

Sir,
Ptosis following an intravitreal injection of triamcinolone acetonide

Ptosis is an exceptional known complication of prolonged topically applied ocular corticosteroids and it has also been recently reported after posterior juxtasclear depot administration of anecortave acetate and posterior Sub-Tenon's capsule triamcinolone injection.^{1–4} Reported adverse effects of intravitreal injections of triamcinolone acetonide (TA) include ocular hypertension and glaucoma, cataract formation, and infectious or sterile endophthalmitis.⁵

We report two cases of ptosis following intravitreal high-dose injection of TA. To our knowledge, these are the first reported cases of ptosis following intravitreal high-dose injection of TA.

Case report

Two patients with choroidal neovascular membrane secondary to age-related macular degeneration (ARMD) were administered an intravitreal high-dose injection (20 mg) of TA.

To condense the steroid crystals, a no-filter technique was utilized. TA at the concentration of 40 mg/ml was used, and the drug was prepared in a 1 ml tuberculin syringe. A 1 ml portion of the suspension of the vial was drawn up into the syringe and kept in a vertical position with the needle turned up for 30 min, until the TA settles down. Then, 0.8 ml of the supernatant (vehicle) was discarded. The remaining solution was mixed, and a volume of 0.1 ml was injected directed to the centre of the vitreous cavity after a paracentesis of aqueous humour. The lid speculum was not used during the surgical procedure and cataract surgery was not performed during the follow-up of these two patients.

Case 1

A 72-year-old man with subfoveal choroidal neovascularization (CNV) in ARMD in his left eye underwent an intravitreal injection of 20 mg triamcinolone acetonide (IVTA). External and slit-lamp examination of anterior segment were normal at the time of injection. His vision was 20/32 OS. During a follow-up examination 2 months after the injection, 2 mm of left upper eyelid ptosis was found. There was no elevated intraocular pressure (IOP) or any other adverse effect at this time. Both pupils were regular and reactive; no relative afferent pupillary defect was present. Visual acuity in OS was stable with an identical level of ptosis at the follow-up examination 5 months after IVTA

(Figure 1). Nine months after IVTA, 2 mm of ptosis was still visually significant and TA crystals were still detectable in the vitreous cavity on indirect ophthalmoscopy.

Case 2

A 68-year-old woman with a 1-year history of occult subfoveal CNV caused by ARMD in her right eye underwent an IVTA in an attempt to reduce subfoveal exudation and to suppress subretinal angiogenesis. The patient had no other medical problems and was not taking any medications. External and slit-lamp examination of anterior segment was normal at the time of injection.

A 1-month follow-up examination revealed 2 mm of right upper eyelid ptosis and slight lid oedema. The patient stated that ptosis had progressively developed over the previous 2 weeks, but she denied pain or diplopia. Her best-corrected visual acuity was 20/200 in the right eye which was consistent with her prior examinations over the previous 6 months. IOP was 26 mmHg, necessitating antiglaucomatous topical treatment with dorzolamide hydrochloride ophthalmic solution twice daily, under which IOP normalized. Both pupils were regular and reactive; no relative afferent pupillary defect was present.

Ptosis progressively worsened over the subsequent 9 months. At the 10-month follow-up examination, 4 mm of ptosis and a retracted lid crease were visually significant (Figure 2) and TA crystals were still detectable in the vitreous cavity on indirect ophthalmoscopy.

Comment

Given the temporal relationship between the intravitreal injection of triamcinolone and upper eyelid ptosis in our patients, and the known reaction with periocular and



Figure 1 Case 1. A 72-year-old man with ptosis of the left upper eyelid at 5 months post-intravitreal high-dose injection of triamcinolone acetonide.



Figure 2 Case 2. A 68-year-old woman with ptosis of the right upper eyelid and a retracted lid crease at 10 months post-intravitreal high-dose injection of triamcinolone acetonide.

topical applied ocular corticosteroid,¹⁻⁴ we believe that upper lid ptosis is related to the triamcinolone injection, possibly owing to its solvent agents.

