

LOTEPREDNOL ETABONATE- loteprednol etabonate suspension/ drops Akorn

Loteprednol Etabonate Ophthalmic Suspension, 0.5%

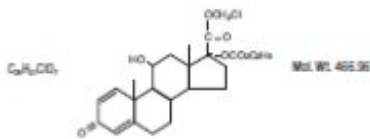
Sterile Ophthalmic Suspension

Rev.265:00 05/17

DESCRIPTION

Loteprednol Etabonate Ophthalmic Suspension contains a sterile, topical anti-inflammatory corticosteroid for ophthalmic use. Loteprednol etabonate is a white to off-white powder.

Loteprednol etabonate is represented by the following structural formula:



Chemical Name:

chloromethyl 17α-[(ethoxycarbonyl)oxy]-11β-hydroxy-3-oxoandrosta-1,4-diene-17β-carboxylate

Each mL contains:

ACTIVE: Loteprednol Etabonate 5 mg (0.5%);

INACTIVES: Edetate disodium, glycerin, povidone K-30, purified water sodium hydroxide and tyloxapol. Hydrochloric acid may be added to adjust the pH to 5.0 - 6.0. The suspension is essentially isotonic with a tonicity of 250 to 310 mOsmol/kg.

PRESERVATIVE ADDED: Benzalkonium chloride 0.01%.

CLINICAL PHARMACOLOGY

Corticosteroids inhibit the inflammatory response to a variety of inciting agents and probably delay or slow healing. They inhibit the edema, fibrin deposition, capillary dilation, leukocyte migration, capillary proliferation, fibroblast proliferation, deposition of collagen, and scar formation associated with inflammation. There is no generally accepted explanation for the mechanism of action of ocular corticosteroids. However, corticosteroids are thought to act by the induction of phospholipase A₂ inhibitory proteins, collectively called lipocortins. It is postulated that these proteins control the biosynthesis of potent mediators of inflammation such as prostaglandins and leukotrienes by inhibiting the release of their common precursor arachidonic acid. Arachidonic acid is released from membrane phospholipids by phospholipase A₂.

Corticosteroids are capable of producing a rise in intraocular pressure.

Loteprednol etabonate is structurally similar to other corticosteroids. However, the number 20 position ketone group is absent. It is highly lipid soluble which enhances its penetration into cells. Loteprednol etabonate is synthesized through structural modifications of prednisolone-related compounds so that it will undergo a predictable transformation to an inactive metabolite. Based upon *in vivo* and *in vitro* preclinical metabolism studies, loteprednol etabonate undergoes extensive metabolism to inactive carboxylic acid metabolites.

Results from a bioavailability study in normal volunteers established that plasma levels of loteprednol etabonate and Δ^1 corticosteroid acid etabonate (PJ 91), its primary, inactive metabolite, were below the limit of quantitation (1 ng/mL) at all sampling times. The results were obtained following the ocular administration of one drop in each eye of 0.5% loteprednol etabonate 8 times daily for 2 days or 4 times daily for 42 days. This study suggests that limited (<1 ng/mL) systemic absorption occurs with loteprednol etabonate.

Clinical Studies:

Post-Operative Inflammation: Placebo-controlled clinical studies demonstrated that loteprednol etabonate is effective for the treatment of anterior chamber inflammation as measured by cell and flare.

Giant Papillary Conjunctivitis: Placebo-controlled clinical studies demonstrated that loteprednol etabonate was effective in reducing the signs and symptoms of giant papillary conjunctivitis after 1 week of treatment and continuing for up to 6 weeks while on treatment.

Seasonal Allergic Conjunctivitis: A placebo-controlled clinical study demonstrated that loteprednol etabonate was effective in reducing the signs and symptoms of allergic conjunctivitis during peak periods of pollen exposure.

Uveitis: Controlled clinical studies of patients with uveitis demonstrated that loteprednol etabonate was less effective than prednisolone acetate 1%. Overall, 72% of patients treated with loteprednol etabonate experienced resolution of anterior chamber cell by day 28, compared to 87% of patients treated with 1% prednisolone acetate. The incidence of patients with clinically significant increases in IOP (≥ 10 mmHg) was 1% with loteprednol etabonate and 6% with prednisolone acetate 1%.

