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Original Article

Impairment of lacrimal drainage after cataract surgery

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Abstract

BACKGROUND: Complaining of tearing was found in some of our patients after phacoemulsification surgery for senile cataract. Secondary acquired lacrimal drainage obstruction has been proposed to happen due to different causes. This study was performed at Feiz hospital in Isfahan, Iran from September to December of 2004 to evaluate the effects of phacoemulsification surgery on tear drainage in eyes with senile cataract.

METHODS: This cohort study was performed on 110 patients with senile cataract who had phacoemulsification and posterior chamber lens (PCL) implantation surgery under topical anesthesia in one eye. Included patients had fluorescein disappearance and taste test duration of ≤5.5 minutes in both eyes before operation. Tear drainage function tests were repeated for one week and one month after surgery in both eyes and obtained data were compared.

RESULTS: The incidence of lacrimal drainage impairment in eyes treated for senile cataract was 35% in a week and 20% in a month after phacoemulsification surgery. The mean taste test duration time was 3.84 ± 0.77 minutes before surgery, 7.30 □ 4.80 minutes in a week and 6.31 ± 4.42 minutes in a month after surgery (P<0.001 and P<0.001 respectively). No post operation tear drainage impairment was observed in the sound eyes of the patients.

CONCLUSIONS: Impairment of lacrimal drainage can be predisposed by cataract surgery in eyes with senile cataract.

KEY WORDS: Lacrimal drainage, cataract surgery, phacoemulsification

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Complaining of tearing was found in some of our patients after phacoemulsification surgery for senile cataract. Decreased drainage or increased secretion of tear or a combined mechanism could be considered for the etiology of this symptom. Bartley proposed an etiologic classification system for secondary acquired lacrimal drainage obstruction (SALDO) which included infectious and inflammatory causes [1]. Tearing has been explained to be a sign of conjunctivitis and adverse ocular effect of topical ocular medications [2]. The term primary acquired nasolacrimal duct obstruction (PANDO) was explained by Linberg and McCormik in 1986 as idiopathic inflammation and fibrosis of nasolacrimal duct resulting in its partial stenosis or complete obstruction and its incidence was found to be higher in older individuals [3]. Most of pathologic specimens obtained during dacryocystorhinostomy from the PANDO cases revealed no significant pathology but a chronic inflammatory process [4-7]. This study was performed to evaluate the effect of phacoemulsification surgery on tear drainage functions of eyes treated for senile cataract at Feiz hospital (affiliated to Isfahan University of Medical Science) in Isfahan, Iran during September to December 2004.

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Methods

In this cohort study, 110 patients with senile cataract were selected for phaco-surgery in one eye. Lacrimal drainage function was tested by taste test [8,9] and dye disappearance test (DDT) [10] before operation, one week and one month after operation in both eyes of each patient. Taste test was performed separately for each eye with one hour interval by instillation of chloramphenicol 0.5% (Sina Daru, Tehran, Iran) drop in the inferior fornix which was repeated after 15 seconds. While the patient was in the semi-sitting position, the patient was asked to report the bitter taste when noticed. DDT was performed by simultaneous application of moistened fluorescein tapes in the inferior fornices of both eyes after topical anesthesia; the disappearance of the dye was observed and compared for six minutes using cobalt blue illumination. The included patients had symmetric dye disappearance and positive taste duration of ≤5.5 minutes in either eye before the operation. Poor responders to the taste of chloramphenicol and cases with a history of previous trauma or surgical intervention on the eyes and ocular adnexa were excluded from the study. Suture-less phacoemulsification and PCL implantation were performed by one surgeon (second author) in all patients under topical anesthesia. Superior sub-tenon injection of 1.5 ml of 2% xylocaine followed by a 3.2 mm limbal incision in temporal or superior part was done. Foldable acrylic lenses were implanted in the capsular bag by the help of hydroxypropyl methylcellulose which was removed after PCL implantation. 5% povidone solution was used for preparation of eyelids and conjunctiva (two drops for one minute duration) just before the surgery. Inferior fornix sub-conjunctival injection of 20 mg gentamycin and 2 mg of betamethasone was performed at the end of surgery. The patients were instructed to put on topical sulfacetamide10% every 8 hours and use betamethasone drops every 6 hours for two to three weeks in the post-operative period according to the severity of ocular inflammation. Washing the face and head was allowed after seven days from the operation time. Surgeries were uneventful except in one case with capsular tear and vitreous loss which were managed and PCL implanted. The tests were performed by the first and the third authors during the study. Eyes with poor dye disappearance (asymmetric DDT) combined with no positive response to taste test within 11 minutes, were defined to have lacrimal drainage impairment. Statistical comparison was performed between the taste test time durations obtained in the pre- and post-op periods for both eyes by paired t test.

