



ORIGINAL RESEARCH PAPER

Ophthalmology

POSTERIOR SUBTENON INJECTION OF TRIAMCINOLONE USING 24 G CANNULA IN DIABETIC MACULAR EDEMA – A CASE REPORT

KEY WORDS: diabetic macular edema, triamcinolone, subtenon injection

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ABSTRACT

Diabetic maculopathy is an important cause of severe vision loss in diabetic patients. Different modalities of treatment are available Laser phocoagulation being no longer preferred and anti-vascular endothelial growth factor therapy may not be financially feasible option for the general masses. Steroids are a good and affordable treatment option in selected cases of diabetic macular edema. Here, we report a case in which posterior subtenon injection of triamcinolone was given to a patient with DME and improvement in central macular thickness and vision was seen.

INTRODUCTION:

Macular edema is a major cause of significant visual impairments and is seen in several eye diseases, including diabetic retinopathy, uveitis, and retinal vein occlusion.

Diabetic macular edema (DME) is a leading cause of visual impairment that occurs as an increased accumulation of fluid within the intraretinal layers of the macula as a result of microvascular changes and breakdown of the blood-retinal barrier (BRB).^{1,2}

In the Wisconsin Epidemiological Study of Diabetic Retinopathy, DME was also found to develop in 20.1% of people with type I diabetes and 25.4% of people with insulin-dependent type II diabetes over a 10 year period³.

The diagnosis of macular oedema can be made clinically and with investigations such as fluorescein angiography (FA) and optical coherence tomography (OCT). Clinically significant macular edema is defined by the following criteria: 1. Increase in retinal thickness within 500 micron of the centre of the fovea 2. Hard exudates within 500 micron of the centre of the fovea with increased retinal thickness 3. Increase in retinal thickness 1 disk diameter with at least one part within 1 disk diameter at the centre of the fovea.

The fluorescein angiography shows either a diffuse leakage in the posterior pole or a petaloid pattern in cases of cystoid macular oedema, There are four different types of macular oedema as classified by OCT - diffuse retinal swelling, cystoid macular oedema, serous retinal detachment and vitreomacular interface abnormalities⁴.

The standard of care for DME is grid/focal laser photocoagulation⁵. But laser photocoagulation can have serious adverse effects such as scotoma, choroidal neovascularisation, subretinal fibrosis, laser scars and risk to fovea⁵.

Consequently, different treatment strategies have been explored including intravitreal triamcinolone, oral protein kinase C inhibitors, intravitreal aptamers, antibodies directed against vascular endothelial growth factor (VEGF), and vitrectomy.⁵

Anti VEGFs such as Pegaptanib, Ranibizumab, Bevacizumab, Aflibercept have a very important and critical role in management of diabetic retinopathy and macular edema but unfortunately it does not work in all patients especially in chronic edema⁶.

Corticosteroids act by stabilizing the BRB, blocking VEGF production, inhibiting leukostasis, decreasing retinal neovascularization, and reducing intercellular adhesion molecule-1 production. The anti-inflammatory, angiostatic and antipermeability properties of corticosteroids have a therapeutic potential for treatment of macular edema^{7,8}. They can be administered topically, by periocular injection, oral and parenteral routes.

Use of topical steroid is limited due to their poor intraocular penetration. Systemic steroids are effective for macular oedema. However, high doses are required to attain therapeutic levels in the posterior segment, resulting in high risk of systemic side-effects. Triamcinolone is a long acting synthetic crystalline steroid that is minimally water-soluble. It is often combined with a vehicle to form a suspension.

Intravitreal triamcinolone acetonide steroid injection given in cases of macular edema has been reported to reduce edema and improve visual acuity⁹. The Triamcinolone for DME study (TDMO) and The Diabetic Retinopathy Collaborative Research network (DRCR.net) found intravitreal triamcinolone useful in refractory edema and leakage close to the fovea. Cataract formation and elevated intraocular pressure (IOP) were the most common complications reported. However; this method involves the risk of severe complications such as retinal detachment and endophthalmitis.^{10,11}

Peribulbar injection of Triamcinolone is a much simpler method of delivering steroid to the posterior pole with minimal side effects.

CASE REPORT

A 50 year old lady with type 2 DM controlled on medications presented with complaints of decreased vision in both eyes in our Out patient department. Her blood pressure was within normal range. She had 6/60 best corrected visual acuity in right eye and 6/24 in left eye. She was phakic with no cataractous changes seen on slit lamp examination. Her intraocular pressure was within normal range. Fundus photography was done and central macular thickness was mapped using Stratus OCT. Patient had CSME with moderate NPDR in RE (figure 1 and 2) and DME with mild NPDR in left eye. She had not taken any previous treatment for decreased visual acuity. The central macular thickness before giving the injection in RE was 480 micron. We used a method of delivering TA through 24 G intravenous cannula (figure 3) as described in a previous study¹². After informed consent and under proper aseptic condition she was given 20mg Triamcinolone via posterior peribulbar route using 24 G intravenous polytetrafluoroethylene cannula. Under topical anaesthesia and eye exposed using an eye speculum, patient was asked to look inferonasally. The bulbar conjunctiva was grasped 10 mm away from the limbus using a forceps in the superotemporal quadrant. Entry was made into the episcleral space using the trocar of a 24-gauge, 0.7/19 mm intravenous cannula. The trocar and cannula were advanced together for about 5 mm. Subsequently, the trocar was withdrawn and the cannula alone was inserted further posteriorly for about 12–15 mm. Then corticosteroid (0.5ml) was then injected using a syringe affixed to the intravenous cannula. Postoperatively, best corrected visual acuity, intraocular pressure was recorded and central macular thickness was analysed.