INDICATIONS AND USAGE

Loteprednol etabonate is indicated for the treatment of steroid responsive inflammatory conditions of the palpebral and bulbar conjunctiva, cornea and anterior segment of the globe such as allergic conjunctivitis, acne rosacea, superficial punctate keratitis, herpes zoster keratitis, iritis, cyclitis, selected infective conjunctivides, when the inherent hazard of steroid use is accepted to obtain an advisable diminution in edema and inflammation.

Loteprednol etabonate is less effective than prednisolone acetate 1% in two 28-day controlled clinical studies in acute anterior uveitis, where 72% of patients treated with loteprednol etabonate experienced resolution of anterior chamber cells, compared to 87% of patients treated with prednisolone acetate 1%. The incidence of patients with

clinically significant increases in IOP (≥ 10 mmHg) was 1% with loteprednol etabonate and 6% with prednisolone acetate 1%. Loteprednol etabonate should not be used in patients who require a more potent corticosteroid for this indication.

Loteprednol etabonate is also indicated for the treatment of post-operative inflammation following ocular surgery.

CONTRAINDICATIONS

Loteprednol etabonate, as with other ophthalmic corticosteroids, is contraindicated in most viral diseases of the cornea and conjunctiva including epithelial herpes simplex keratitis (dendritic keratitis), vaccinia, and varicella, and also in mycobacterial infection of the eye and fungal diseases of ocular structures. Loteprednol etabonate is also contraindicated in individuals with known or suspected hypersensitivity to any of the ingredients of this preparation and to other corticosteroids.

WARNINGS

Prolonged use of corticosteroids may result in glaucoma with damage to the optic nerve, defects in visual acuity and fields of vision, and in posterior subcapsular cataract formation. Steroids should be used with caution in the presence of glaucoma.

Prolonged use of corticosteroids may suppress the host response and thus increase the hazard of secondary ocular infections. In those diseases causing thinning of the cornea or sclera, perforations have been known to occur with the use of topical steroids. In acute purulent conditions of the eye, steroids may mask infection or enhance existing infection.

Use of ocular steroids may prolong the course and may exacerbate the severity of many viral infections of the eye (including herpes simplex). Employment of a corticosteroid medication in the treatment of patients with a history of herpes simplex requires great caution.

The use of steroids after cataract surgery may delay healing and increase the incidence of bleb formation.

PRECAUTIONS

General

For ophthalmic use only. The initial prescription and renewal of the medication order beyond 14 days should be made by a physician only after examination of the patient with the aid of magnification, such as slit lamp biomicroscopy and, where appropriate, fluorescein staining.

If signs and symptoms fail to improve after two days, the patient should be re-evaluated.

If this product is used for 10 days or longer, intraocular pressure should be monitored even though it may be difficult in children and uncooperative patients (see **WARNINGS**).

Fungal infections of the cornea are particularly prone to develop coincidentally with long-

term local steroid application. Fungus invasion must be considered in any persistent corneal ulceration where a steroid has been used or is in use. Fungal cultures should be taken when appropriate.

Information for Patients

This product is sterile when packaged. Patients should be advised not to allow the dropper tip to touch any surface, as this may contaminate the suspension. If pain develops, redness, itching or inflammation becomes aggravated, the patient should be advised to consult a physician. As with all ophthalmic preparations containing benzalkonium chloride, patients should be advised not to wear soft contact lenses when using loteprednol etabonate.

Carcinogenesis, Mutagenesis, Impairment of Fertility

Long-term animal studies have not been conducted to evaluate the carcinogenic potential of loteprednol etabonate. Loteprednol etabonate was not genotoxic *in vitro* in the Ames test, the mouse lymphoma tk assay, or in a chromosome aberration test in human lymphocytes, or *in vivo* in the single dose mouse micronucleus assay. Treatment of male and female rats with up to 50 mg/kg/day and 25 mg/kg/day of loteprednol etabonate, respectively, (600 and 300 times the maximum clinical dose, respectively) prior to and during mating did not impair fertility in either gender.

Pregnancy

Teratogenic effects: Pregnancy Category C. Loteprednol etabonate has been shown to be embryotoxic (delayed ossification) and teratogenic (increased incidence of meningocele, abnormal left common carotid artery, and limb flexures) when administered orally to rabbits during organogenesis at a dose of 3 mg/kg/day (35 times the maximum daily clinical dose), a dose which caused no maternal toxicity. The no-observed-effect-level (NOEL) for these effects was 0.5 mg/kg/day (6 times the maximum daily clinical dose). Oral treatment of rats during organogenesis resulted in teratogenicity (absent innominate artery at ≥ 5 mg/kg/day doses, and cleft palate and umbilical hernia at ≥ 50 mg/kg/day) and embryotoxicity (increased post-implantation losses at 100 mg/kg/day and decreased fetal body weight and skeletal ossification with ≥ 50 mg/kg/day). Treatment of rats with 0.5 mg/kg/day (6 times the maximum clinical dose) during organogenesis did not result in any reproductive toxicity. Loteprednol etabonate was maternally toxic (significantly reduced body weight gain during treatment) when administered to pregnant rats during organogenesis at doses of ≥ 5 mg/kg/day.

