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Intravitreal triamcinolone acetonide injection in blind painful eyes

Intraocular steroids as a treatment for blind painful red eyes

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PURPOSE. *Phthisis bulbi results from different ocular conditions. We evaluated intravitreal triamcinolone acetonide as a treatment option in blind painful eyes.*

METHODS. *Thirty-one patients with unilateral phthisis were randomly divided into two groups. Group A received 0.3 ml (12.5 mg) triamcinolone acetonide intravitreally and Group B 0.3 ml balanced salt solution after retrobulbar anesthesia. Treatment success was assessed by subjective response to pain and clinically by biomicroscopic evaluation of conjunctival congestion. Tonometry was done before and after treatment. Follow-ups were at 24 hours, 3 weeks, 3 and 6 months, and 1 and 2 years.*

RESULTS. *Throughout the two-year follow-up, only two patients in Group A reported pain after the procedure and were retreated, one at week 4 and the other at week 7. Conjunctival congestion was significantly lower in Group A. Two patients with hypotony before treatment had normal tension after triamcinolone. All Group B patients were reinjected with triamcinolone because pain continued after balanced salt solution injection. No severe complications were found.*

CONCLUSIONS. *Intravitreal triamcinolone acetonide may be effective and safe for treating blind painful eyes. (Eur J Ophthalmol 2003; 13: 292-7)*

KEY WORDS. *Phthisis bulbi, Intraocular steroids, Blind eyes, Alternative treatment*

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INTRODUCTION

Ophthalmologists often treat patients with red painful eyes, many of whom present phthisis bulbi. Phthisis bulbi results from different ocular conditions such as severe injury, inflammation, necrotizing tumors, or vascular diseases. Clinically, this is a slowly progressive secondary process leading to a blind, painful eye resulting from intraocular fibrosis with traction ciliochoroidal detachment and hypotony. This is an untreatable condition resulting in loss of function, which usually leads to clinical resignation and recommendation for symptomatic treatment. Surgical enucleation is indicated in 14.7-16.4% of cases (1). Retrobulbar alcohol injections (2) are also used as an alternative treatment to relieve ocular pain but some significant complications have been reported (3).

Corticosteroids reduce intraocular inflammation and, depending on their concentration, supress cell proliferation (4, 5). Many short- and long-acting corticosteroid combinations have been used periocularly and there are reports of experimental and clinical application of intraocular triamcinolone acetate for the inhibition of intraocular neovascularization (6, 7) and treatment of proliferative vitreoretinopathy (8, 9).

The present clinical study evaluated the effectiveness and complications of intravitreal triamcinolone acetate in the treatment of blind painful eyes.

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PATIENTS AND METHODS

Thirty-one patients with a unilateral untreatable painful eye were admitted to our ophthalmologic department for clinical management. Each patient underwent a complete eye examination, including biomicroscopy, and fundus examination when possible. Diagnostic ultrasonography was performed when the fundus study was not feasible. The interval between the onset of ocular damage and treatment varied between several weeks and more than three years. Patients were given complete information about the treatment available for this condition and the experimental nature of the triamcinolone application, and gave their written consent.

Two groups were formed randomly until there were ten patients in each. Because the clinical status of the controls either did not improve or deteriorated, it was decided, following Ethics Committee's suggestion, to assign the rest of the patients to the group treated with intravitreal triamcinolone acetonide. In Group A,therefore, 21 patients were injected with 0.3 ml (12.5 mg) triamcinolone acetonide with preservative (Kenacort A 40 mg /ml, Bristol-Myers Squibb Co., Princeton, NJ) intravitreally. In Group B, 10 patients received 0.3 ml of balanced salt solution (BSS) intravitreally. Injections were given after 3 ml of retrobulbar anesthesia and the eyes were occluded until the first follow-up. Visits were scheduled at 24 hours, 3 weeks, and 3, 6, 12, and 24 months after treatment. On each occasion, patients were asked to indicate whether they experienced more, less, or the same degree of pain. An ophthalmic examination with slit-lamp biomicroscopy and tonometry was carried out and conjunctival congestion was classified as follows: 0, none; 1, mild; 2, moderate; and 3, severe. Results were evaluated by Student's t-test for statistical significance.

All adverse events associated with treatment, including procedure-related complications, were recorded.

