ORIGINAL ARTICLE

Visual Rehabilitation Following Manual Small Incision Cataract Surgery

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Abstract

Recent technological advances in cataract surgery with small incision ensure less surgically induced astigmatism and faster visual rehabilitation .Manual small incision non phaco surgery has added advantage of low cost and less machine dependence. We present a series of 115 patients who were operated upon using manual small incision cataract surgery and studied for visual recovery. 95.65% of patients achieved a best corrected visual acuity of 6/12 or better and the mean surgically induced astigmatism at 3 months was 0.69 Diopters .

Key Words

Astigmatism, Scleral tunnel, Sutureless surgery

Introduction

The two main objectives of modern cataract surgery are to minimize surgically induced astigmatism and to achieve rapid visual rehabilitation. Clear corneal or scleral tunnel incision of the minimum possible size are the key to achieving these objectives. Although phacoemulsification has become the biggest surgical achievement of the present decade, it is still not been practised by the majority of surgeons in developing countries including India. Two important reasons for this are, that the technique has a prolonged and sometimes traumatic learning curve and secondly, it requires expensive and complex equipments (1, 2). Manual small incision sutureless cataract surgery (SICS) offers a good and effective alternative in this situation. The technique of manual sutureless phacosurgery offers the following advantages (3): it preserves the integrity of the limbal anatomy, thus minimising post-operative astigmatism, there is early wound stabilization (after approximately 2 weeks), no suture induced problems, safe, easy for mature and hypermature cataract, cost effective, less complications like posterior capsular rupture, dropped nucleus and bullous keratopathy. Moreover, it can even be performed for hard nuclei or incomplete capsulorrhexis.

Material and Methods

The study was conducted in the Department of Ophthalmology, SKIMS medical college, Bemina, Srinagar, from March 2003 to March 2004. 175 patients with cataractous lens were randomly selected for manual SICS, out of which 115 patients who completed the post-operative follow-up were included in the study. The conditions likely to influence the visual prognosis like previous intraocular surgery, significant corneal opacification, uveitis, glaucoma/ocular hypertension, high myopia, exfoliation syndrome and diabetes mellitus were excluded from the study.

Keratometery was done to measure the pre-operative corneal astigmatism and intraocular lens (IOL) power was calculated using SRK-II formula. On the day of surgery, pupil was dilated with cyclopentolate eye drops and ketorolac eye drops were instilled twice to maintain intra-operative mydriasis. The surgery was performed under peribulbar anesthesia. After making a fornix based conjunctival flap, a frown incision 6- 6.5 mm long and 1/3-1/2 thickness of sclera was made about 1 mm behind the limbus at 12 o'clock position (4). A cresent blade was used for fashioning the tunnel, 1 mm in the sclera,

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1mm in the limbal tissue and 1-1.5 mm in the clear cornea. At the internal incision, dissection was extended laterally 0.5-1 mm to produce the pockets on both sides. Capsulotomy (continous capsolorrhexis or cane-opener) was done using a cystitome fashioned from a 26 G needle, through a 1 mm paracentesis performed in the clear cornea at about 10 o'clock position. Anterior chamber was entered with a 3.2 mm keratome at the anterior most end of the tunnel. With lateral and anterior movements, the entry was extended throughout the length of the internal lip of the incision. This incision provides a corneal valve that seals the incision as the introcular pressure (IOP) rises.

Hydroprocedures-hydrodissection and hydrodelineation, were performed through the tunnel wound and the nucleus was dislocated into the anterior chamber using a viscoelastic substance (methylcellulose). Based on hydrodynamic expression, using an irrigating vectis, the nucleus was expressed out. After cleaning the residual cortex using a simcoe cannula, a posterior chamber IOL was implanted in-the-bag. Post-operatively, patients recieved topical antibiotic and steroid eye drops for a minimum period of 6 weeks.

Follow-up was done at Ist week, 3rd week, 6th week and 12th week after the surgery. At the final follow-up, keratometery was done to assess the post-operative astigmatism. Refraction was performed and the best corrected visual acuity was recorded.