Newsome *et al*⁶ noticed that intracamerally and subconjunctivally injected steroid preparations produced ptosis in rhesus monkeys. The ptosis produced seemed to depend on a malfunction of the muscle fibres of the levator caused by a direct myopathic effect of the vehicle. Eyes treated intravitreally with Decadron[®] and with vehicle alone displayed similar lid effects, whereas the pure steroid dexamethasone had no effect on the lids. On the other hand, when attempting to concentrate the commercial formulation of triamcinolone using both the filter and no-filter techniques, Rodriguez-Coleman *et al* recently revealed that the mean level of benzyl alcohol ranged from 3.6 to 4.3% (weight-volume ratio), thereby resulting in a higher concentration in comparison with 0.99% reported in the Kenalog-40 product labelling.⁷ We hypothesize that our technique, using the no-filter preparation, the high-concentrate vehicle, may have affected the muscle fibres of the levator, further supporting the view that solvent agents can have a direct myopathic effect.⁶ Moreover, corticosteroids weaken tendons and cause muscle wasting through mechanisms involving protein catabolism and mitochondrial dysfunction.^{8,9}

However, it is unclear whether the ptosis in our patients is related to corticosteroid itself or to the vehicle. How intravitreal TA and the vehicle mixture reached the levator fibres to produce the observed ptosis is not clear, although human scleral permeability to TA is well established.¹⁰ Therefore, a longer follow-up will be needed to assess whether the ptosis may be permanent or temporary as the drug effect relents. Hence, alternative preparation of preservative-free TA or a careful quantification of drug levels and preservatives is suggested.

As the speculum was not used during the surgical procedure, a stretching of the levator should be excluded. Moreover, in a retrospective review of the 96 cases where an IVTA was performed in 2003 in our clinic, without using a speculum in the surgical procedure and not undertaking cataract surgery during the follow-up, the incidence of ptosis was 25% (24 patients).

We report this case to alert the ophthalmologist of the potential risk for developing ptosis following intravitreal high-dose injection of TA and the need to inform patients of this potential complication.

References

- 1 Augustin AJ, D'Amico DJ, Mieler WF, Schneebaum C, Beasley C. Safety of posterior juxtасcleral depot administration of the angiostatic cortisone anecortave acetate for treatment of subfoveal choroidal neovascularization in patients with age-related macular degeneration. *Graefes Arch Clin Exp Ophthalmol* 2005; **243**: 9-12.
- 2 Bhupendra P. Lids. In: Roy FH (ed). *Ocular Differential Diagnosis*, 6th ed. Williams & Wilkins: Baltimore, MD, 1997, pp 50-126.
- 3 McGhee CN, Dean S, Dasesh-Meyer H. Locally administered ocular corticosteroids: benefits and risks. *Drug Saf* 2002; **25**: 33-55.
- 4 Dal Canto AJ, Downs-Kelly E, Perry JD. Ptosis and orbital fat prolapse after posterior Sub-Tenon's capsule triamcinolone injection. *Ophthalmology* 2005; **112**: 1092-1097.
- 5 Sutter FK, Gillies MC. Pseudo-endophthalmitis after intravitreal injection of triamcinolone. *Br J Ophthalmol* 2003; **87**: 972-974.
- 6 Newsome DA, Wong VC, Cameron TP, Anderson RR. 'Steroid-induced' mydriasis and ptosis. *Invest Ophthalmol* 1971; **10**: 424-429.
- 7 Rodriguez-Coleman H, Yuan P, Kim H, Gravlin L, Srivastava S, Csaky KG *et al*. Intravitreal injection of triamcinolone for diffuse macula edema (Letter). *Arch Ophthalmol* 2004; **122**: 1085-1086.
- 8 Hugate R, Pennypacker J, Saunders M, Juliano P. The effects of intratendinous and retrocalcaneal intrabursal injections of corticosteroid on the biochemical properties of rabbit Achilles tendons. *J Bone Joint Surg* 2004; **86**: 794-801.
- 9 Mitsui T, Azuma H, Nagasawa M, Luchi T, Akaike M, Aki K *et al*. Chronic corticosteroid administration cause mitochondrial dysfunction in skeletal muscle. *J Neurol* 2002; **249**: 1004-1009.
- 10 Mora P, Eperon S, Felt-Baeyenes O, Gurny R, Sagodira S, Breton P *et al*. Trans-scleral diffusion of triamcinolone acetonide. *Curr Eye Res* 2005; **30**: 355-361.