RESULTS

The patients' main details at the time of treatment are summarized in Table I. The patients were followed for a minimum of two months to a maximum of two years. All eyes were blind with no light perception and the causes of painful eyes are detailed in Tables II and III. Clinical evaluation is shown in Table IV. In Group A, all but two patients, who were reinjected, one after a month and the other at seven weeks, reported no pain 24 hours after the procedure and through the two-year follow-up. Patients in the control group had, subjectively, the same (n = 1) or more (n = 9) pain 24 hours after the BSS injection. They were excluded from the study and injected with intraocular triamcinolone after three weeks.

No significant difference was noted in intraocular pressure (IOP) in the two groups. Two patients with hypotony before treatment had normal IOP after triamcinolone. Conjunctival congestion was significantly less in Group A than Group B. The day after the surgical procedure, triamcinolone was present as a widely dispersed whitish opacity in eyes where the posterior chamber could be seen. This white coagulum had disappeared by approximately the second month, though in one eye with silicone oil the drug was visible intraocularly for almost five months. No complications were detected during or after the injection in this eye.

TABLE I - CHARACTERISTICS OF STUDY POPULATION

Characteristics	Group A	Group B
Number	21	10
Age		
Range (years)	07-85	10-79
Mean	50.1	43.0
Standard deviation	±21.68	±21.29
Sex		
Male	12	7
Female	9	3

No differences were significant

TABLE II - CAUSES OF PAINFUL EYES

Causes %	Group A n (%)	Group B n (%)
Multiple surgery	0 (47.62)	6 (60)
Post-traumatic	6 (28.57)	3 (30)
Retinal vascular diseases	3 (14.29)	1 (10)
Coats' disease	2 (9.52)	0

DISCUSSION

Despite the use of effective antibiotics, fine suture material, and delicate instruments to perform intraocular surgery, phthisis bulbi continues to be an important cause of blindness. Clinical findings in this condition include intraocular tissue damage, intraocular scarring, ocular hypotension, loss of function, corneal neovascularization, shrinkage of the globe, recurrent intraocular irritation, and attacks of ocular pain (10).

Phthisis bulbi is a progressive process leading to a blind, painful eye due to intraocular fibrosis with traction ciliochoroidal detachment and hypotony. This severe condition is a result of intraocular wound healing.

Loss of ocular function, irritation, and pain are the major complaints and all these symptoms are recurrent through time at different levels of intensity (10). Medical treatment with topical corticosteroids and atropine can produce transient and usually partial symp-

TABLE III - PATIENT INFORMATION: MULTIPLE SURGERY GROUP

Patient	Eye	Cause	Surgery	No. Surgeries	Post-operative time before treatment (moths)
			Group A		
1	OD	PVR	Vitrectomy	4	3
2	OD	RD/PVR	Cataract extraction/ Vitrectomy	5	40
3	OS	Infectious endophthalmitis	Cataract extraction/ Vitrectomy	3	12
4	OD	RD/PVR	Vitrectomy	8	37
5	OD	PDR	Vitrectomy	3	17
6	OS	RD/PVR	Vitrectomy/ Lensectomy	5	23
7	OS	RD/PVR	Cataract extraction/ Vitrectomy	7	9
8	OS	PVR	Vitrectomy	4	11
9	OD	PDR	Vitrectomy	3	7
10	OD	PDR	Vitrectomy	4	3
			Group B		
1	OS	RD/PVR	Vitrectomy/ Lensectomy	5	22
2	OD	RD/PVR	LASIK/Vitrectomy	5	13
3	OS	PDR	Vitrectomy	4	18
4	OD	PDR	Vitrectomy	4	7
5	OS	RD/PVR	Vitrectomy	7	35
6	OD	RD/PVR	Vitrectomy/ Lensectomy	6	16

OD = Right eye; PVR = Proliferative vitreoretinopathy; RD = Retinal detachment; OS = Left eye; PDR = Proliferative diabetic retinopathy; LASIK = Laser *in situ* keratomileusis

tom relief. However, in most cases, more aggressive treatment such as retrobulbar alcohol injection and/or enucleation is required (1, 2, 10).

Corticosteroids, including triamcinolone acetonide locally or systemically applied, have been used in many ocular conditions. Triamcinolone acetonide (Kenacort A, Bristol-Myers Squibb Co., Princeton, NJ) is a synthetic corticoid with marked anti-inflammatory activity. It is available commercially as a sterile aqueous suspension (11). Reports of the clinical outcome after accidental intraocular injection of cortisone have been published (12, 13). Machemer et al and other authors studied the possibility of injecting cortisone directly into the eye, experimentally in animal models and clinically, in selected situations (6, 7, 9, 14-16).

