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# Effect of heparinized irrigation solution on postoperative inflammation after cataract surgery in diabetics– A randomized control study

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ABSTRACT

**Purpose**: To evaluate the influence of heparinized irrigation solution on postoperative inflammation on anterior chamber cellular reaction (ACR) after cataract surgery in diabetics.

**Materials and Methods:** 120 patients of 164 patients selected for the study who completed 2 months follow up were included in this study. Patients with controlled blood sugar levels with cataract attending R.L. Jalappa Hospital OPD (Outpatient department) were selected. Consecutive patients were segregated into 2 groups. All patients underwent manual small incision cataract surgery (MSICS) under peribulbar anaesthesia performed by a single surgeon. Superior 6mm sclerocorneal tunnel was made and cataract was extracted and rigid PMMA (Polymethyl metha acrylate) lens was implanted in the bag. The remaining viscoelastic substance was replaced by balanced salt solution (BSS).

In group 1, 5000 IU Low molecular weight heparin (LMWH) was added to balanced salt solution of 500 ml and hence the final concentration was 10 IU/ml of BSS. In group 2 heparin was not added to BSS. Post operative anterior chamber (AC)reaction were noted on first postoperative day, after 1 week, 1 month and 2 months. Intraoperative hyphaema, postoperative shallow AC and hyphaema were documented. The AC reaction was noted by (Standard Uvea Nomenclature) SUN classification system. It is a prospective randomized control trial. Statistical analysis was done by Chi-square test.

**Results**: Anterior chamber reaction was statistically significant between the two groups at Day 1 and Day 7 postoperatively with p value being $< 0.001$. Both the groups showed lesser AC reaction in first and second postoperative months with p value being statistically in significant.

Postoperative complications such as Cystoid macular oedema (CME) was seen in 4 patients in group 2 and 1 patient in group 1. Pigments on IOL was seen in 14 pts and 3 pts of group 1 and 2 respectively.

**Conclusion:** Addition of heparin to irrigating solution showed statistically significant lesser AC reaction in Group 1 than Group 2 at first and seventh postoperative day. There was no difference in the anterior chamber reaction in Group 1 and Group 2 at the end of postoperative 1 and 2 months.



## 1. Introduction (Around 65 years)[1]

MSICS is commonly done cataract surgery. Postoperative inflammation is more common in diabetic patients since they have significantly increased blood aqueous barrier breakdown when compared with normal eyes.[2–4] Rigid PMMA lenses have been most widely used intraocular lenses. Though PMMA is relatively inert it tends to have some degree of inflammatory response postoperatively.[5–8]

Heparin surface modified lenses provide a greater degree of protection from postoperative inflammation, but due to technical reasons manufacture of these

Studies show diabetics to have 3-4 fold risk of developing cataract among people lenses has stopped. So, heparinized irrigating fluid may be simple and an effective alternative.

## 2. Objectives

To evaluate the influence of heparinized irrigation solution and postoperative anterior chamber cellular reaction after

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cataract surgery in diabetics.

## 3. Materials and Methods

164 patients who visited R.L. Jalappa hospital Ophthalmology OPD (Outpatient department) were considered for this study. 120 patients came for the follow up. It is a prospective Randomized controlled trial. Consecutive patients who came to the OPD were segregated into 2 groups, Group 1 and Group 2, with heparin and without heparin respectively.

### *3.1. Inclusion criteria*

Cataract patients with diabetes having normal blood sugar level.

### *3.2. Exclusion criteria*

1. Preexisting ocular inflammatory disease
2. Evidence of Proliferative diabetic retinopathy with or without macular edema.
3. Patients who have received systemic anti-inflammatory medication prior to surgery.

Informed consent was taken from all patients. All the patients underwent standard cataract evaluation which consists of recording visual acuity, Intra ocular pressure estimated with Goldmann applanation tonometer followed by Slit lamp and fundus examination. Intraocular lens power calculation was done by Sanders Retzlaff krauff method.

