Research Article

Early Visual Recovery in Patients with Diabetic Macular Edema After Giving Intravitreal Injection Avastin and Posterior Subtenon Triamcinolone

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Abstract

Objective:

To determine the combine role of intravitreal injection Avastin and Posterior subtenon triamcinolone.

Methodology:

This prospective-randomized control trial study was conducted at Civil hospital Karachi, Pakistan from January 2019 to October 2019. Ethical approval of the study was taken from Review Board of Baqai hospital of Diabetology and Endocrinology. Subject were categorized into two study group; Group A was treated with combine treatment of intravitreal injection Avastin and Posterior subtenon triamcinolone. Group B was treated with intravitreal injection Avastin only. The changes in BCVA (best corrected visual acuity), IOP (intraocular pressure) and CMT (central macular thickness) were compared between the two groups.

Results

In group A 42 (50.6%) were included and treated with combine treatment of intravitreal injection Avastin and Posterior subtenon triamcinolone. Whereas, in group B 41 (49.4%) were treated with intravitreal injection Avastin only. In group A gender male, hypertension, smoking shows significant results as compared to group B. Baseline and follow up characteristics (BCVA, CMT, IOP and change in RNFL) of group A shown statistically significant, while (BCVA, CMT and change in RNFL) were found significant in group B.

Conclusion:

The outcome of this study revealed that combine intravitreal injection Avastin and Posterior subtenon triamcinolone in DME induced earlier visual recovery and decreased CMT noted.

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Key Words: Intraocular pressure; bevacizumab; subconjunctival; BCVA; IOP

Introduction

The DME (diabetic macular edema) was found as foremost cause of visual loss or visual diminishing in any stage of diabetic retinopathy[1]. Prevalence of DME was estimated in the district of America as 6.4%, in South East India as 6.3%, and in Western Pacific region 5.6%. Whereas in the Europeon and Eastern Medeterian region, it was slightly higher 8.9% and 11%, respectively[2]. Macular oedema develops through, breakdown in the inner blood-retinal barrier (BRB), that permits fluid to accumulate in

cystoid spaces within the retina in those who were suffering from retinopathy due to diabetes[3].

Primary treatment of retinopathy due to diabetes indicates that focal/grid laser of photocoagulation effectively decline the moderate risk of vision loss in macular edema. Other studies also determine limited efficacy of grid laser photocoagulation because of progressive macular scar and subretinal fibrosis[3,4]. In addition, other treatment modalities are evaluated including intravitreal triamcinolone acetonide (IVTA), anti-vascular endothelial growth factor (VEGF) and pars plana vitrectomy therapy, respectively[5]. Anti-VEGF therapy was used as a first-line treatment for DME since it has many beneficial effects were reported[5] rather than that all DME patients does not respond towards this therapy. Another treatment such as intravitreal TA injection expose efficacy towards DME[6,7]. Whereas, IVTA injection use leads to the development of eye related complications including cataracts, IOP (elevated intraocular pressure), sterile and infectious endophthalmitis. On the other hand, pseudophakic macular edema and uveitis have been treated with posterior stTA (subtenon triamcinolone acetonide) injection[8]. Contrastingly, previous study reported that stTA posterior injection do not show adverse events as describe for early DME treatment[8]. It was found that Posterior sub-tenon methylprednisolone acetate injection was beneficial in the improvement of early visual recovery in diffuse DME that be unsuccessful to respond to laser photocoagulation and intra-vitreal anti-VEGFs[9]. Thus, our study aimed to determine the effect of intravitreal injection of Avastin (IVIA) and Posterior subtenon triamcinolone (PSTA) in diabetic patients treating macular edema secondary diabetic retinopathy.

Methodology

This prospective-randomized control trial study was carried out from 2019 January to October at Civil Hospital Karachi, Pakistan. Ethical approval of the study was taken from Review Board of Baqai hospital of Diabetology and Endocrinology with approval no BIDE/IRB/SSULTAN/08/10/19/0212. Subject were categorized into two study group; Group A was treated with combine treatment of intr-avitreal injection Avastin and Posterior subtenon triamcinolone. Group B was treated only with intravitreal injection Avastin only. Data was collected through a predesigned questionnaire from selected subjects. After taking assigned informed consent demographic (age, gender, BMI) and clinical parameters (HbA1c, cholesterol, HDL, LDL, and triglyceride) were recorded.

