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ORIGINAL ARTICLE / RESEARCH

Subtenons vs. Intravitreal Triamcinolone in Refractory Diabetic Macular Oedema

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ABSTRACT

Diabetic macular oedema has been treated with triamcinolone acetonide (TA) with varying results. The study aimed to compare the effectiveness of intravitreal vs. posterior subtenons injection of TA for treatment of refractory diabetic macular oedema.

Method: Twelve patients received 40 mg of subtenons triamcinolone (STA) and 15 received 4 mg of intravitreal triamcinolone (IVTA).

Results: IVTA and STA groups demonstrated a reduction in macular thickness of 48.4% and 12.4%, respectively, at 1 month. IVTA eyes remained statistically thinner at 3 months but not at 6 months. In the IVTA group, 50% had an improved visual acuity and 35.7% a stable visual acuity. Vision improved in 33.3% of patients in STA group and remained stable in 50%. Change in visual acuity was not statistically significant between the two groups.

Conclusion: This study does not advocate the superiority of one route of administration of TA over another and recommends randomised control trials to establish best practise in this field.

Key words: Macular oedema, triamcinolone acetonide, subtenons, intravitreal

Key messages: Intravitreal and subtenons triamcinolone are equally effective in transiently improving vision in refractory diabetic macular oedema.

Introduction

Diabetic retinopathy is one of the leading causes of blindness in the developed world [1]. Macular oedema affects approximately 29% of diabetics with disease duration of 20 years or more. It is the main reason for reduced vision in these patients [2]. Triamcinolone acetonide (TA) is a glucocorticosteroid suspension with antiangiogenic and antioedema properties.

Administered as a periocular injection or intravitreally, it has been used to treat macular oedema of varying aetiology [1]. TA has also been reported to have favourable results in treatment of diffuse diabetic macular oedema [1],[2],[3].

Aim: To compare the effectiveness of intravitreal vs. posterior subtenons injection of TA for treatment of refractory diabetic macular oedema.

Subjects and Methods

A total of 27 patients with refractory diffuse diabetic macular oedema were enrolled. Diffuse macular oedema was defined by central thickening on bio-microscopy using a 78-D noncontact lens and by diffuse fluorescein leakage, involving most of the macular area on fluorescein angiography. All focal leaks had previously been treated by laser

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photocoagulation. Baseline data included duration of macular oedema, number of laser sessions, subjective refraction, best-corrected visual acuity, Goldman applanation tonometry, fluorescein angiography, and macular thickness mapping using optical coherence tomogram (OCT). Patients received either 40 mg of subtenons triamcinolone (STA) or 4 mg of intravitreal triamcinolone (IVTA). Patients were seen before injection and 1 week, 1 month, 3 months, and 6 months after the injection. Primary outcomes were monitored anatomically by OCT macular thickness and functionally by visual acuity assessments at 1-, 3-, and 6-month post-injection visits. Secondary outcomes, which were potential corticosteroid- and injection-related complications, were also observed. Data were analysed using an SPSS package.

Results

A total of 27 patients (20 males, seven females) with a mean age of 65.03 ± 8.95 years (age range 44–84 years) were recruited into either the intravitreal triamcinolone acetonide group (IVTA) or the subtenons triamcinolone acetonide group (STA) for the study. Age was normally distributed (Kolmogorov–Smirnov test) in both research groups, and there was no significant difference in gender, duration of diabetes, and past laser treatments between the two groups. The mean duration of diabetes was 15.4 years. The average duration of macular oedema pre-intervention was 13.07 months in either group. The mean number of laser treatments was 3.1. All eyes were phakic and had macular oedema refractory to laser therapy. Twelve patients underwent a subtenons TCA (40 mg) injection, while 15 had an intravitreal TCA (4 mg) injection.

Anatomical outcome

One month after injection, IVTA- and STA-injected eyes demonstrated a reduction in mean macular thickness of 48.4% and 12.4%, respectively. The central macular thickness in IVTA-injected eye remained statistically thinner than in the STA eyes at 3 months. At 6 months, this difference was no longer significant.

Functional outcome

At the pre-intervention time point, there was no significant difference between the visual acuity in the two research groups. Visual acuity improved in 33.3% of patients in STA group, remained stable in 50% of patients, and worsened in the remaining 16.7% patients at 3-month follow-up. In the IVTA group, 50% of patients had an improved visual acuity, whereas the vision remained stable in 35.7% of patients. However, the vision worsened in 14.3% of patients at 3-month follow-up. Statistically, there was no significant difference between the two research groups and average change in visions ($p = 0.165$).

Neither the IVTA group nor the STA group had statistically significant changes in the IOP ($p = 0.127$). Serious complications that could be related to the TA injection (such as vitreous haemorrhage, endophthalmitis, retinal detachment, and inadvertent ocular perforation) were not observed.

Discussion

Machemer et al. first advocated the use of intravitreal corticosteroid for the treatment of proliferative vitreoretinopathy[4]. The rationale behind their use lies in their ability to inhibit the arachodonic acid pathway, of which prostaglandin is a product. TCA has been shown to reduce the breakdown of the blood–retinal barrier [3],[5]. TCA has been used for the treatment of macular oedema of varying aetiology, especially diffuse macular oedema refractory to grid laser photocoagulation, with promising short-term results [3],[6–10]. The short-term efficacy has been attributed to a mean elimination half-life of 18.6 days for TCA, which lasts in the vitreous for only 3 months [7]. The present study allows comparison of IVTA with STA injection for refractory diabetic macular oedema regarding safety, anatomic, and functional outcomes. Quantitative measurements of retinal thickness by OCT showed a reduction from baseline at 1- and 3-month follow-up visits that were not sustained at 6 months. The improvement in visual acuity was not statistically significant between the two groups, though the injections were well tolerated by all patients without any reports of sight-threatening complications. Long-standing macular oedema as was recorded in the study groups may have been responsible for disruptive changes in the retina and irreversible damage to the photoreceptors, leading to a decreased efficacy of IVTA over STA in improving the anatomical and visual outcome. This is in contrast to other studies that have reported a clear short-term advantage of the intravitreal injection over the

subtenons route in a small series of patients [2],[11],[12].

The drawbacks of our study were a small sample size and a short duration of follow-up. A bigger patient group (n = 69) would be required to calculate a statistically significant difference between the IVTA and STA groups.

Conclusions

Both IVTA and STA injections may be equally tolerated in patients with refractory diffuse diabetic macular oedema, with a short-term improvement in functional and anatomical outcome in both groups. This study does not advocate the use of TA injection by one route over the other for the treatment of diabetic macular oedema. Randomised controlled trials need to be done in a larger group of patients with long-term follow-up to decide the superiority of intravitreal vs. subtenons steroid or the efficacy of repeated injections of TCA in the long term.

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