All patients were on oral ciprofloxacin 500mg twice daily and topical ciprofloxacin 0.3% eye drops hourly instilled one hour before surgery. Preoperatively pupils were dilated with tropicamide 1% with phenylephrine 0.5% drops along with flurbiprofen 0.03% eye drops instilled in both the groups.

Surgery was performed by a single surgeon. Under peribulbar anaesthesia, with aseptic precautions conjunctiva and tenons capsule dissection was done in the superior aspect. Side port was made at 9' 0 region. 6mm sclerocorneal incision was made 2-3 mm behind superior limbus and 1mm extended anteriorly towards the cornea. With the keratome 3.2 mm entry was made into the anterior chamber. Anterior continuous curvilinear capsulorrhexis was done with 26gauge bent needle. With the extensor 5.5mm corneo scleral wound was extended on either side of the tunnel. Hydrodissection and hydrodelineation was done. Nucleus was prolapsed into the anterior chamber and delivered by irrigating vectis method in both groups. Rigid PMMA intra ocular lens was implanted in the bag.

In Group 1, 5000 IU LMWH of 5 ml was injected to 500 ml of BSS and the final concentration was 10 IU/ml. Heparinized BSS was used to irrigate the anterior chamber in Group 1 and nonheparinized BSS was used in Group 2 subjects. Standard postoperative treatment included topical Gatifloxacin 0.3% eye drops and 1% prednisolone acetate eye drops hourly for about one week in both groups and then tapered gradually after one week of surgery.

All patients were followed on first post-operative day, after 1 week, 1 month and 2 months. Anterior chamber reaction was assessed under slit lamp examination with bright illumination using 2mm$\times$1mm width beam.

Anterior chamber inflammation were graded by SUN Classification system.

**Table 1:**

| Grade | Cells/mm$^2$ |
|---|---|
| 0 | $<$1 |
| Trace | 1-5 |
| +1 | 6-15 |
| +2 | 16-25 |
| +3 | 26-50 |
| +4 | $>$50 |

## 4. Results

Group 1 consists of 24 males and 36 females. Group 2 consists of 33 males and 27 females. Age distribution in two groups showed majority of patients between 61-70 years.

**Table 2:** Age distribution

| Age | Group 1 | Group 2 |
|---|---|---|
| 50-60 | 27 | 16 |
| 61-70 | 28 | 26 |
| $>$70 | 5 | 19 |

**Table 3:** Sex distribution

| | Group 1 | Group 2 |
|---|---|---|
| Males | 24 | 33 |
| Females | 36 | 27 |

42 Patients in heparin group i.e, 70% of cases showed 2+ AC reaction. 39 patients in non heparin group i.e, 65% showed 3+ AC reaction. P value $<$ 0.001 between group 1 and group 2 on first postoperative day AC reaction is statistically significant.

First postoperative week showed 70% i.e, 42 patients with 1+ reaction in group 1 whereas 58% i.e, 35 patients in group 2 showed 2+ reaction. p value $<$0.001 in first postoperative week AC reaction is statistically significant between these two groups as shown in Table 4.

One month postoperatively, patients had lesser reaction in both Group 1 and Group 2. P value of 0.064 showed AC reaction is not statistically significant between the two groups as shown in Table 4.

After 2 months anterior chamber reaction was nil in 100% of patients in Group 1 and 96%in Group 2. Two

**Table 4:**

| | | Group Group 1 | Group 2 | $\chi^{2Value}$ | P-Value |
|---|---|---|---|---|---|
| ACR 1 Day | 2+ | 42 | 10 | 34.93 | <0.001 |
| | 3+ | 15 | 39 | | |
| | 4+ | 3 | 11 | | |
| ACR 1 week | 0.5+ | 0 | 1 | 37.7 | <0.001 |
| | 1+ | 42 | 20 | | |
| | 2+ | 11 | 35 | | |
| | 3+ | 0 | 4 | | |
| ACR 1 month | NIL | 7 | 0 | 5.48 | 0.064 |
| | 0.5+ | 18 | 18 | | |
| | 1+ | 3 | 11 | | |
| ACR 2 months | NIL | 39 | 31 | 2.034 | 0.154 |
| | 0.5+ | 0 | 2 | | |
| | NIL | 60 | 58 | | |

**Table 5:**

| | | Group Group 1 | Group 2 | Total |
|---|---|---|---|---|
| Complications | CME | 1 | 4 | 5 |
| | NIL | 56 | 42 | 98 |
| | PIGMENTS ON IOL | 3 | 14 | 17 |
| Total | | 60 | 60 | 120 |

patients in Group 2 showed AC reaction of +0.5%. P value of 0.154 showed the AC reaction between heparin and non heparin to be statistically nonsignificant.