Results

Of the 115 patients, who were included in the study, 73 were male and 42 female. The patients age ranged from 46-78 years, with a mean of 63.2 years. 70 (60.8%) patients improved to an uncorrected visual acuity of 6/12 or better in the 3rd week only and 88 (76.52%) patients had an uncorrected visual acuity of 6/12 or better by the end of 12th week. The commonest cause of an uncorrected vision of less than 6/12 was astigmatism. Of the 27 patients with a visual acuity of less than 6/12 at 12th week, 20 (74%) patients had post-operative against-the-rule astigmatism and 7 (26%) patients had post-operative with-the-rule astigmatism. In the majority of these patients, astigmatism varied from 0.5 - 1.0 Diopters (D) with only 2 patients having a post-operative astigmatism of more than 1.5 D.

The mean surgically induced astigmatism at 12 weeks was 0.69 D, with 71% of patients demonstrating against-the-rule astigmatism and 29% having with-the-rule astigmatism. The best corrected visual acuity after 12 weeks is shown in the (Table 1).

Table 1. Visual acuity after 12 weeks of surgery

Visual acuity	No. of patients (%)
6/12 & better	110 (95.65%)
6/18 - 6/36	2 (1.73%)
6/60 & less	3 (2.60%)
Total	115

Out of the 5 patients, whose best corrected visual acuity was less than 6/12 at 12 weeks, the cause was posterior capsular opacification in 2 patients and age related macular degeneration (ARMD), cystoid macular odema (CMO) and central choroiditis in 1 patient each .

Discussion

From the above observation, it is clearly evident that patients undergoing SICS have an early visual rehablitation as about 60.8% of patients obtained 6/12 or better vision in the first 3 weeks only. This quick visual restoration is attributed to little inflammation and less surgically induced astigmatism (SIA). Patients also had fewer complaints regarding ocular discomfort in terms of pain, foreign body sensation and redness. Guzeh et al (6) in his study on 200 eyes undergoing small incision manual exra capsular cataract surgery found that 90% of eyes achieved a final best corrected visual acuity of atleast 6/12. Inaddition, patients had a faster visual recovery and lower incidence of ocular inflamation particularly fabrinous iritis. Hepsen et al (7) also achieved a post-operative best spectacle corrected visual acuity of 6/9 or better in 83% of eyes undergoing small incision extra capsular cataract surgery.

Based on the algebraic method, 74% of patients demonstrated ATR shift in post operative astigmatism and which is explained by sutureless incision , as the sutureless incision tends to flatten in the meridian of the incision and steepens in the meridian 90 degree away. These changes in the curvature are explained by the law of "elastic domes" and which states that for every change

in curvature in one meridian, there is an even and opposite change 90 degree away. Henning et al (8) in his study on 500 patients undergoing sutureless cataract surgery found that 85.5% of the eyes had against the rule (ATR) astigmatism and which was the major cause of uncorrected visual acuity of less than 6/18.

The various forces that are important in understanding the cause for astigmatism include incision (9), sutures (10), wound healing (11), cautery, position (12) configuration, nutrition, age and eyelid action. The incision is a major cause of these shifts. This effect is directly related to the length, location and depth of the incision.

Sutureless incision when constructed properly and adequatly proved to be stable incision that resists leakage and iris prolapse at intraocular pressure of over 400 mm Hg (hydrostatic) (13), as these incisions are self sealing because pressure in the anterior chamber automatically pushes the lip against the intracorneal portion of the incision sealing it tightly without sutures. Other advantages are absence of hyphema, absence of foreign body sensation from sutures, no damage to ciliary body by suture needles and incision stability of the wound.

Conclusion

Rapid recovery of good vision can be achieved with manual small incision cataract surgery at low cost in areas where there is a need for high volume cataract surgery like India. However further work needs to be done to reduce post operative astigmatism which still exists to be the main cause of poor uncorrected visual acuity.

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