Clear Corneal Versus Scleral Incision for Cataract Surgery

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A prospective study was performed to observe the single parameter of post operative astigmatism after extra-capsular cataract extraction using either a three stepped clear corneal incision or a three stepped scleral incision. The results show that the post-operative astigmatism is slightly higher in the corneal incision group for the initial period. After the removal of the corneal sutures, the results are comparable with either type of cataract incision
Key Words: Cataracts; Astigmatism

Cataract surgery is indeed the most commonly performed surgical procedure in ophthalmology. Various aspects of the surgical techniques are constantly under review to improve the surgical results.

The cataract surgery is a fairly safe procedure and the serious complications like endophthalmitis and retinal detachment are very rare. More attention is now being paid to the finer aspects like controlling the post-operative astigmatism, posterior capsular opacification, type of local anaesthesia, and theatre time used.

This study was performed to test the hypothesis that the clear corneal incision would always result in a higher astigmatism when compared with a limbal or scleral incision. This was indeed expected with the single plane corneal incisions which required fairly tight suturing to obtain water-tight closure. With the three stepped incisions, the sutures need not be excessively tightened because the incisions are basically self-sealing and require the sutures only to hold the lamellae of the incision in their anatomical proximity. The water-tight closure is obtained by the valve-like action of the deeper layer of the incision which is kept firmly pressed against the superficial layer by the pressure of the aqueous in the anterior chamber.

Aim: One of the most important consideration following planned extra-capsular cataract extraction (ECCE) is the post-operative astigmatism. The aim of this study was to see if the location of the cataract incision had any significant effect over this astigmatism. We decided to compare the results of clear corneal incision with those of the scleral incision.

Patients and methods:

A prospective study of the various incisions for the standard extra capsular cataract extraction with intra-ocular lens implantation was undertaken. All of our patients included in this study presented between January 1999 and January 2000. We included forty patients with significant cataracts in our study. The eyes with other complicating factors like glaucoma, uveitis, previous eye surgery, and a history of significant ocular trauma were not included in this study. The age of the patients ranged from fifty years to ninety years, the average age being seventy three years. Each patient had a detailed eye examination performed before the booking for surgery. Any associated general medical conditions like diabetes mellitus and hypertension were controlled by appropriate medicines. Details of the procedure were explained to the patients and informed consent was obtained before they were scheduled to have their cataract surgery.

A post-operative follow-up examination was arranged on the first post-operative day, after one week, one month, two months, three months, and six months. Topical steroid and antibiotic drops were continued till the anterior chamber became free of all inflammatory activity.

Surgical technique: Local anaesthesia was used in all of our patients in this series. It was achieved with topical surface anaesthetic drops and peribulbar injection of long acting injectable local anaesthetic.

Mydriasis was achieved with topical Tropicamide and phenylephrine drops. Topical non-steroidal anti-inflammatory drops were also used to maintain the mydriasis during surgery. No bridal suture was used. A three-stepped clear corneal incision was used for twenty patients placed in Group-1 of this study.

In the remaining twenty patients comprising the Group-2 in this study, the initial step was to put a superior rectus bridal suture. Then a fornix-based conjunctival flap was raised and the bleeding points cauterized using a bipolar cautery. The cataract incision was given through the sclera, about 1mm behind the limbus.

The partial thickness clear corneal or scleral incision was converted to full thickness corneal incision in two steps, initially going forward parallel to the plane of the cornea and then entering the anterior chamber. This generated the three-stepped incision. Corneal scissors were used to extend the incision to the required size so that the nucleus could be extracted through this incision, using a wire vectus. The residual soft matter was aspirated using manual irrigation-aspiration canula. A visco-elastic was used to maintain the anterior chamber while a PMMA lens was implanted in the bag. The corneal or scleral incision was closed using 10/O Nylon sutures. No sutures were used for the conjunctival flaps in the patients in Group-2.

The visco-elastic was aspirated out from the anterior chamber and replaced with balanced salt solution. A sub-conjunctival injection of gentamycin and dexamethasone was given and aseptic dressing done.

Results:

All of our patients had excellent results after the cataract surgery. None of our patients developed any serious complication like post-operative endophthalmitis or retinal detachment.

The keratometry reading showed that there was a tendency for with the rule astigmatism in both the groups. The astigmatism in the Group-1 ranged from zero to plus three dioptres. The average astigmatism in this group was 1.5 dioptres. The patients having more than 1.5 D of astigmatism had their corneal sutures removed after three months from the surgery. This invariably resulted in the astigmatism to drop to less than 1.00 D. The sutures in the remaining patients in this group were removed six months after the surgery.

The amount of astigmatism in the Group-2 patients ranged from 1.00 D against the rule to 2.00 D with the rule. The average astigmatism was 0.75 D. The sutures in the patients in this group were not removed.

Discussion:

Cataract surgery is increasingly being performed under topical anaesthesia. Several studies have demonstrated that it provides satisfactory analgesia, comparable with regional blocks[1-11]. How ever we are still using retrobulbar or peribulbar anaesthesia, with surface anaesthesia alone being reserved for a few selected patients only. Some degree of anxiety is inevitable before the surgery but none of our patients reported any significant pain during surgery.

All of our patients were quite happy at the visual outcome after their surgery. Four of our patients showed some degree of posterior capsular opacity after a period of six months. This is indeed one of the most common complications following planned extra-capsular cataract extraction[12-15] There is an age-related tendency toward PCO formation.[16] In general, the older the patients, the lower the incidence of PCO[17-19].

The post-operative astigmatism after clear corneal incision become significantly reduced if three-stepped incision is used which allows the surgeon to achieve the water-tight closure of the incision without excessively tight sutures. This procedure gives the additional advantages in the sense that we do not need to use the superior rectus bridal suture, the conjunctival flap, or the use of the cautery. This saves the theatre time as well. The eye is practically white on the first post operative day and the ocular irritation is absolutely minimal. The main drawback of this technique is the need to remove the corneal sutures. This technique is therefore preferable if the patient can follow up in the clinic on reliable basis.

The scleral incision technique is more suitable if the patient does not wish to have the sutures removed after the surgery, or his follow up visits in the clinic are not certain.

There is a slight advantage regarding the astigmatism in the initial post-operative period for the scleral incision patients but this disappears after the corneal sutures have been removed in the corneal incision group.

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