaining lens matter was removed using Simcoe Irrigation/aspiration cannula. The viscoelastic substance was injected and posterior chamber PMMA intraocular lens of 6.5 diameters was implanted. The viscoelastic substance was washed out and the conjunctiva was closed using electric cautery after confirming the integrity of the wound. A subconjunctival injection of antibiotic/steroid was given and the eye was padded for 24 hours. Intraoperative complications, if any, were documented and postoperative complications were recorded on first day and on the first week post-operatively. To deal with any intraoperative complications, the surgical technique was modified accordingly.

The data was entered on Statistical Package for Social Sciences (SPSS) version 13. Descriptive statistics were calculated for all the variables. Mean and standard deviation was calculated for the quantitative variables that is age in years. Frequency and percentage were calculated for the qualitative variables that is intra-operative and postoperative complications.

RESULTS

A total of 300 eyes of 300 patients, 161 (55%) males and 149 (45%) females, were included in the study. The mean age of the study population was 60.4 ± 6.2 years with a range of 55 - 75 years. Sixty five percent of the cases underwent surgery for right eye and 35% for left eye. Among the 300, 81.3% surgeries went uneventful whereas 18.6% had some complication. A total of 9 cases (3%) underwent second surgery: 2 cases for lens matter wash, 2 cases for hyphema and 5 cases needed suturing of wound for shallow anterior chamber due to wound leak.

Superior buttonhole formation and posterior capsule (PC) rent were the commonest intraoperative complications. However, there was only one case in which there was vitreous loss from the wound as the self-sealing incision helped in maintaining the anterior chamber (Table I). None of the posterior capsular rents rendered the implantation of intraocular lens impossible.

Premature entry and iris prolapse were the third commonest problem encountered intraoperatively (Table I). Two cases had iridodialysis, none required repairing. Intraoperative haemorrhage in the anterior chamber was seen in 1.6% cases which were cleared before the patients left the operation theater (Table I).

Postoperatively, the commonly encountered complications were striate keratopathy and hyphema (Table II). These patients were put on topical medication accordingly.

At first week follow-up, 4% had striate keratopathy, 0.6% had hyphema and 0.6% had residual lens matter (Table II). Rest of the cases were normal. The hyphema was removed after surgical intervention. Striate keratopathy also resolved with topical medication on subsequent follow-ups.

Table I: Intraoperative complications (n = 300).

Complications	n (%)
Superior button-hole formation	15 (5%)
Premature entry	9 (3%)
Iridodialysis	2 (0.6%)
Haemorrhage in the anterior chamber	5 (1.6%)
Iris prolapse	9 (3%)
PC rent	15 (5%)
PC rent with vitreous loss	1 (0.3%)

Table II: Postoperative complications (n = 300).

Complications	1st postoperative day	1st postoperative week
Striate keratopathy	29 (9.6%)	12 (4%)
Hyphema	27 (9%)	2 (0.6%)
Shallow anterior chamber	5 (1.6%)	Nil
Iritis	10 (3.3%)	Nil
Residual lens matter	8 (2.6%)	2 (0.6%)

DISCUSSION

Exhaustive work has been done in comparing manual sutureless cataract surgery (MSCS) with extracapsular cataract extraction and phacoemulsification but limited information exists in regard to the intraoperative and early postoperative complications of the MSCS.

Like any surgery, all the steps of MSCS are crucial for avoidance of intraoperative complications but wound construction plays a major role as the size, shape and type of the wound remains the same in most of the cases.⁵ Flap related complications like flap thinning and superior buttonhole formation occur due to improper wound construction. There was a superior buttonhole formation in 5% of these cases which were consistent with findings of Basti and Maske.^{6,7} Buttonhole can be corrected by making a deeper 'frown' incision and dissecting the tunnel in a deeper plane, starting at the opposite side of the buttonhole⁸ while others suggest deepening the groove and starting dissection at a deeper plane.⁹ Too deep groove will increase the difficulty of corneal dissection and increase the chances

of a premature entry into the anterior chamber. Premature entry into the anterior chamber, as in 3% cases here, leads to repeated iris prolapse intraoperatively and there is always a tendency of the wound to leak postoperatively.¹⁰ Schroeder suggested management of a premature entry by starting a more shallow dissection at the other end of the tunnel and suturing of the wound at the end of surgery.⁸

