ORIGINAL ARTICLE

Comparison Between Intravitreal Triamcinolone Acetonide and Posterior Sub-Tenon's Injection in Treating Diabetic Macular Edema

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ABSTRACT

Objective: To compare the efficacy of intra-vitreal versus sub Tenon triamcinolone acetonide administration in treatment of Diabetic Macular Edema(DME).

Patients and Methods: This prospective clinical, pilot study was conducted at the Armed Forces Institute of Opthalmology, Rawalpindi from January 2011-April 2011. 12 patients 6 in each group were recruited at AFIO Rawalpindi, 6 underwent IVTA and the other 6 PSTI, Macular thickness and visual acuity were checked at baseline 01 and at 03 months and IOP was measured at baseline at 2 weeks.

Results: There was no statistical difference between the efficacy of either modality. Both groups showed a statistically significant decrease in Macular thickness, improvement in visual acuity and maintenance of IOP.

Conclusions: PSTI can be explored as a viable alternative to IVTA with reduced side effects.

Key Words: Diabetic Macular edema, Intra-vitreal Triamcinolone Acetonide, Sub Tenon's.

INTRODUCTION

Diabetes Mellitus affects 200 million people globally.[1] Diabetic retinopathy remains one of the leading threats to eye sights of the working population in the developing world.[2] Diabetic Macular edema is a manifestation of diabetic retinopathy that causes loss of central vision.[3] Visual loss is more commonly due to proliferative changes in Type I diabetes and attributable mainly to macular edema in Type II diabetes.[3]

Diabetic Macular edema (DME) is characterized by increased vascular permeability and the deposition of hard exudates at the central retina. Diabetic macular edema is now considered the principle cause of vision loss in diabetic patients.[4]

Triamcinolone acetonide has been shown to be efficacious for diffuse macular edema when administered through intravitreal or posterior sub-Tenon's route, especially in cases refractory to laser treatment.[5,6]

A previous study showed that intravitreal triamcinolone acetonide administration (IVTA) was more efficacious than posterior Sub Tenon's injections (PSTI) for the management of DME.[7] Several other studies have reported that PSTI is just as effective as IVTA and can be accepted as a valid alternative to PSTI.[8,9], while avoiding serious complications like endopthalmitis and retinal detachment.

The purpose of our pilot study is to evaluate whether there's any difference in efficacy between the IVTA and PSTI as gauged by visual acuity and macular thickness. A larger scale study can then be carried out.

PATIENTS AND METHODS

This prospective clinical, pilot study was conducted at the Armed Forces Institute of Opthalmology, Rawalpindi from January 2011-April 2011. A total of 12 patients were treated in which 6 were given PSTI and 6 were given IVTA. All patients were phakic and showed diffuse macular edema without retinal-vitreous traction. Exclusion criteria was history of uveitis episodes, previous ocular surgery, glaucoma and ocular hypertension.

In all the patients the best corrected visual acuity was assessed using Snellen chart and then converted to logarithm of the minimum angle of resolution (logMAR) visual acuity, as well as

intraocular pressure (IOP) applanation tonometry and anterior and posterior segment slit lamp biomicroscopy. Macular edema was defined by central thickening revealed with biomicroscopy using a 90-diopter non-contact lens and by diffuse fluorescein leakage on fluorescein angiography (FA). Macular thickness was measured by optical coherence tomography (OCT).

For the IVT injection, a volume of 0.1 ml containing 4 mg preservativefree TA (Kenacort, Bristol-Myers) was injected through the inferotemporal pars-plana (4.0 mm posterior to the limbus) using a 27-gauge needle. Indirect ophthalmoscopy was used to confirm correct intravitreal localization of the suspension. After the injection topical 0.3% ofloxacin eye drops were prescribed for one week.

For the PSTI injection, a 1ml of a 40 mg/ml of triamcinolone acetonide (Kenacort, Bristol-Myers) was given in the inferotemporal quadrant using a 27- gauge needle on 2.5-ml syringe. After injection topical 0.3% Ofloxacin ointment was prescribed.

Subsequently, IOP was checked after two weeks and visual acquity and macular thickness were measured at two weeks, one and three month using Snellen chart and OCT respectively.

