

Intravitreal Injection of Triamcinolone Acetonide for Diabetic Macular Edema

Shahid Jamal Siddiqui, Syed Imtiaz Ali Shah, Muhammad Afzal Pechuho, Abdul Waheed Memon

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See end of article for authors affiliations
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Correspondence to:
Shahid Jamal Siddiqui
Department of phthamology
Chandka Medical College &
Hospital, Larkana

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Purpose: To determine the clinical outcome of an Intravitreal Injection of Triamcinolone Acetonide in the treatment of Diabetic Macular Edema.

Material and Methods: The Study included 16 patients (32 eyes) who were diagnosed with clinical significant macular edema and treated with laser photocoagulation both grid and focal, received intravitreal triamcinolone acetonide injection 4mg/0.1ml under topical anaesthesia. The visual acuity was recorded before and after injection with 1 to 3 months of followup. Applanation tonometry was performed and readings recorded before and after injection.

Results: In this prospective study of 16 patients (32 eyes) with clinical significant macular edema (CSME) unresponsive to laser photocoagulation 11 patients were male (68.75%) and 5 female (31.25%) from 35 to 62 years of age, average age 52.25 years. Visual outcome after laser photocoagulation remained same in 19 eyes (59.37%), improved in 6 eyes (18.75%) and decreased in 7 eyes (21.87%). Visual outcome after intravitreal injection of triamcinolone acetonide improved in 18 eyes (56.25%) and remained same in 14 eyes (43.75%).

Conclusion: Intravitreal injection of 4mg/0.1ml triamcinolone acetonide may be beneficial for improving vision in patients with clinical significant macular edema (CSME) who are unresponsive to conventional laser photocoagulation.

Diabetic retinopathy is the most common cause of newly diagnosed legal blindness amongst the working population in the industrialized world today¹. Diabetic macular edema is the common cause of visual impairment in diabetic retinopathy that produces loss of central vision^{2,3}. According to the results of the study on the early treatment of diabetic retinopathy, diabetic macular edema has usually been treated by focal laser photocoagulation of leaking circumscribed retinal areas⁴. Whereas in eyes with diffuse diabetic macular edema, laser treatment cannot be focused on localized retinal leakage spots since entire macula is involved, therefore grid laser is recommended but has been controversial, since studies proving the efficacy of treatment have not yet been published⁵. In view of the uncertainties in the treatment of diabetic macular edema, the aim of our present study is to assess the efficacy of an intravitreal injection of triamcinolone

acetonide in reducing macular edema and improving visual acuity.

MATERIAL AND METHODS

This study was conducted at the Department of Ophthalmology, Chandka Medical College Larkana. Span of study was from January 2008 to September 2008. The study included 16 patients (32 eyes) selected from Retina Clinic who were diagnosed with clinical significant macular edema and treated with laser photocoagulation both grid and focal macular laser, received intravitreal triamcinolone acetonide injection 4mg/0.1 ml under topical anaesthesia.

The following protocol was observed:

1. Visual acuity was measured before and after injection.
2. Intraocular pressure was recorded before and after injection.

3. Before injection patients were prescribed systemic and topical antibiotic prophylactically, Ciprofloxacin 500mg orally 3 days before and after injection along with topical Moxifloxacin 0.3% three to four times a day, three days before and after injection.
4. Oral acetazolamide 250mg BD before and after injection along with topical beta blockers twice a day to maintain the intraocular pressure and to prevent post injection rise of intraocular pressure.

The intravitreal injection was given in the operation theatre under topical anaesthesia with strict protocol of sterilization. Preoperative drapping and washing the area with 5% povidone iodine solution. Intravitreal injection 4mg/0.1ml of triamcinolone acetonide was given transconjunctival inferotemporal about 3.5mm away from the limbus. After the injection pad and bandage was applied and the patients were directed to come for followup after one week, 1 month upto 3 months. Visual acuity was measured and improvement was notified and intraocular pressure was also measured and recorded.

RESULTS

In this study of 16 patients (32 eyes) with clinically significant macular edema unresponsive to laser photocoagulation, 11 were male (68.75%), 5 female (31.25%) from 35 to 62 years of eye, average age was 52.25 years (see table 1). Visual outcome after laser photocoagulation remained same in 19 eyes (59.37%) decreased in 7 eyes (21.87%) and improved in 6 eyes (18.75%) (table 2). Visual outcome after intravitreal injection of triamcinolone acetonide improved in 18 eyes (56.25%) and remained same in 14 eyes (43.75% see table-3 and (Fig. 1-2).