Hennig and co-authors reported intraoperative hyphema in 9.4%,¹¹ Khan reported 15.3% and Zaman reported 4.2% in comparison to 1.6% of these cases.¹¹⁻¹³ The source of the hyphema is thought to be a poorly constructed tunnel with premature entry causing trauma to the iris base and resulting in iridodialysis and subsequent haemorrhage in the anterior chamber.¹⁴ Khan reports some degree of irido-dialysis in 4% cases whereas in this study only 0.6% occurred.¹²

Failing to complete the anterior capsulotomy, making a too-small CCC, and pulling residual anterior capsular tags can cause the posterior capsule to rupture.¹⁰ Hennig and co-authors reported posterior capsular rent in 0.2% cases whereas Khan reported 3.33%.^{11,12} A series of MSCS by Maske had 1.2% posterior capsular rents while another series of a 100 cases on white cataracts from South India did not have a single rent.^{7,15} Posterior capsular rent occurred in 5% of these cases. Can opener capsulotomy may have been responsible for this increased incidence, while others suggest that posterior capsule rupture occur while clearing the cortex with a Simcoe cannula.^{10,16} But as the wound is self-sealing, the incidence of vitreous loss is minimal; 0.3% in this study and 1.8% reported by a United Kingdom based study.¹⁷

If proper wound integrity was not maintained at the end of the surgery, shallowing of the anterior chamber will be seen on the first postoperative day as in 1.6% of these cases.¹¹ In such cases, suturing of the wound is required at the end of surgery.⁷

A transient corneal oedema is reported postoperatively, which clears off by the first week. Gogate found corneal striate in 7% cases.¹⁴ Venkatesh had 2% cases of postoperative corneal oedema.¹⁵ There were 9.6% cases with corneal oedema in the present series. Although Bayramlar and co-authors concluded that there was no significant difference in the endothelial cell loss among the three techniques of cataract surgery, others report on the contrary.¹⁸ A series from Duch had 0.5% of bullous keratopathy.¹⁹ A clinical audit of cataract surgeries conducted in Hepsen found 12 cases of corneal decompensation after MSCS.²⁰ But are these findings surely related to the technique it can be known only after conducting a longer follow-up period study.

Ruit reported 29.6% cases of hyphema after MSCS;²¹ Kongsap reported 6.2%;²² whereas this percentage was

9% in this study. According to Gurung and Hennig scleral cauterization before tunnel construction reduces the risk of pre- and postoperative hyphema.¹¹ Another study compared hyphema in cases with a deep scleral tunnel incision (34%) and a superficial scleral tunnel incision (6%) and it was suggested that the superficial scleral tunnel and adequate treatment with an electric cautery to stop bleeding may have been the reason for the low incidence.²³

Khan reported postoperative endophthalmitis in 2% of his cases whereas a study from India demonstrates no significant anterior chamber contamination in MSCS.^{12,24} The large self-sealing tunnel may increase the chances of endophthalmitis;¹⁴ although further studies are needed to support or refuse this hypothesis. There was no incident of endophthalmitis in this study.

During the procedure, the iris gets involved at some point either with premature entry, nucleus delivery or intraocular lens implantation. This may lead to higher incidence of postoperative iritis.²⁵ There were 3.3% cases of iritis in comparison to the trial in Pune which showed mild iritis in 6% and moderate iritis with fibrin membrane in 3% of cases.¹⁵

In 2.6% case, there was residual lens matter. Aspiration of the lens matter through the main incision creates some difficulty in manipulation and complete cortical clean-up because the configuration of the tunnel causes the outer wound to be posterior and lower than the inner wound. A 12 O'clock cortex is especially difficult to deal because of the difficult approach. For this, many methods have been suggested like tilting of irrigation and aspiration cannula, using a J-shaped cannula, side port Simcoe aspiration, Iris massage maneuver, Ice-Cream scoop maneuver and post-IOL implantation aspiration. These might prevent this complication to happen.

CONCLUSION

Superior button-hole formation, posterior capsular rent and premature entry were the common intraoperative complications of MSCS whereas the common early postoperative complications were striate keratopathy and hyphema. The surgeon has to be extra careful in the construction of the scleral tunnel in MSCS to avoid button-hole formation and postoperative hyphema. Minimum handling inside the anterior chamber during nucleus delivery decreases the chances of striate keratitis and posterior capsular rupture.

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