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Comparison of Intravitreal Triamcinolone with Posterior Subtenon Triamcinolone for Cytoid Macular Edema in Diabetic Patients

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Abstract

Aim: Comparison of intravitreal triamcinolone with posterior subtenon triamcinolone for cytoid macular edema in diabetic patients.

Method: A prospective controlled study was carried out at VMMC and Safdarjung Hospital, New Delhi in 200 eyes of Diabetic patients. Inclusion criteria included phakic diabetic patients complaining from cystoid diabetic macular edema without vitreomacular traction. The patients were divided equally and randomly into two groups; IVT group and PST group. Visual Acuity, CMT and Iop was recorded pre and post injection in both groups.

Result: There was a statistically significant improvement in visual acuity in both groups and reduction in CMT IN BOTH GROUPS. There was no statistically significant difference between these two parameters in both groups. However IOP rise was more seen in IVTA group.

Conclusion: Both the methods help in cystoid diabetic macular edema as proven in our study and hence serve as a cheaper alternate to Anti-VEGF. Also PST injunctions can be equally efficacious with less side effects overall and also less affect on the IOP as compared with IVTA injections.

Keywords: Diabetes; Macular edema; Triamcinolone Acetenoide; Intravitreal subtenon

Background

Macular edema is the commonest cause of visual loss in diabetic patients. Damaged tight junction in-between endothelial cells and pigmented epithelial cells lead to water and electrolytes leakage. According to the Early Treatment Diabetic Retinopathy Study (ETDRS), macular laser blocked further visual loss in half of patients. However, it was unable to restore the vision. Complications of intravitreal triamcinolone injections include hemorrhage, endophthalmitis and retinal detachment. Subtenon triamcinolone injection might be a better choice, less invasive and deliver same therapeutic dose for the management of intermediate uveitis and macular edema [1-3]. The aim of this study was to evaluate and compare the two methods of triamcinolone delivery in cystoid macular edema in diabetic patients.

Methods

A prospective controlled study was carried out at VMMC and Safdarjung Hospital, New Delhi in 200 eyes of Diabetic patients. Inclusion criteria included phakic diabetic patients complaining from cystoid diabetic macular edema without vitreomacular traction. Patients were informed about the procedures and the study aim. In all the patients; the best corrected visual acuity was reported using Snellen chart, as well as intraocular pressure (IOP) using applanation tonometry, Central macular thickness (CMT) was evaluated by optical coherence tomography. Exclusion criteria included previous ocular surgery like cataract, glaucoma, ocular hypertension and uveitis. The patients were divided equally and randomly into two groups; IVT group and PST group. Procedures for the IVT injection, the surface anesthesia with topical paracaine, followed by skin sterilization with 5% povidone, iodine. A paracentesis was done. A volume of 4 mg of triamcinolone in 0.1 ml was injected 3mm behind the limbus in the inferotemporal pars-plana using a 27-gauge needle. For the posterior SBT injection, the patients' eyes were directed superonasally. He conjunctiva and the Tenon's capsule were incised and 1 ml of a 40 mg/ml of triamcinolone acetonide was given in the inferotemporal quadrant using 23G cannula. Both groups received a topical antibiotic like moxifloxacin post op for 2 weeks. The BCVA , IOP and CMT were reported one week, one month and three months.

Statistical Method Used

Sample size was selected by convenient sampling technique. The sample size was selected by convenience sampling technique. The sample size was determined by the statistician based on the

average number of diabetic retinopathy patients seen in the eye OPD. Chi Square test was used as the statistical method.

Limitation of the study

Due to short duration of study, convenience sampling technique was followed. Thus sampling size was also calculated by convenience. The results of the study cannot be generalized due to the potential bias resulting from the sampling technique and sample size estimation.