Phthisis bulbi results from a fluoride proliferative reaction involving continuous inflammation, progressive intraocular fibrosis, and degenerative changes (10). Intraocular steroids may inhibit all these changes, ameliorate the inflammatory process, and relieve symptoms. In this study all but one of the patients treated with 12.5 mg intraocular triamcinolone acetonide were relieved of clinical symptoms (pain and ocular inflammation) after two years of follow-up. One application was enough in most cases. Only two patients needed a second dose because pain recurred. They received the second doses 4 and 7 weeks after the initial treatment, and achieved satisfactory pain control. A possible explanation for recurrence is that, by this time, the drug had been cleared from the posterior segment. The interval between the start of the inflammatory process

TABLE IV - CLINICAL EVALUATION

Subjective symptoms	**Group A***	**Group B***
Greater	0	9
Equal	2	1
Lower	19	0

*p < 0.0005

Conjunctival congestion	**Group A1* (before treatment)**	**Group A2* (after treatment)**	**Group B3* (before treatment)**	**Group B4* (after treatment)**
0	0	9	0	0
1	0	12	0	0
2	13	0	3	0
3	8	0	7	10

Reinjection	**Group A**	**Group B**
	2	10

IOP mmHg	**Group A* (n)**	**Group B* (n)**
Before treatment	5.00 (21)	5.34 (10)
24 hours	5.71 (21)	6.01 (10)
3 weeks	4.95 (21)	5.30 (10)
3 months	4.50 (21)	5.47 (10)
6 months	4.57 (19)	5.24 (10)
1 year	4.51 (15)	4.80 (8)
2 years	4.20 (11)	4.34 (8)

*p = NS

Correlations between p values in conjunctival congestion: *1 vs *2 = p < 0.0005; *3 vs *4 = p NS; *1 vs *3 = p NS; *2 vs *4 = p < 0.0005

IOP = Intraocular pressure

and triamcinolone treatment is important. Authors treating different ocular situations reported that triamcinolone disappeared within 6.5 days and 3 months (17-20). In one of our patients who had silicone oil and received 0.3 ml of triamcinolone, the drug remained within the eye for five months. A possible explanation is that the silicone oil worked as a drug delivery system.

Two of our patients had restored normal IOP after treatment, which could be explained by the fact that they were treated at 7 and 10 weeks after a previous surgery, which had induced pre-phthisical ocular hypotony. However, another possibility is that these patients were steroid responders. A recent paper describes two patients with pre-phthisical ocular hypotony treated with intravitreal injection of 20 mg crystalline cortisone (21). The authors suggest that in eyes with this condition the crystalline cortisone may be beneficial to stabilize the eye and even to raise IOP and improve visual acuity. It is important to note that these two patients were very similar to the ones who had restored normal IOP in our series. In both studies, the patients were treated at an early phase of ocular hypotony. Our patients showed no significant increase in IOP but there was an improvement in the inflammatory conditions of all the treated eyes.

No complications were seen during or after intraocular injection of triamcinolone acetonide. Even though one patient had an intraocular foreign body with staphylococcal endophthalmitis successfully treated three months before treatment with the intraocular steroid, no recurrence of the ocular infection was detected.

Sympathetic ophthalmia is a rare disease, with an incidence of 0.03/100,000, causing bilateral severe posterior uveitis after penetrating trauma to one eye (22). It has been reported after some intraocular procedures such as cataract surgery (23, 24) and vitrectomy (25, 26), and after extraocular interventions such as cyclocryotherapy (27). However, we found no evidence of inflammatory response in any of the treated eyes after the follow-up.

The complex reactions associated with inflammation, healing, and scarring in phthisis bulbi can be partially inhibited by triamcinolone. Cell proliferation and transformation are early and important features of this process, which leads to retinal and ciliochoroidal detachment, hypotension, and marked shrinkage of the globe (10). A single dose of 12.5 mg intravitreal triamcinolone acetonide injection seems to be a safe, effective, and economical alternative for the treatment of blind painful eyes. It can be repeated easily before choosing more aggressive therapeutic options such as retrobulbar alcohol injection or enucleation. The crystalline nature of the preparation, with its sequestration in the vitreous results in slow dissipation of the drug, ensuring an effective concentration in the eye over an extended period.

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