F Viola¹, F Morescalchi², R Ratiglia¹ and G Staurenghi¹

¹Eye Clinic of the University of Milan, Ospedale Maggiore Policlinico, Mangiagalli e Regina Elena, Fondazione IRCCS, Milan, Italy

²Clinica Oculistica, Spedali Civili di Brescia, Italy

Correspondence: F Viola, Clinica Oculistica, Università degli Studi di Milano, Via Sforza 35, Milan 20135, Italy
 Tel: +39 3494 768 680;
 Fax: +39 0250 320 449.
 E-mail: fra_viola@hotmail.com

The authors have no relevant financial interest in this article

Eye (2007) **21**, 421–423. doi:10.1038/sj.eye.6702297; published online 24 February 2006

Sir,
Globe rupture as a complication of intravitreal injection of triamcinolone

Intravitreal injection of triamcinolone (IVTCA) is a useful treatment modality in various retinal disorders. Few reports have documented adverse events including intractable glaucoma, endophthalmitis, intraocular haemorrhage, and hypotony.^{1–4} We report a case of scleral rupture as a complication of this procedure.

Case report

An 85-year-old man underwent right IVTCA for macular oedema secondary to branch retinal vein occlusion (BRVO). The Snellen visual acuity (VA) was hand movement. He had no relevant medical or ocular history.

A bolus of 4 mg of triamcinolone in 0.1 ml was injected via the pars plana inferotemporally using a 27-gauge needle on a 1 ml syringe. The patient experienced pain immediately and the injection was stopped when a popping sound was heard. Examination under anaesthesia revealed a scleral rupture extending from 2 to 6 o'clock along the limbus, sparing the original entry site. There was lens and uveal prolapse subconjunctivally (Figure 1a), superior iridodialysis (Figure 1b), and suprachoroidal haemorrhage superiorly and inferotemporally. The scleral defect was repaired followed by pars plana vitrectomy with 360° endolaser to 'wall off' the choroidal haemorrhage.

Postoperatively, the suprachoroidal haemorrhage resolved (Figure 2) and the VA at 6 months was hand movement.

Comment

Numerous reports support good visual outcome with IVTCA as the treatment of macular oedema. Transient

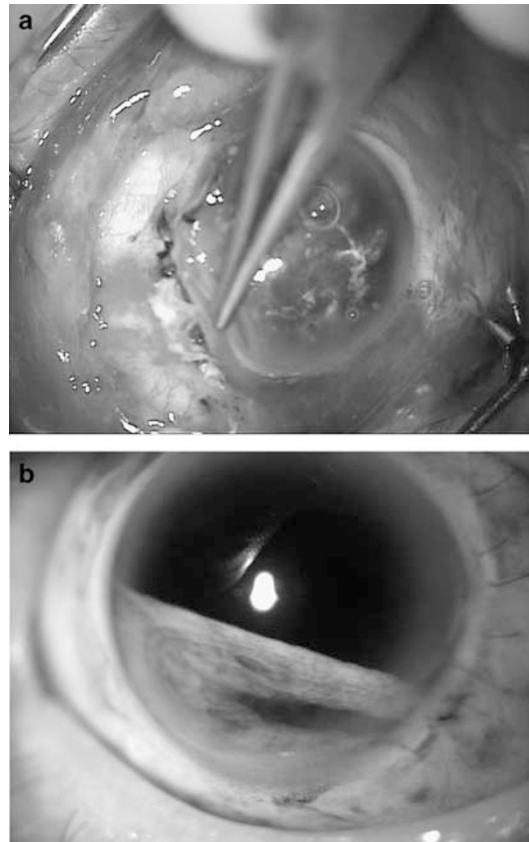


Figure 1 (a) Lens and uveal prolapse through scleral rupture, (b) superior iridodialysis.

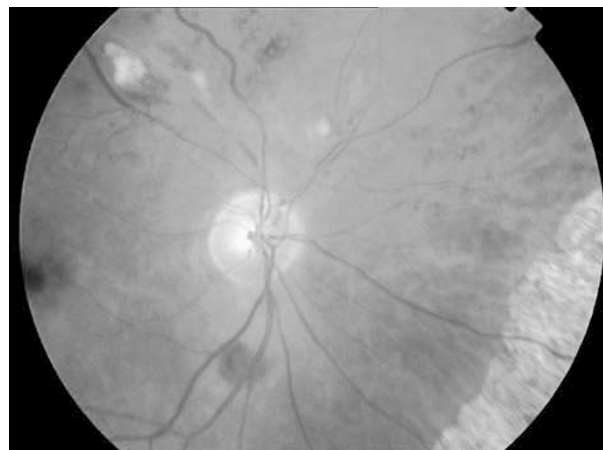


Figure 2 Resolved suprachoroidal haemorrhage.

ocular hypertension and cataract are the most common complications occurring in 30 and 10% of patients, respectively.^{1–4} Globe rupture to date has not to our knowledge been reported.