In each patient, best-corrected visual acuity (BCVA) assessed followed by an examination, through slit lamp by microscopy, clinically significant macular edema or suspected diabetic macular edema detected. CMT was analysed by OCT, were evaluated before giving stTA injection at baseline ,3rd month, and 6th months, after at least 3 doses of Avastin or 3 doses of Avastin+stTA. Status of lens at each appointment was assessed to determine posterior subcapsular cataract.

Patients with diabetic macular edema who were not responded with Avastin were included in the study and there CMT was not decreased by more than 30 µm after > 3 consective IVB injection. CMT increased after at least 2 injection of Avastin.

Patients with history of occlusion retinal vein, occlusion retinal arterial, ischemic related macular oedema, membrane of epiretinal, uveitis or any disease of chorioretinal other than retinopathy due to diabetes, focal or grid laser previous treatment, photocoagulation of pan retinal and previous IVTA or stTA treatment, surgery history of cataract, within last 3 months were excluded.

BCVA and IOP were measured by using chart of Snellen visual acuity, and tonometry of goldmann applanation. Optical coherence tomography of spectral-domain was used to analyse CMT.

Foveal thickness was demarcated as the average central 1000-µm diameter thickness of the Primary Diabetic Retinopathy treatment. Statistical Package for Social Sciences (SPSS) ver. 20.0 was performed for all statistical tests. Paired t-test was applied between each followed-up period for comparing results.

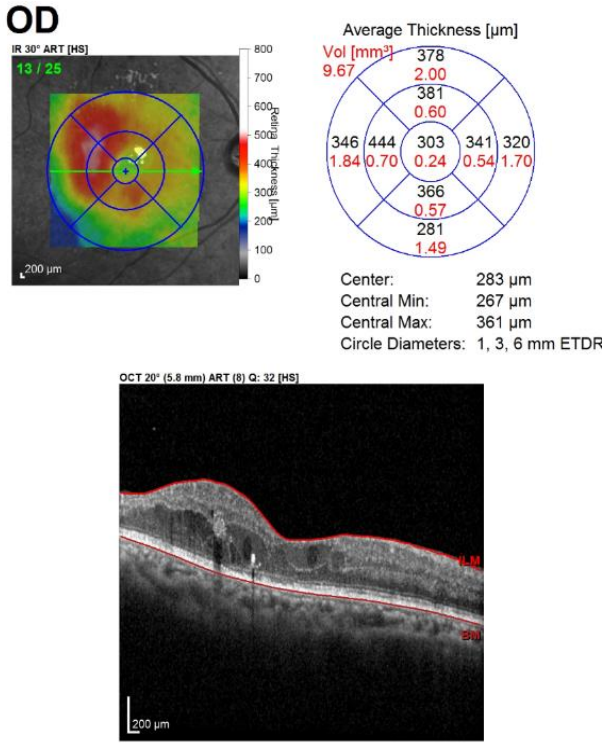
Result:

Patients baseline and demographics characteristics are shown in table 1. Total no of eye in group A were 42(50.6%) and 41(49.4%) in group B. In group A gender male only hypertension, cholesterol and smoking show significant results as compared to group

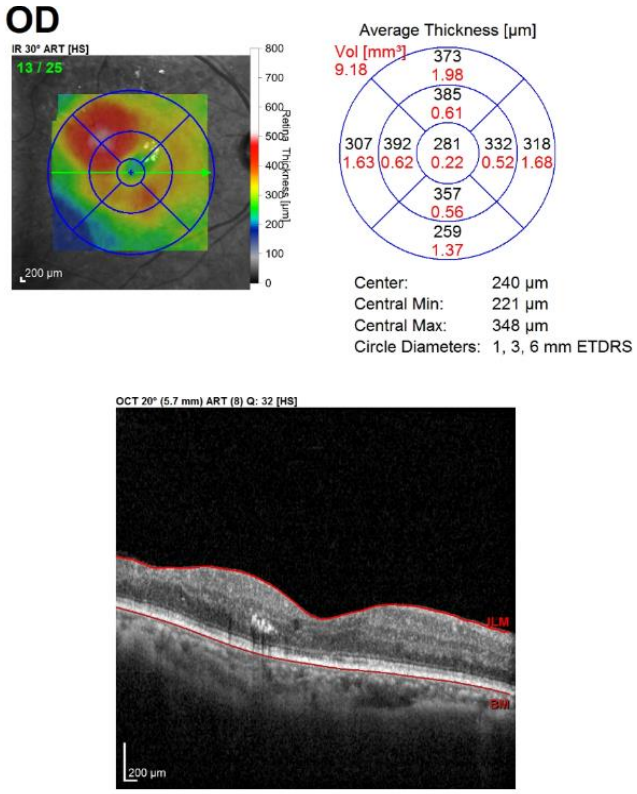
B. In classification of maculopathy eyes diffuse and mixed (ischemic + exudative) type were statistically significant as compared to group. Lens status (55.6%) ,(48.4%) ,Phakia and Pseudophakia in group A, whereas (44.4%) and (51.6%) in group B.

