INTRODUCTION

Diabetic cataract is a disease in which blood glucose levels increase due to lack of insulin in vivo or decreased galactokinase activity in vivo, so that intraocular aqueous osmotic pressure increases, lens fiber swells, fractures or disintegrates, resulting in complete lenticular turbidity. Therefore, diabetic cataract is a major complication of diabetes. Compared to non-diabetic patients, diabetic patients are more susceptible to cataract in early stage.

Phacoemulsification is currently one conventional surgical treatment for cataract, which has such advantages as no incision or suture, less postoperative astigmatism and rapid visual recovery. However, it may cause varying degrees of damage to corneal endothelial cells and corneal incision, which then leads to corneal edema, turbidity, and in severe cases, corneal endothelial function decompensation, resulting in bullous keratopathy. With the rapid development of modern medical technology, phacoemulsification combined with intraocular lens implantation has become a safe and effective new treatment. It can significantly deepen the central and peripheral chamber depth, relieve pupillary block state, not only effectively reducing intraocular pressure, but also significantly lowering the incidence of complications.

The purpose of this study was to investigate the effect of phacoemulsification combined with intraocular lens implantation on aqueous inflammatory factor, oxidative stress response and peripheral blood hemorheologic indexes in diabetic cataract patients, so as to provide reference for clinical treatment of diabetic cataract.

ABSTRACT

Objective: To investigate the change on phacoemulsification combined with intraocular lens implantation on inflammatory factors IL-2, IL-6, hs-CRP, TNF-α; oxidative stress response indexes MDA, CAT, SOD, GSH-Px; peripheral blood hemorheologic index WHV, WMV, PV, PCV, FIB in diabetic cataract patients.

Study Design: An observational study.

Place and Duration of Study: Department of Ophthalmology, the Second Hospital of Shandong University, Jinan, China, from January 2015 to July 2017.

Methodology: One hundred and fifty-two diabetic cataract patients (160 eyes) were randomly divided into observation group and control group, each with 76 cases (80 eyes). The control group was treated with conventional therapy, while the observation group was treated with phacoemulsification combined with intraocular lens implantation on the basis of conventional treatment. After one month of treatment, the patients were tested for IL-2, IL-6, hs-CRP, TNF-α, MDA, CAT, SOD, GSH-Px, WHV, WMV, PV, PCV, FIB.

Results: After one month of treatment, the levels of IL-2, IL-6, hs-CRP and TNF-α were lower in the observation group (p < 0.001); the levels of SOD, GSH-Px and CAT were higher in the observation group (p < 0.001), while MDA level was higher in the control group (p < 0.001); the levels of WHV, WMV, PV were lower in the observation group (p < 0.001), and there was no significant difference in the levels of PCV and FIB between the two groups (p = 0.794 and 0.838, respectively).

Conclusion: Phacoemulsification combined with intraocular lens implantation can improve the level of aqueous inflammatory factors and oxidative stress response indexes in diabetic cataract patients and improve their level of hemorheological indexest.

Key Words: Phacoemulsification, Intraocular lens implantation, Diabetic cataract, Inflammatory factor, Oxidative stress.
Inflammatory factors, oxidative stress response and hemorheology in diabetic cataract

**METHODOLOGY**

This was an observational study done in the Department of Ophthalmology at The Second Hospital of Shandong University, from January 2015 to July 2017. Approval was taken from the Hospital's Institutional Review Board. Diabetic cataract patients (160 eyes) were enrolled in this study, without any surgical contraindications or active eye inflammation. The binocular lacrimal ducts were routinely irrigated to exclude infectious diseases. Exclusion any other diseases in heart, liver, blood, inflammation, endocrine, did not receive any treatment in the recent three months, and could actively cooperate with the relevant treatment with detailed clinical data provided before treatment.

One hundred fifty-two patients (160 eyes) were divided into observation group, and control group according to the random number table method, 76 cases in each group (80 eyes). Control group patients received conventional treatment of blood sugar reduction, intraocular pressure control and anti-inflammation. The observation group patients were treated with phacoemulsification combined with intraocular lens implantation, based on routine treatment. The phacoemulsification combined with intraocular lens implantation was performed by physicians with skilled surgical experience. Compound tropicamide eye drops were dripped three times half an hour before the operation, retrobulbar nerve blocking anesthesia was performed, transparent corneal incision was made, the anterior chamber was maintained with viscoelastic substance, continuous annular capsulorhexis was performed, lens nucleus and cortex were separated by water, crystalline lens were emulsified by phacoemulsification, residual cortex was extracted, posterior chamber intraocular lens were implanted, and the incision was stitched until watertight. All patients' operative eyes were treated with tobramycin dexamethasone eye drops, pranoprofen eye drops, in gradually reduced amount until withdrawal, sustained medication for 1-3 months.

After one month of treatment, 5 mL peripheral blood was drawn from the two groups of patients with empty stomach for hemorheology examination. Anterior chamber puncture was performed through corneal margin by 1mm, and 0.2 mL aqueous humor was collected for detection of inflammatory reaction and oxidative stress response. Inflammatory factors like IL-2, IL-6, high hs-CRP, TNF-α, and oxidative stress response indexes like MDA, CAT, SOD, GSH-Px were detected by enzyme-linked immunosorbent assay (ELISA). Hemorheologic indexes of the two groups, such as PV, WHV, WMV, FIB, PCV, were tested by automatic hemorheology tester.

Data was entered and analysed by using SPSS 21.0. P-value of less than 0.05 was considered significant. Measurement data like inflammatory factors, oxidative stress response indexes, and hemorheologic indexes were indicated in $\bar{x} \pm s$. The t-test was used to compare the outcome between two groups. $X^2$ test was used to compare count data like gender.

**RESULTS**

The study included 152 patients; out of which 86 (56.58%) were males with 90 (56.25%) eyes and 66 (43.75%) eyes. Seventy-two patients (47.37%) were of 41-54 years of age, and 80 (52.63%) 54~67 years of age. With 4~17 years of diabetes history, they had an average diabetes history of 12.5 ±1.6 years. With 1~6 years of cataract history, they had an average cataract history of 2.9 ±1.5 years. There were 50 (31.25%) eyes with a vision of 0.02~0.08, 60 (37.50%) eyes with a vision of 0.05~0.08, and 50 (31.25%) eyes with a vision of 0.10 ~ 0.30.

After one month of treatment, the levels of IL-2, IL-6, hs-CRP and TNF-α in the observation group were lower than control group (p <0.001, Table I); the levels of SOD, GSH-Px and CAT in the observation group were higher than control group (p <0.001, Table II), while MDA level in the observation group was higher in the control group (p <0.001, Table III), and oxidative stress response indexes like IL-2, IL-6, hs-CRP, TNF-α, and MDA, CAT, SOD, GSH-Px were lower in the observation group.
The results of this study show that and Treatment of diabetic cataract patients with phacoemulsification combined with intraocular lens implantation can significantly improve the level of aqueous inflammatory factors and oxidative stress response indexes in diabetic cataract patients and improve their level of hemorheological indexes, which is the first choice for treatment of diabetic cataract.

**REFERENCES**

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