Table 1: Patients data

| | |
|-----------------|--------------|
| No. of Patients | 16 |
| No. of Eyes | 32 |
| Age Group | 35-62 years |
| Average Age | 52.25 years. |
| Male | 11 (68.75%) |
| Female | 05 (31.25%) |

Table 2: Visual outcome after laser photocoagulation

| | |
|---------------|------------------|
| Improved | 06 (18.75%) eyes |
| Decreased | 07 (21.87%) eyes |
| Remained same | 19 (59.37%) eyes |

Table 3: Visual outcome after intravitreal injection

| | |
|---------------|------------------|
| Improved | 18 (56.25%) eyes |
| Remained same | 14 (43.75%) eyes |

DISCUSSION

Diabetic macular edema is one of the main reason for reduced visual acuity in patients with diabetic retinopathy. According to the results of the study on the early treatment of diabetic retinopathy, diabetic macular edema has usually been treated by focal laser photocoagulation of leaking circumscribed retinal areas, unless the whole macular region is diffusely affected^{4,5}. In eyes with diffuse macular edema grid laser treatment is recommended. In the early treatment of diabetic retinopathy, laser photocoagulation of eyes with diabetic macular edema reduced the risk of moderate visual loss by 50%⁴. These results demonstrated that 12% of eyes treated with laser photocoagulation developed moderate visual loss. The frequency of an unsatisfactory outcome following laser photocoagulation in eyes with diabetic macular edema has developed interest in other treatments. The use of corticosteroid to treat diabetic macular edema follows from the observation that the increase in retinal capillary permeability that results in diabetic macular edema may be caused by a break down of blood retinal barriers mediated in part by VEGF (Vascular endothelial growth factor)⁶. Antonetti and his colleagues demonstrated that VEGF may regulate vascular permeability by increasing the phosphorylation of tight junction proteins such as occluden and zonula occluden⁷. Corticosteroids with anti-inflammatory properties inhibit the expression of VEGF gene⁸. Intravitreal injection has been proposed as a way to efficiently deliver corticosteroid to the posterior portion of the eye in close proximity to the retina. The typical dose in triamcinolone acetonide used to treat eyes with diabetic macular edema is 4mg/0.1 ml⁹. Patients experience rapid and dramatic resolution of macular edema and improvement in visual acuity¹⁰.

Fig. 1 A: Fundus photograph of the patient with CSME before injection

Fig. 2 A: Fundus photograph of the same patient with CSME before injection

Fig. 1 B: Fundus photograph of the same patient with CSME after injection

Fig. 2 B: Fundus photograph of the same patient with CSME after injection

Martidis and his colleagues reported results using intravitreal triamcinolone acetonide injection in 16 eyes with macular edema due to diabetic retinopathy. All the 16 eyes had persistent macular edema after laser photocoagulation. Optical coherence tomography in these patients demonstrated that the mean thickness of the central macula decreased from 540 μ m before injection to 242 μ m after injection (the normal average thickness of the central macula is 175 μ m). Visual acuity was improved by 2.4 and 1.3 lines (from the baseline value)⁹. Jones et-al in their study of 26 eyes described the results of intravitreal injection triamcinolone acetonide with diabetic macular edema, the fluorescein angiography showed decreased fluorescein leakage after intravitreal injection in all patients and visual acuity was also improved from a mean of 20/165 at baseline to mean of 20/105. In comparison 16 patients followed in a control group who received

laser photocoagulation showed no improvement in visual acuity⁵. The results of our present study of 16 patients (32 eyes) suggest that the intravitreal injection of triamcinolone is beneficial as a treatment for diabetic macular edema. Our study shows improvement of visual acuity in 18 eyes (56.25%) and remained same in 14 eyes (43.75%) with no increase in post injection intraocular pressure. Although the results would have been best documented by OCT but this facility was not available in our setup.

CONCLUSION

Intravitreal injection of 4mg/0.1ml triamcinolone acetonide is beneficial for improving vision in patients with clinical significant macular edema (CSME) who are unresponsive to conventional laser photocoagulation.

Author's affiliation

Dr: Shahid Jamal Siddiqui
Associate Professor
Department of Ophthalmology
Chandka Medical College & Hospital
Larkana Sindh.

Prof. Syed Imtiaz Ali Shah
Department of Ophthalmology
Chandka Medical College & Hospital
Larkana Sindh.

Dr. Muhammad afzal pechuho
Assistant Professor
Department of Ophthalmology
Chandka Medical College & Hospital
Larkana Sindh.

Dr. Abdul Waheed Memon
Assistant Professor
Department of Ophthalmology
Chandka Medical College & Hospital
Larkana Sindh.