Data was analyzed using SPSS version 16. Descriptive statistics for macular thickness, IOP, visual acuity, gender and age were analyzed. Independent and paired t tests were used to analyze data.

RESULTS

The mean age of the patients was 60.7 years. Mean Macular thickness at all follow up times for both groups are shown in Table 1, which were not statistically different. There was no statistically significant difference between the visual acuity recorded at baseline and all follow up times, between the groups, results are shown in Table 2. Intra-occular pressure showed a similar trend and the results are shown in Table 3.

Table 1: Macular thickness

	Macular thickness IVTA (µm)	Macular thickness PSTI (µm)	P<0.05
Baseline	404.33±77.249	464.33±126.735	0.552
01 month	320.67±50.401	374.50±94.982	0.286
03 month	287.50±31.854	329.50±67.764	0.183

Table 2: Visual Acuity

	Visual Acuity IVTA	Visual Acuity PSTI	P<0.05
Baseline	0.983±0.368	0.940±0.394	0.548
01 month	0.786±0.368	0.790±0.421	0.977
03 month	0.676±0.374	0.576±.0366	0.092

Table 3: Intra-occular Pressure

	IOP IVTA	IOP PSTI	P<0.05
Baseline	14.33±1.5	17.33±3.7	0.113
2 weeks	15.0±2.7	17.0±1.09	0.146

There was a statistically significant difference in the macular thickness between baseline and 01 month and also between 01 month and 03 month follow up times for both groups. Macular thickness decreased in a statistically significant manner in both groups but was not different between groups p<0.05 (with equal variances not assumed). Intra ocular pressure decreased for PSTI and slightly increased after IVTA but the difference was not statistically significant. There was a similar trend in visual acuity improvement for both groups.

DISCUSSION

This study demonstrates that three months after the intravitreal injection of TA and the subtenon injection of TA there is a statistically significant improvement in visual acuity and an equally

significant reduction in retinal thickness, there was no significant difference in macular thickness reduction between the two groups.

In the past years Triamcinolone Acetonide injections via intra vitreal or sub Tenon's route has yielded favorable results in DME patients that were refractory to laser treatment.[5,10,11]

IVTA may be used after failure of initial laser treatment, or, instead of laser treatment as the primary therapeutic modality in some cases.[12,13] The effects of corticosteroid delivered by IVTA treatment do not last longer than 6 months, and recurrence of macular edema often requires repeated IVTA applications.[5,6] The problem with repeated intraocular injections of triamcinolone acetonide is that patients become predisposed to the cumulative risk of injection-related complications such as cataract progression, infectious endophthalmitis, intraocular hemorrhage, retinal detachment, and glaucoma.[14-16]

A previous study compared treatment results in patients with diffuse DME after intravitreal injection and sub-Tenon's infusion of triamcinolone acetonide and suggested that IVTA treatment may be more effective than PSTI.[9] On the other hand, some other studies demonstrated that PSTI would be a valid alternative to the IVTA.[7,8] Cellini[8] and colleagues showed comparable results between PSTI and IVTA, their explanation for the better results was based on an improved TA delivery modality.

In our study, since the macular thickness in both the groups decreased similarly, it is suggested that PSTI could prove to be an equally effective and yet safer alternative.

According to atleast once study the IVTA group showed a longer duration of resolved macular edema[17] , however, the effect of triamcinolone acetonide injections through either route seems to have a transient effect and begins to wear out after 3 months, repeated injections are hence necessary. Owing to this factor it may be wiser to choose a safer yet effective route of administration.The same study[17] showed promise in combining PSTI TA and modified grid laser treatment for improvement in macular thickness and visual acuity.

Other treatment modalities for the management of DME include, modified grid laser treatment alone, antibodies against VEGF delivered through intra vitreal route, Chun et al reported that ranibizumab therapy has the potential to maintain or improve Best corrected visual acquity (BCVA) and reduce retinal thickness in patients with DME. In addition, intravitreal injections of the aptamer pegaptanib sodium in patients with DME have been shown to improve VA and retinal thickening.[18]

This pilot study has given some insight to the potential of PSTI modality as a replacement for IVTA without, loosing efficacy. A larger scale study would better depict statistical significance.

CONCLUSIONS

There is no statistical significant difference between the efficacy of IVTA and PSTI modalities. PSTI can be used in place of IVTA as it is a safer procedure.

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