Postoperative complications such as CME was seen in 4 patients in Group 2 and 1 patient in Group 1. Pigments on IOL was seen in 14 pts and 3 pts of Group 1 and 2 respectively.(Table 5)

## 5. Discussion

Senile cataract is the commonest cause of avoidable blindness. Cataract surgery forms the major workload of eye units. It has progressed to refractive procedure that aims for post operative emmetropia. The quality of vision and early visual rehabilitation are the important parameters which determine success of modern cataract surgery.

Post operative inflammation poses a challenge for the Ophthalmologist. During MSICS, iris manipulation leads to iritis due to release of prostaglandins and moreover disturbance of the blood aqueous barrier in turn leads to inflammation. Addition of heparin to BSS does not lead to any undue complication to the eye, inturn it decreases the inflammatory reaction by inhibhiting fibrinous reaction after intraocular surgery and also by stabilizing the blood aqueous barrier.

Bayramlar and colleagues, Kernger et al[9] showed decreased postoperative fibrinoid reaction and late inflammatory complications with heparinised irrigating solution. In our study results we showed anterior chamber reaction decreased in heparin group particularly on postoperative day 1 and day 7 than at 1 month and 2 months between Group 1 and Group 2.

## 6. Conclusion

Addition of heparin to irrigating solution showed statistically significant lesser AC reaction in Group 1 than Group 2 at first and seventh postoperative day. There was no difference in the anterior chamber reaction in Group 1 and Group 2 at the end of postoperative 1 and 2 months.

## 7. Source of funding

None.

## 8. Conflict of interest

None

## References

1. Obstbaum SA. Biologic relationship between poly-(methyl methacrylate) intraocular lenses and uveal tissue. *J Cataract Surg*. 1992;18:219–231.
2. Kruger A, Schauersberger J, Findl O, Petternel V, Svolba G, Amon M. Postoperative inflammation after clear corneal and sclerocorneal incisions. *J Cataract Refract Surg*. 1998;24:524–528.
3. Miyake K, Sugiyama S, Norimatsu I, Ozawa T. Prevention of cystoids macular edema after lens extraction by topical indomethacin (III) radioimmunoassay measurement of prostaglandins in the aqueous during and after lens extraction procedures. *Graefes Arch Clin Exp Ophthalmol*. 1987;209:83–88.

4. Ursell PG, Spalton DJ, Whitcup SM, Nussenblatt RB. Cystoid macular edema after phacoemulsification: relationship to blood-aqueous barrier damage and visual acuity. *J Cataract Refract Surg*. 1999;25:1492–1497.
5. Miyake K, Masuda K, Shirato S, Oshika T, Eguchi K, et al. Comparison of diclofenac and fluorometholone in preventing cystoid macular edema after small incision cataract surgery: amulticentered prospective trial. *Jpn J Ophthalmol*. 2000;44:58–67.
6. Brown N, Hungerford J. The influence of the size of lens in ocular disease. *Trans Ophthalmol Soc UK*. 1982;102:359–363.
7. Sparrow JM, Bron AJ, Phelps NA, Brown NA, Neil HA. Biometry of the crystalline lens in late onset diabetes: the importance of diabetic type. *Br J Ophthalmol*. 1992;76:428–433.
8. Sparrow JM, Bron AJ, Brown NA, Neil HA. Autofluorescence of the crystalline lens in early and late onset diabetes. *Br J Ophthalmol*. 1992;76:25–31.
9. Bayramlar, Hüseyin. Heparin in the intraocular irrigating solution in pediatric cataract surgery. *J Cataract Refractive Surg*. 2004;30:2163–2169.

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