Evaluation of Macular Thickness in Patients Underwent Combined Cataract and Epiretinal Membrane Surgery

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Abstract

Cataract and idiopathic epiretinal membrane (ERM) are eye diseases especially seen in elderly people. We may observe them at the same time. Both surgeries may affect macular thickness and combining surgery may worsen macular edema. Total 54 cases that were operated for ERM, combined with cataract surgery or vitrectomy only, were included the study. Pre-operative, post-operative 1st week, 1st month, 3rd month and 6th month macular OCT images were taken. Macular thickness (MT) was decreased in both groups at the end of six months. When we compared the both groups measurements no difference was found. Pre-operative MT values and last visual acuity were correlated weakly. Visual acuity was also increased in both groups. But this was not significant between groups. In this study we found that combined surgery was not increasing macular thickness more than vitrectomy only in ERM surgery.

Keywords: Epiretinal membrane; Macula; Phacoemulsification; Vitrectomy

Introduction

Epiretinal membranes (ERM) are avascular fibro cellular proliferations at the vitreoretinal junctions [1]. Idiopathic epiretinal membranes are mostly seen in elderly people [2].

Cataract is pathology of crystalline lens that is also seen elderly people. Both cataract and ERM should affect the visual acuity and may be observed at the same time. Performing surgery in the same session may reduce cost and shorten the postoperative recovery [3].

Phacoemulsification surgery without any complication may affect macula. Cystoid macular edema (CME) is a cause of vision decrease after both complicated and uncomplicated cataract surgery and release of prostaglandins is the reason even after minimal traumatic surgery [4]. Degenerung studied on 108 nondiabetic and 24 diabetic patients, measured their macular thicknesses (MT) by SD-OCT before surgery and performed uncomplicated phacoemulsification and intraocular lens implantation. After surgery they followed up the patients and measured MTs' in every visit up to four weeks and found that the mean of the measurements increased from 183 ± 27 to 191 ± 37 microns at the end of the study [5]. Clinically and approved by optical coherence tomography, CME after uncomplicated cataract surgery is present in around 0%, 1%-2%, 35% respectively [6-8].

ERMs’ deteriorates visual acuity and also distorts images. Vitreomacular traction is present when vitreous separation is incomplete and an area of attachment of the ERM to the posterior hyaloid remains. The membrane may be associated with the presence of CME on fundus fluorescein angiography. Cataract appears in 47%-80% of cases and frequently requires surgical treatment within 2 years after the vitrectomy performed [9]. In this study our objective is to evaluate the macular thickness (MT) differences in early periods of combined cataract and vitrectomy and only vitrectomy surgery performed for patients who have epiretinal membrane.

Materials and Methods

Subjects

Between 2009-2015, selected 54 patients who were being performed pars plana vitrectomy or combined with cataract surgery for ERM are included the study. For 28 patients only vitrectomy and for 26 combined surgery was performed. Patients with ERM secondary to uveitis or trauma or associated with simultaneous retinal detachments, who have myopia more than 6D, were excluded. Patients operated for cataract after 6 months was also an exclusion criterion. Indication for ERM surgery is decreased vision below 20/80 measured by Snellen acuity test and combined cataract surgery if fundus periphery is not observed well.

Before surgery an informed consent was taken from all patients. The protocol was in accordance with the tenets of the Declaration of Helsinki. Visual acuity was measured with Snellen chart; results are converted into logMAR values. With a calibrated Goldman applanation tonometer ocular tension was measured. Anterior and posterior segment examinations were performed. Macular OCT images were taken by Cirrus HD-OCT (Zeiss Meditech AG, Jena, Germany). From the patients’ preoperative charts data concerning age, sex was gathered.

Surgery

Nepafenac drop is instilled three times for all patients before surgery. All surgeries are done by the same surgeon (Kocak I). Under local anesthesia first 23G vitrectomy ports were opened. After core and peripheral vitrectomy, if not detached, by using suction mode, posterior vitreous cortex was elevated and then vitrectomised. Trypan Blue was applied with another injector on macula from one port,
were instilled. In combined group under local anesthesia vitrectomy
implanted in the capsular bag. Machemer, today it's being performed worldwide. Improvement in
surgeries in vitrectomy only group at the end of six months, three cases
were operated more than a week. Retinal detachment
whenever they occur. No intravitreal hemorrhage and no endophthalmitis was
checked for tears. Air fluid exchange was made and C3F8 is injected,
the ports were removed. Nephefaeac sodium and topical antibiotics
were instilled. In combined group under local anesthesia vitrectomy
ports are opened first than clear corneal and two side port incisions are
made. After capsulorhexis, hydrodissection, hydrodelineation,
phacoemulsification, cortical cleaning, Alcon SA 60 intraocular lens is
implanted in the capsular bag. After this, ERM surgery is performed.
Nephefaeac drop is also applied to this group. Post operatively macular
OCT images are taken first week, after one month, 3rd month and 6th
month from every patient in both groups.