Decrease in macular edema (CMT) (figure 4) at 2 months post injection was about 180 microns which persisted till 3 months postoperatively only. Her best corrected visual acuity improved to 6/24. Post injection no cataractous changes; rise in intraocular pressure or any other complication was seen.

DISCUSSION

Steroids administered both systemically and locally have been used for the treatment of cases of posterior uveitis and macular edema secondary to diabetic retinopathy, central vein occlusion etc.

Systemic steroids are associated with various serious side effects and also have poor penetration into the eye. Intravitreal route avoids systemic side effects and has better therapeutic benefit⁸ However; this method involves the risk of severe complications such as retinal detachment and endophthalmitis¹³

Peribulbar injections of corticosteroid have been used in the treatment of a number of ocular conditions, such as diabetic macular edema (DME), cystoid macular edema following cataract surgery, and most commonly uveitis^{14,15}.

Periocular injections deliver the steroid to the posterior pole either by absorption through the sclera or via the orbital vasculature. They may be administered as using anterior subtenon's/ subconjunctival, posterior subtenon's, and retrobulbar approaches¹⁶ Local side effects such as raised intraocular pressure, cataract and ptosis may occur, but systemic absorption and side effects are low.¹⁷

Rise of intraocular pressure is reported to be relatively lower with subtenon injection as compared to intravitreal injection of Triamcinolone¹⁸ Anterior peribulbar triamcinolone acetone injections are associated with an increased incidence of intraocular pressure elevation and an increased risk of cataract development compared with posterior peribulbar injections¹⁹

Posterior subtenon injection of triamcinolone in diabetic macular edema has shown significant improvement in central macular thickness and visual acuity as compared with those seen at baseline in a previous study¹⁶.

In conclusion, posterior peribulbar injection of triamcinolone was found to be effective in improving case of diabetic macular edema but for short term duration only.

Steroids via posterior peribulbar route may be more beneficial in pseudophakic patients, chronic diabetic macular edema and leakage involving centre of macula²⁰ It can be used as initial foundation therapy for rapid resolution of edema and later on supplemented with laser/ other therapy.

CONCLUSION

In conclusion, Triamcinolone injected into the posterior sub-Tenon capsule appears to be effective in improving diffuse DME, at least in the short term. Furthermore, the technique used for injection into the sub-Tenon capsule is simple.

Legends:

1. Preinjection fundus photograph of right eye
2. OCT of the same patient of right eye
3. Intravenous cannula- 24 G
4. OCT photograph 2 months post injection of triamcinolone

Declaration of patient consent- The authors declare that they have obtained all appropriate patient consent forms. In the form the patients have give their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity.

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Fig 1

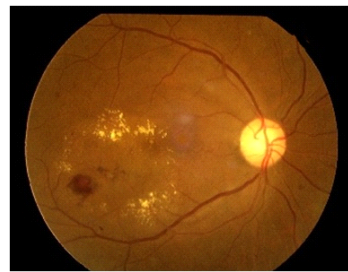


Fig2

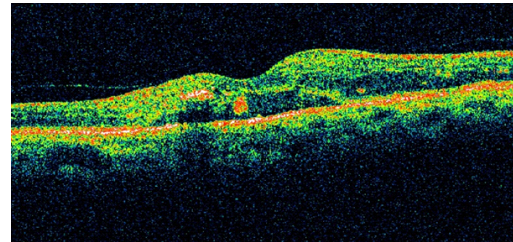


Fig 3

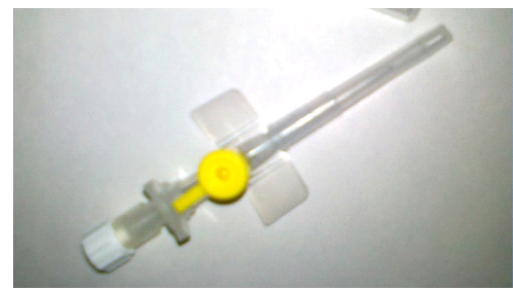
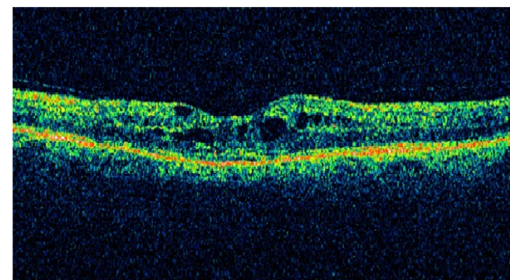


Fig 4



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