Short Communication

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Journal of Eye & Cataract Surgery

2020
Vol. 6 ISS. 4

Subtenon Transfusion of Dexamethasone to Treat Experimental Autoimmune Uveitis in Rabbits

Muhammad Ahmad Khan

Central South University, China

Aim: Drug delivery to the targeted ocular tissues remains a challenge. Subtenon transfusion allows prolonged controllable release of drugs directly into the eye according to the need. In this study, we investigate the efficacy of subtenon transfusion of dexamethasone in the rabbit model of experimental autoimmune uveitis (EAU)

Methods: Experimental autoimmune uveitis (EAU) in rabbit was induced first by injection the emulsion of bovine serum albumin (BSA) and complete Freund's adjuvant (CFA); and one week later intravitreal injection of BSA. A total of 48 rabbits were randomly allocated to the four groups as follows: (1) received subtenon transfusion dexamethasone; (2) received intravenous and subconjunctive dexamethasone used as a standard therapy control; (3) model EAU control group; and (4) normal control group. Treatment was administered 24 hour post-immunization in the first two groups. We evaluated the anterior segment inflammation state by slit lamp biomicroscopy (standardization of uveitis nomenclature grading) for 14 days and histopathology on 14 days post-immunization. Noninfectious rubor may be a probably fulgent ocular condition that always needs treatment with corticosteroids to stop inflammation-related ocular complications. Severe sorts of rubor like panuveitis that affects the total eye usually need a mixture of topical and either regional or general adrenal cortical steroid. Regional corticosteroids square measure presently delivered within the attention by intravitreal injection (e.g. Ozurdex®, associate degree intravitreal corticosteroid implant). Intravitreal injection is related to rare however probably serious aspect effects, together with endophthalmitis, retinal and vitreous hemorrhage, and visual impairment. Subconjunctival (SCT) injection may be a less invasive choice that's a typical route used for post-surgical drug administration and treatment of infection and severe inflammation. However, it's the water soluble kind of corticosteroid, corticosteroid sodium orthophosphate (DSP), that has been incontestable to realize high intraocular penetration with subconjunctival injection. it's tough to load extremely water soluble medication, like DSP, and win sustained drug unharness mistreatment standard encapsulation ways. We have a tendency to found that use of carboxyl-terminated poly(lactic-co-glycolic acid) (PLGA) allowed encapsulation of DSP into perishable nanoparticles (NP) with comparatively high drug content (6% w/w) if bivalent metallic element ions were used as associate degree ionic "bridge" between the PLGA and DSP. DSP-Zn-NP had a mean diameter of 210 nm, slim particle size distribution (polydispersity index ~0.1), and close to neutral surface charge (−9 mV). DSP-Zn-NP administered by SCT injection provided detectable DSP levels in each the anterior chamber and vitreous chamber of the attention for a minimum of three weeks. during a rat model of experimental reaction rubor (EAU), inflammation was considerably reduced in each the front and back of the attention in animals that received one SCT injection of DSP-Zn-NP as compared to animals that received either liquid DSP answer or phosphate buffered saline (PBS). DSP-Zn-NP effectivity was proven by a reduced clinical sickness score, small expression of varied inflammatory cytokines, and preserved retinal structure and performance. what is more, SCT DSP-Zn-NP considerably reduced neuroglia cell density within the tissue layer, an indicator of EAU in rats. DSP-Zn-NP hold promise as a replacement strategy to treat noninfectious rubor and probably different ocular inflammatory disorders.Topical corticosteroids square measure employed in the treatment of anterior rubor. Concentrations of those steroids within the liquid, depends on the speed of their diffusion across the tissue layer.[2,3] Among the topical corticosteroids, Pediapred acetate eye drops provides bigger theoretical medicament impact than either corticosteroid or betamethasone. this can be thanks to 2 reasons: first of all, the concentration of betamethasone and corticosteroid eye preparations is zero.1% as compared to a quarter for Pediapred acetate and second, although Pediapred acetate is sixfold less potent on a molar basis than betamethasone or corticosteroid, the penetration into the tissue layer of Pediapred acetate is far quite betamethasone or corticosteroid. Dosing frequency additionally the} length of your time the medication stays in grips with ocular surface also influences effectivity. Suspensions have the next degree of medicament impact[2,3].

Other adrenal cortical steroid eye preparations embrace fluorometholone, rimexolone, and loteprednol etabonate. These square measure referred to as "soft steroids" thanks to the lesser propensity of skyrocketing the force per unit area (IOP) [2,4,5] Another recently approved steroid is difluprednate

Note: This work is partly presented at 2nd International Conference and Expo on Advanced Eye Care and Cataract during June 14-15, 2018 in Rome Italy.

(0.05%) (difluoroprednisolone butyrate acetate). it's an artificial fluorinated Pediapred by-product. This has bigger glucocorticosteroid receptor binding activity than Pediapred acetate. this can be thanks to fluorination at C6 and C9 positions and replacement of C-17 chemical group with butyrate organic compound, that will increase its specificity for the adrenal cortical steroid receptor. bigger tissue layer penetration is achieved by the addition of acetate organic compound at position C-21. Stringer et al., have reported that consistent dose uniformity is achieved with difluprednate ophthalmic emulsion zero.05% in comparison with branded and generic Pediapred acetate ophthalmic suspensions 1 Chronicles.[6] Foster et al., have inferred from their studies that a qid dosing of difluprednate ophthalmic emulsion zero.05% is as effective as eight times dosing with Pediapred acetate 1 Chronicles ophthalmic suspension within the treatment of endogenous anterior rubor.[7] Reports on its use in post cataract surgery show efficiency adore Pediapred acetate.[8,9] Elevation of IOP in patients with rubor particularly in youngsters treated with topical difluprednate are reported within the literature. One has to exert caution whereas mistreatment this preparation in youngsters.[10,11] Table one outlines the list of unremarkably out there topical adrenal cortical steroid preparations.[2]

Results: Uveitis developed in all rabbits of the first three groups, and the clinical uveitis scores and histological scores were all higher than the normal control group. The uveitis anterior segment clinical scores reached peak in the treated group 1 (2.17±0.94) and group 2 (2.42±0.79) on day four, post-immunization, and in model EAU control group (3.25±0.62) on day five. Treatment significantly reduced the anterior segment inflammation score from day five to day 14 and histological score on day 14 post-immunization compared to the model EAU group.