INTRODUCTION

Age related cataract is the most common cause of blindness all over the world. Cataract is responsible for 45% of all the blindness. In Pakistan, cataract accounts for 51.5% of the cause of blindness. Cataract surgery is one of the most commonly performed procedures. Although very successful, it has its complications including corneal oedema, descemeto's membrane folds, posterior capsular rupture, vitreous loss, and endophthalmitis. The most common of these complications is postoperative inflammation. Inciting factor may be the irrigation fluids, viscoelastic use, miotics and direct mechanical trauma to the ocular structures from cataract pieces, instruments and intraocular lens. Postoperative uveitis may cause patient discomfort and results in anterior and posterior synechiae formation, pupillary membrane formation, posterior capsular opacification and rise in intraocular pressure. All these complications may delay visual rehabilitation.

To control postoperative uveitis and its consequential complications, anti-inflammatory therapy is used. The perioperative use of anti-inflammatory therapy has well established role in standard cataract surgery. The aim is to treat postoperative intraocular inflammation and enhance patient's comfort. Different anti-inflammatory agent are used according to the patient's need and surgeons preferences. Dexamethasone is a commonly used drug for this purpose.

Perioperatively anti-inflammatory agent can be delivered in the form of topical drops, subtenon, subconjunctival or intravitreal injections, collagen shields and intraocular injections or infusion. Subconjunctival injection of steroids is routinely used after the surgery but perioperative intracameral injection of steroids is increasingly used. There are certain advantages in using intracameral route. The drug acts directly where it is required i.e. in the anterior chamber, the amount of drug is less so risk of side effects like elevation of intraocular pressure is less, complications associated with subconjunctival or subtenon injections like subdermal fat atrophy, extraocular muscle atrophy and skin hypopigmentation are eliminated.

While using intracameral corticosteroids results in significant reduction in intraocular inflammation, its safety to use in such a delicate environment must be
known. When dexamethasone is injected in anterior chamber, the most vital structure that comes in contact is corneal endothelium. Corneal endothelium is a very important structure. It is unable to regenerate. Once lost, it is gone forever. It demands utmost respect. A healthy cornea has about 3000 cells/mm². With a reduction in cell density to a value of about 700 cells/mm², the endothelium transport function remains no more efficient and stromal edema can develop.

The effects of intracameral dexamethasone on corneal endothelium must be studied to determine safety of this new promising therapeutic approach. Before using intraocular dexamethasone to control intraocular inflammation, one has to make sure that this has no adverse effect on corneal endothelium.

The purpose of this study was to study the effects of intracameral dexamethasone on corneal endothelium.

**METHODOLOGY**

The study was conducted at Layton Rehmatulla Benevolent Trust Eye Hospital, Lahore, from May 2011 to January 2012. The study was approved from the ethical and research board of the Hospital. Two hundred and twenty patients with senile cataract having nuclear sclerosis of grade 2 and 3 were selected from the outpatient department. Both genders between 45-65 years were included in the study. Patients having corneal opacification, previous history of intraocular surgery, glaucoma, intraocular inflammation, pre-operative endothelial cell count less than 2000 cells/mm² and peroperative complication were excluded from the study. The patients were asked to sign the informed consent. The patients were divided into two groups, each comprising of 110 patients. Group-A received subconjunctival dexamethasone 0.5 ml (2 mg) at the end of the surgery. Group-B received 0.1 ml (0.4 mg) intracameral dexamethasone at the end of the surgery. Sociodemographic profile like age and gender was recorded and history of the disease was taken. Detailed anterior and posterior segment examination was performed. Pre-operative specular microscopy for corneal endothelial cell count was performed with SP 3000P Topcon specular microscope. All the patients were operated by limbal incision and surgery was performed by same surgeon. Rigid PMMA 5.5 mm intraocular lens was implanted in the capsular bag. Phaco-machine, phaco-power, viscoelastic, irrigation fluid and intraocular lens were kept constant in all patients. Postoperatively, all patients received a combination of tobramycin 0.3% and dexamethasone 0.1% eye drops six times per day. The medicine was tapered in next 6 weeks. There was withdrawal of 5 patients from group-A and 6 patients from group-B during follow-up. Postoperatively, specular microscopy for corneal endothelial cell count was performed at 1 week, 1 month and 3 months.

All the data was analysed through Statistical Package for Social Sciences (SPSS) version 17 and the result were obtained accordingly.

The variables analysed were demography and examination. The quantitative data (age) was presented with simple descriptive statistics like mean and standard deviation. The qualitative data (gender, laterality of eye) was presented as frequency and percentage. Endothelial cell count and phacoemulsification time were represented as mean and standard deviation. Comparison was made in endothelial cell count changes between two groups using t-test. A p-value was taken as equal to or less than 0.05.