Results

The intravitreal triamcinolone injection treated eyes showed statistically significant improvement in best corrected visual acuity, one month postoperative and three months postoperative of treatment when compared to the preoperative values. Significant improvement was displayed also in eyes treated with PST injection, again one month postoperative and three months postoperative. There was an average gain of 3 lines at the end of 3 months and an average gain of 1 line at the end of one month in both the groups-with no statistical difference between the two groups. No statistically significant difference in best corrected visual acuity was found between both groups during follow-up visits. The CMT of IVT injection treated eyes were significantly reduced both one month (212 ± 14μm; $p < 0.001$) postoperative and three months (245 ± 14μm; $p < 0.001$) of treatment when compared to the baseline values of 403 ± 18 μm. The eyes treated with PST injections showed significant improvement one month postoperative (215 ± 14μm; $p < 0.001$) and three months postoperative (255 ± 13μm; $p < 0.001$) of treatment when compared to the baseline values of 433 ± 18 μm. The improvement in CMT was statistically insignificant between the two groups. There was significant increase in the IOP of the IVT treated eyes one month postoperative (20.8 ± 1.8 mmHg; p=0.03), three months (19.2 ± 1.2 mmHg; p=0.02) when compared to baseline value (15.6 ± 1.6 mmHg). Glaucoma reduction eye drops were used to control the IOP. The eyes treated with PST injection showed significant elevation in the IOP only at one month (18.4 ± 1.4 mmHg; p=0.01). IOP aier three ms was (15.6 ± 1.6 mmHg) comparable to baseline value (15.4 ± 1.4 mmHg) (p=0.1). The mean IOP was significantly higher in IVT group than in SBT group at one month. However, it was statistically Insignificant at three months of treatment.

Discussion

Macular edema is the main cause of loss of visual acuity in diabetic patients. Damaged tight junction in-between endothelial cells and pigmented epithelial cells, lead to water and electrolytes leakage. According to the Early Treatment Diabetic Retinopathy Study (ETDRS), macular laser blocked further visual loss in half of patients. However, it was unable to restore the vision and was not effective in the treatment of cystoid macular edema. The diabetic retinopathy presents with features of chronic inflammation such as; vasodilatation, blood flow increase, tissue edema and vascular permeability. All experimental data such as; leukostasis in diabetes with adhesion of activated molecules to the endothelium, increased production of prostacyclin, vascular endothelial growth factor (VEGF) and macrophage cellular component confirm the involvement of proLnflammatory molecules in the early stages of diabetic retinopathy. Corticosteroids inhibit the initial arachidonic acid cascade, down regulate the cytokines and support the blood-retinal barrier [1,2]. The complications of intravitreal TA were endophthalmitis, intraocular hemorrhages, retinal detachment and IOP elevation in 20% to 80% of patients [1]. The subtenon TA was used in the management of intermediate uveitis and cystoid macular edema. A Correct injection makes delivery of the drug in the macular area is possible [1]. Our study/ work proved that intravitreal injection of TA and the subtenon injection of TA improved the visual acuity and an equally reduced the retinal thickness. A significant elevation of the IOP is seen in treated eyes and was proved at one and three months in the form of raised IOP. This was more in case of intravitreal injection-hence PST injunctions can be equally efficacious with less side effects overall and also less affect on the IOP.

In a pilot study performed by Chew et al, they proved less central subfield thickness in PST subgroup [2]. Song et al. [3] found a better improvement in visual acuity 8 weeks with IVT with less macular thickness which was superior to intravitreal bevacizumab injection [3]. On the other hand Marey et al. [4] stated that intravitreal bevacizumab alone was better and safer than both intravitreal TA and combined intravitreal bevacizumab-TA because of higher IOP [4]. Also Chung et al. [5] proved the visual and foveal thickness improvement in PST Combined with laser macular therapy. It was comparable to IVT with lower IOP elevation [5]. Wang et al. [6] proved that, intravitreal injection of bevacizumab combined with or without triamcinolone acetonide was effective in treatment of DME [6]. Choi et al., Cellini et al. and Qi et al. reported that IVTA and PST had same effects on DME, but that IVTA elevated IOP. Ozdek et al. proved that 8.2% of the SBT cases showed a significant elevation in IOP (>21 mmHg), and 24.3% of cases in the IVT group had a significant elevation in IOP [7]. Bakri & Kaiser reported minimal elevation in IOP at 3 months that was normalized at 6 months.

Conclusion

Both the methods help in cystoid diabetic macular edema as proven in our study and hence serve as a cheaper alternate to Anti-VEGF. Also PST injunctions can be equally efficacious with less side effects overall and also less affect on the IOP as compared with IVTA injections.

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