In table 2, baseline and follow up characteristics of group A were shown. In group A, BCVA improved significantly from baseline,3rd month and 6th month, mean (0.19), (0.5) and (0.8) µm, ($p<0.05$). CMT, IOP, and change in RNFL in group A from baseline, mean (501.21), (14.7), (112.4) µm, at 3rd month (238.8), (15.1), (103.1) and at 6th month (210.16), (16.9), (96.8), ($p<0.05$) respectively. The difference between baseline to 6th months treatment measurements for each parameter in the same group was found significant.

In table 3, baseline and follow up characteristics of group B were shown. In group B, BCVA improved from baseline 3rd month and 6th month, mean (0.28), (0.4) and (0.61), ($p<0.05$). CMT and change in RNFL in group B from baseline, mean (549.18), (112.4), at 3rd month (209.33) (107.01) and at 6th month (210.16), (100.43), ($p<0.05$) respectively.



Case 1: *Figure (a) shown before intravitreal injection effect and figure (b) shown effect after treatment.*



Case 2: *Figure (a) shown before intravitreal injection effect and figure (b) shown after effect treatment.*

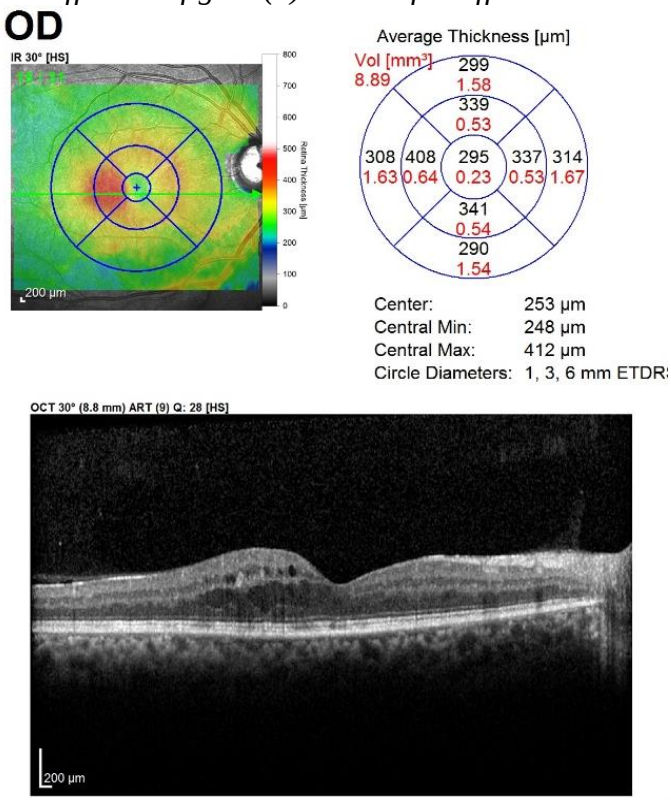


Figure (II-b): *After Intravitreal Injection*

Table 1: Baseline Characteristics of study group

Parameters		Group A	Group B
No of eyes		42(50.6%)	41(49.4%)
Gender	Male	21(53.8%) *	18(46.2%)
	Female	13(46.4%)	15(53.6%)
Laterality	OD;Right eye	19(47.5%)	21(52.5%)
	OS; Left eye	23(52.3%)	21(47.7%)
Duration of T2D		13.1±4.60	12.8±5.21
Risk Factors			
Hypertension		31(51.7%)	29(48.3%)
Dyslipidemia		25(48.1%)	27(51.9%)
Nephropathy		26(52.0%)	24(48.0%)
Smoking		6(66.7%) *	3(33.3)
Classification of Maculopathy eyes			
Focal		1(100%)	0(0%)
Diffuse		3(37.5%) *	5(62.5%)
Mixed(ischemic+exudative)		5(71.4%) *	2(28.6%)
CSME		33(49.3%)	34(50.7%)
LENS STATUS			
Phakia		10(55.6%) *	8(44.4%)
Pseudophakia		31(48.4%)	33(51.6%)
Aphakia		1(100%)	0(0%)