Statistical analysis
One way ANOVA for repeating measurements test is used for
significance of macular thickness (MT) results in each group, Man-
Whitney U test for to compare MT results of both groups,Wilcoxon
Rank Test for to compare visual acuities in preoperatively and at the
end of the study and correlation analysis for analyze any relation
between pre-operative MT measurements and last visual acuity.

Results
The mean age for combined surgery group was 68.16 ± 3.37 and
66.76 ± 8.36 for other group. Female/Male ratio was 15/13 and 14/12
respectively. MT was decreased significantly after the surgery in
combined group (0.043, p<0.05) and in vitrectomy group (0.04). But
when we compare the results between two groups there was no
significant difference (p=0.59, p<0.001). The Mean MT values of both
groups' at the beginning and at the end of the study are shown in Table

| Table 1: Mean macular thickness (MT) values of combined surgery and ERM surgery only group at the beginning and at the 6th month (latest) of the study. |
|---------------------------------------------------------------|
| Combined Surgery Group | ERM Surgery Only Group | p-value |
|------------------------|------------------------|---------|
| Mean MT before surgery  | 398 ± 63               | 432 ± 30 | 0.58    |
| Mean MT latest | 271 ± 34               | 271 ± 07 | 0.41    |

There was a positive but not strong correlation between end visual
acuity and pre-operative MT measurements in combined surgery
group (r=0.58, p<0.1) and vitrectomy group (r=0.41, p<0.1). Visual
acuity change between preoperative and at the 6th month measurements was significant (Table 2). It was increased in both groups.

Corneal edema was seen in 3 patients in combined surgery group
and in 1 in other group lasted more than a week. Retinal detachment
observed in one patient in vitrectomy only group and operated
immediately. No intravitreal hemorrhage and no endophthalmitis was
seen in both groups. No posterior capsule rupture was seen after
phacoemulsification in combined group. Two case undergone cataract
surgeries in vitrectomy only group at the end of six months, three cases
in combined surgery group had temporary elevated intraocular
pressure elevation and medicated for a short period. Recurrence of
membrane is seen in one case also in this group. There was 3
pseudophakic patients in vitrectomy group who were operated more
than a year before.

Conclusion
Since vitreoretinal surgery for epiretinal membrane is described by
Machemer, today it's being performed worldwide. Improvement in
visual acuity is seen 75%-85% of cases [10]. Different techniques are
used. In technique as described by Peyman is, after standard pars plana
vitrectomy ERM is elevated by a pick and then grasped by a forceps
and peeled [11]. We were not used pick, elevated and peeled
membrane by forceps. Non vitrectomised techniques are also described
but recurrence rate is too high and floaters are mostly seen [12]. At
the beginning only ERM peeling was enough but today it's generally
accepted to peel also internal limiting membrane because of reduced
recurrence rate [13]. So we also preferred peeling ILM. In Perrier's
study trypan blue was used for ERM peeling. And no related toxicity
was found for one year follow up [14]. No side effect was seen by using
trypan blue dye for ERM in our cases. We directly applied it on the
macula and waited for two minutes by stopping the irrigation without
air-fluid exchange. Because of its side effects on ganglion cells ICG is
not used and brilliant blue is preferred for ILM peeling. There are
reports about increasing complications in cataract surgery in
vasectomized eye [15]. It's pointed out that if surgeons wait longer for
cataract extraction, they could be faced with perioperative
complications. In our study two patients were undergone surgery at the
end of six months and no complication was seen. A common complication of combined surgery is PCO but this is generally seen as a long-term complication and was not seen in our short term study [16]. In our study we found reduction in MT measurements in both groups. At the end of six months mean MT was 271 ± 71.99 and 269.07 ± 108 microns respectively and it was better than the measurements in Dugas study (406 ± 74 in combined group, 416 ± 84 in vitrectomy group) [17]. There wasn't MT difference between two groups in Yi and co-workers [18] study that was similar with our results. Mean MT of vitrectomy only group seems a little bit higher than the other group but at the end of the study they were almost equal in our study. Visual acuity change in our study was also significant as these two authors' results and our cases mean ages were younger.

It's defined in the prospective non randomized controlled clinical study of Mylonas et al that the mean MT was greater after successful cataract surgery in cases that were operated for ERM before [19]. Various theories have been proposed for the MT increase including releasing of inflammatory mediators during the surgery [20]. Nepafenac, as a non-steroidal anti-inflammatory drug, prevents cystoid macular edema especially in diabetics after cataract surgery [21]. We instilled it before and after surgeries of both groups. This may affect MT but needs prospective randomized clinical study. In a new study, Kauffmann showed preoperative prognostic factors for combined surgery in idiopathic ERM is pointed out such as age, disease duration and photoreceptor layer impairment [22]. Also in this study Kauffmann and co-workers found that there was no correlation between initial MT and final visual acuity in their combined surgery group. We found weak but positive correlation. We didn't studied on factors predicted by Kauffmann and this may be one the weakness of our report and the others are our limited case series and it's a retrospective study. The reason for this study limited to 6 months is we wanted to do measurements before cataract surgery of vitrectomy only group. The other authors were continued to measure MT also after phacoemulsification.

As conclusion we found that uncomplicated cataract surgery was not increased macular thickness when combined with vitrectomy in ERM surgery.

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