**RESULTS**

In this study, there were 55 (50%) males and 55 (50%) females in group-A and 44 (40%) males and 66 (60%) females in group-B. In group-A, there were 66 (60%)
right and 44 (40%) left eyes while group-B had 62 (56.36%) right and 48 (43.63%) left eyes. Mean age was 55.02 ± 5.73 years. Mean age in group-A was 55.17 ± 5.93 years and mean age in group-B was 54.87 ± 5.55 years. Distribution of cases according to consumed phacoemulsification time is shown in Table I. Mean phacoemulsification time in group-A was 1.92 ± 0.63 minutes and in group-B it was 1.82 ± 0.54 minutes. Pre-operative and postoperative endothelial cell count is shown in Table II. There was no difference in endothelial cell counts between the two groups pre-operatively and postoperatively. After 3 months, in group-A, there was 7.55 ± 1.19% endothelial cell loss while in group-B, there was 7.63 ± 1.10% endothelial cell loss. The difference between the two groups was not statistically significant (p=0.614).

DISCUSSION

The study was conducted to determine the effects of intracameral dexamethasone on corneal endothelial cells. It was observed that the use of intracameral dexamethasone is a safe method of giving steroids at the end of surgery. Intraocular inflammation after cataract surgery can prolong patient's visual rehabilitation.13-15 Among the many regimens used to suppress postoperative intraocular inflammation, the use of intracameral dexamethasone has well-established role.16 A study done by Hasnain and Rahman showed that intracameral injection of dexamethasone provided an equally effective alternative to subconjunctival injection of dexamethasone.17 The work of Iqbal and co-authors demonstrated that dexamethasone when injected intracameraly increased its efficacy by about 5% as compared to subconjunctival route.18 Work done by Chang demonstrated that the efficacy of intracameral dexamethasone in reducing intraocular inflammation and improving subjective reports of recovery.13

There are many studies indicating the efficacy of intracameral dexamethasone in reducing intraocular inflammation after cataract surgery. But the effect of intracameral dexamethasone on corneal endothelial cell count changes was not observed. The normal transparency and thickness of the cornea are due to the active pumping action of the corneal endothelium.19 There are many factors which can damage corneal endothelium. Changes in endothelium are considered important indicator of surgical procedure safety. It is essential to monitor the effects of new techniques on this delicate structure.

In this study, the effects of intracameral dexamethasone on corneal endothelium were studied and compared with control group. After 3 months, in group-A, there was 7.55 ± 1.19% endothelial cell loss while in group-B, there was 7.63 ± 1.10% endothelial cell loss. The difference between the two groups was not statistically significant.

As there is no study available on the effect of intracameral dexamethasone on healthy human corneal endothelium so these results could not be compared. We have made comparison with studies that discussed the effect of phacoemulsification on corneal endothelium.

Mahmood and co-authors reported a mean cell loss of 6.44% ± 0.62% by scleral tunnel incision and 8.39% ± 0.61% by clear corneal incision at 3 months post-operatively.20 This cell loss is slightly higher than that caused by scleral tunnel incision and slightly lower than clear corneal incision. This difference might be due to the incision site in this study. The presently reported patients were operated by limbal incision that is midway between the scleral tunnel and clear corneal incision.

Nayak reported a cell loss of 7.38% and 7.47%, thirty days postoperatively, in two groups using continuous anterior chamber infusion and viscoelastic during phacoemulsification respectively.21 The presently reported results resemble their results.

So intracameral dexamethasone use during cataract surgery is an effective way to reduce intraocular inflammation,8,13,16 and at the same time it is safe to corneal endothelium. Intracameral dexamethasone may be better option than the subconjunctival route of dexamethasone. Subconjunctival injection can cause subconjunctival haemorrhage that can be distressing to the patient. The globe can be accidentally perforated during subconjunctival injection. Subconjunctival injection can cause pain and it is more significant when doing surgery under topical anaesthesia.17 All these drawbacks of subconjunctival injections can be avoided by intracameral route.

The main limitation of this study is a short follow-up. Sample size is not very large which is another limitation. The authors have studied safety of intracameral dexamethasone with regard to corneal endothelium; we have not studied other possible adverse effects of intracameral dexamethasone like effects on intraocular pressure and susceptibility to infections. Nonetheless, this work showed that the use of intracameral dexamethasone was not harmful for corneal endothelium. Intracameral use of dexamethasone can be an effective way to combat postoperative inflammation,17,18 and at the same time it preserves the integrity of corneal endothelium.

CONCLUSION

Use of intracameral dexamethasone at the end of cataract surgery is safe for corneal endothelium.

REFERENCES