Results

The study was performed on 100 patients who remained for the complete follow up, including 56 females and 44 males. The average age of the patients was 67.6 ± 8.92 years ranging from 51 to 90. The incidence of lacrimal drainage impairment in eyes being treated for senile cataract was 35% at one week and 20% at one month after phacoemulsification surgery, the mean taste test duration time was 3.84 ± 0.77 minutes before surgery, 7.3 ± 4.8 minutes at one week and 6.31 ± 4.42 minutes at one month after surgery ($P<0.001$ and $P<0.001$ respectively). No post-operation tear drainage impairment was observed in the sound eyes of the patients. Table 1 indicates the time durations of the taste test in the operated and the sound eyes of the patients in the pre- and post-operative periods.

Discussion

This study indicates that functional impairment of lacrimal drainage can happen after phacoemulsification surgery in eyes with senile cataract. Two mechanisms can be proposed for the results of this study: 1. Inflammation of the ocular surface and anterior segment of the operated eye could extend in to the lacrimal system and cause functional impairment and SALDO. Surgical trauma, subconjunctival injections and specially preparation of eyelids and conjunctiva with povidone solution before surgery could affect the extent of ocular inflammation too through leakage of povidone solution into the drainage system. 2. Less

forceful blinking by the patient in the early post-operation period might cause weakness of lacrimal pump that could simulate a functional occlusion in an already compromised lacrimal system of old age (de-epithelialization within the lacrimal drainage system and higher incidence of PANDO in individuals aged 50 to 70) [3]. Improvement in lacrimal drainage one month post-operation in comparison to one week post-operation ($P<0.05$) indicates that the effect of predisposing factors had gradually decreased. Although taste test is a subjective test with false negatives [8,9] and DDT is a gross test [10], there may be no better ways for functional evaluation of the lacrimal drainage. Exclusion of poor responders to taste test and using these tests in combination and might have decreased the faulty evaluations. Over secretion of tear as a cause of tearing was not evaluated in this study. Further studies may clarify the pathologic reason for the results of this study which can help us in its prevention and treatment.

Table 1. Lacrimal drainage taste test duration times in the operated and sound eyes of the patients before and after cataract surgery.

Number	1	2	3	4	5	6
Groups	Operated eyes before surgery	Operated eyes one week after surgery	Operated eyes one month after surgery	Sound eyes before surgery	Sound eyes one week after surgery	Sound eyes one month after surgery
Mean± SD (minutes)	3.84 □ 0.77	7.3 □ 4.8	6.31 □ 4.42	3.83 □ 0.79	3.84 □ 0.77	3.85 □ 0.77
Minimum-Maximum	(2.25 - 5.35)	(2.20 - 16.40)	(2.30 - 16.25)	(2.20 - 5.45)	(2.25 - 5.30)	(2.20 - 5.40)

Paired differences between groups; 1 and 2: $P<0.001$; 1 and 3: $P<0.001$;
2 and 3: $P<0.05$; 1 and 4: $P>0.1$; 4 and 5: $P>0.1$; 5 and 6: $P>0.1$.

Conclusions

The results of this study indicate that the lacrimal drainage system is prone to functional impairment in old patients. Phacoemulsification cataract surgery could work as a predisposing factor in this regard.

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