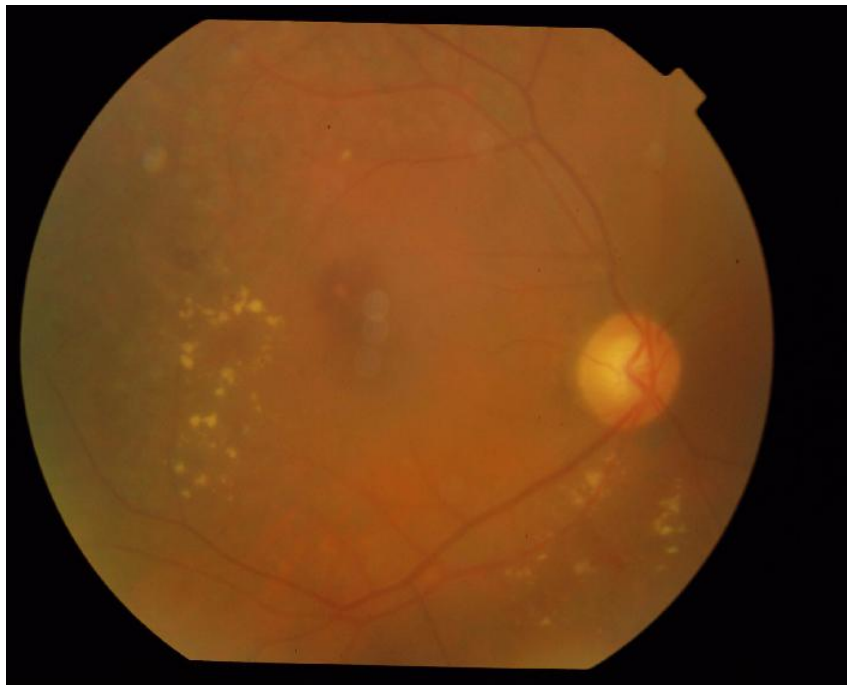
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Figure 1



Figure 1- A: Fundus p



**Figure 1- B: Fundus ph
injection**

Figure 2

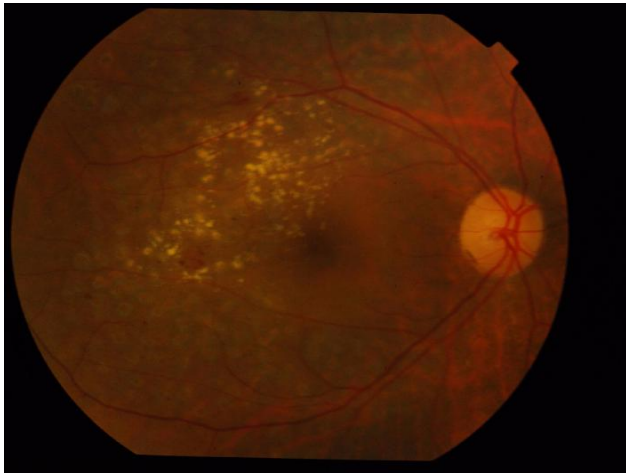


Figure 2- A: Fundus photograph of the same patient with CSME before injection

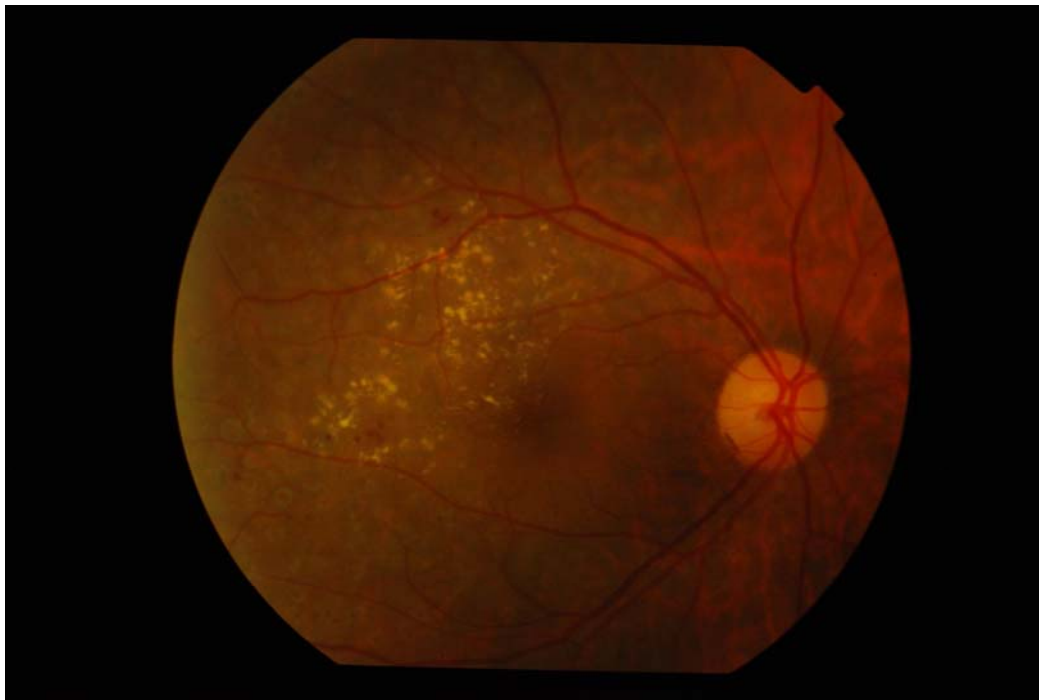


Figure 2- B: Fundus photograph of the same patient with CSME after injection