P<0.0.5 was considered, Data presented as n (%)

Table 2: (GROUP A): Change in BCVA, IOP, CMF and RNFL

Characteristics	Baseline	3rd Month	6th Month	P-value
BCVA	0.19±0.095	0.5±0.1	0.8±0.12*	P<0.001
IOP (µm)	14.7±3.1	15.1±3.3	16.9±2.3*	P<0.04
CMT (mmHg)	501.21±74.77	238.8±24.9	294.3±3.391*	P<0.02
Change in RNFL (µm)	112.4±34.13	103.1±17.08	96.8±15.31*	P<0.032
Changes in RNFL thickness(µm)	0.56±0.31	1.38±1.11	1.38±1.53	P<0.059

Best-corrected visual acuity (BCVA), Intraocular pressure (IOP), Central macular thickness (CMT), Retinal nerve fiber layer (RNFL), Data presented as mean±SD P<0.05

Table 3: (GROUP B): Change in BCVA, IOP, CMF and RNFL

Characteristics	Baseline	3rd Month	6th Month	P-value
BCVA	0.28±0.083	0.4±0.13	0.61±0.21*	P<0.001
IOP (µm)	14.7±1.2	14.7±1.9	15.2±2.2	P<0.071
CMT (mmHg)	549.18±43.3	209.33±82.41	210.16±72.34*	P<0.0001
Change in RNFL (µm)	110.4±41.43	107.01±27.3	100.43±19.33*	P<0.005
Changes in RNFL thickness(µm)	0.61±0.11	1.43±1.11	1.41±1.12	P<0.060

Best-corrected visual acuity (BCVA), Intraocular pressure (IOP), Central macular thickness (CMT), Data presented as mean±SD P<0.05

Discussion:

Macular edema remains one of the major causes of visual acuity loss in diabetic patients[8]. The main finding of present study was BCVA and CMT signifycantly improved by giving the combine treatment of intravitreal injection Avastin and Posterior subtenon triamcinolone from baseline, 3rd month, and 6th month but IOP was not much improved. Single treatments of intravitreal Avastin injection found not sufficient to control DME during the disease of entire course, which shown late response intravitreal injection in contrast Avastin and Posterior subtenon triamcinolone shown quick response. This study results were consistent to the study that describe the multiple intravitreal injections has potential to develop complication but combination of subtenon TA and intravitreal bevacizumab has effective to treat DME[10]. Previous studies that reported the comparative outcome of injection intravitreal with subtenon posterior injection of triamcinolone[11]. Injection intravitreal was more suitable than the subtenon posterior injection for functional and anatomic improvement aspects until both used to enhance the effect[12]. Another study determines intravitreal single bevacizumab or bevacizumab triamcinolone plus injection effects larger macular thickness reduction signifycantly in patients with diabetes in standard treatment of laser comparison. However, triamcinolone plus bevacizumab injection group shown decrease in macular thickness was only associated marginally with visual improvement acuity[13]. Present study determined that intravitreal injection Avastin along with subtenon posterior triamcinolone in patients with edema of diabetic macular beneficial effect on recovery of eye.

On the contrary previous studies proposed that injection intravitreal found more effective as compare to subtenon posterior injection for treatment of refractive diffuse diabetic macular edema[14]. Subtenon Posterior (PSTT) and triamcinolone intravitreal (IVT) injections enhance visual acuity and a decrease in thickness of central foveal, particularly in the short time period. However, PSTT injection found to be a safe and effective technique for the treatment of DME[15].

Thus, intervention on combination of intravitreal injections of corticosteroids and anti-VEGF drugs had proposed to treat DME[16]. Similarly, earlier study also reported combined treatment protocol decreased CMT effectively below 300 µm provided improvement of visual acuity and stabilization at the end of 3-month follow-up.

Marey et al., reported that bevacizumab intravitreal was better if treated alone as compared to both intravitreal TA and combined bevacizumab-TA intravitreal reason higher intra ocular pressure (IOP)[15]. Another study showed the visual and foveal thickness improvement in Posterior sub tenon (PST) Combined with laser macular therapy[17]. On the other hand, intravitreal injection of bevacizumab combined with or without triamcinolone acetonide was effective in treatment of DME supported this study [18].

Conclusion:

This study concludes that combination of subtenon triamcinolone and intravitreal bevacizumab is effective and safe for early visual recovery and to treat DME.

Ethical Approval: Given
Conflict of Interest: The authors declare no conflict of interest
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