Oral exposure of female rats to 50 mg/kg/day of loteprednol etabonate from the start of the fetal period through the end of lactation, a maternally toxic treatment regimen (significantly decreased body weight gain), gave rise to decreased growth and survival, and retarded development in the offspring during lactation; the NOEL for these effects was 5 mg/kg/day. Loteprednol etabonate had no effect on the duration of gestation or parturition when administered orally to pregnant rats at doses up to 50 mg/kg/day during the fetal period.

Nursing Mothers

It is not known whether topical ophthalmic administration of corticosteroids could result

in sufficient systemic absorption to produce detectable quantities in human milk. Systemic steroids appear in human milk and could suppress growth, interfere with endogenous corticosteroid production, or cause other untoward effects. Caution should be exercised when loteprednol etabonate is administered to a nursing woman.

Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

ADVERSE REACTIONS

To report SUSPECTED ADVERSE REACTIONS, contact Hi-Tech Pharmacal Co., Inc. at 1-800-262-9010 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

Reactions associated with ophthalmic steroids include elevated intraocular pressure, which may be associated with optic nerve damage, visual acuity and field defects, posterior subcapsular cataract formation, secondary ocular infection from pathogens including herpes simplex, and perforation of the globe where there is thinning of the cornea or sclera.

Ocular adverse reactions occurring in 5-15% of patients treated with loteprednol etabonate ophthalmic suspension (0.2%-0.5%) in clinical studies included abnormal vision/blurring, burning on instillation, chemosis, discharge, dry eyes, epiphora, foreign body sensation, itching, injection, and photophobia. Other ocular adverse reactions occurring in less than 5% of patients include conjunctivitis, corneal abnormalities, eyelid erythema, keratoconjunctivitis, ocular irritation/pain/discomfort, papillae, and uveitis. Some of these events were similar to the underlying ocular disease being studied.

Non-ocular adverse reactions occurred in less than 15% of patients. These include headache, rhinitis and pharyngitis.

In a summation of controlled, randomized studies of individuals treated for 28 days or longer with loteprednol etabonate, the incidence of significant elevation of intraocular pressure (≥ 10 mmHg) was 2% (15/901) among patients receiving loteprednol etabonate, 7% (11/164) among patients receiving 1% prednisolone acetate and 0.5% (3/583) among patients receiving placebo.

DOSAGE AND ADMINISTRATION

SHAKE VIGOROUSLY BEFORE USING.

Steroid Responsive Disease Treatment: Apply one to two drops of loteprednol etabonate into the conjunctival sac of the affected eye four times daily. During the initial treatment within the first week, the dosing may be increased, up to 1 drop every hour, if necessary. Care should be taken not to discontinue therapy prematurely. If signs and symptoms fail to improve after two days, the patient should be re-evaluated (See **PRECAUTIONS**).

Post-Operative Inflammation: Apply one to two drops of loteprednol etabonate into the conjunctival sac of the operated eye four times daily beginning 24 hours after surgery and continuing throughout the first 2 weeks of the post-operative period.

HOW SUPPLIED

Loteprednol Etabonate Ophthalmic Suspension, 0.5% is supplied in a plastic bottle with a controlled drop tip and a pink cap in the following sizes:

5 mL - NDC 50383-265-05

10 mL - NDC 50383-265-10

15 mL - NDC 50383-265-15

TAMPER EVIDENT: FOR YOUR PROTECTION THIS BOTTLE HAS A SAFETY SEAL AROUND THE NECK OR UNDER THE CAP.

Storage: Store upright between 15°–25°C (59°–77°F). DO NOT FREEZE.

KEEP OUT OF REACH OF CHILDREN.

Rx Only

Manufactured by:

AKORN, INC.

Amityville, NY 11701

Rev: 265:00 05/17

PACKAGE/LABEL PRINCIPAL DISPLAY PANEL



AKORN

NDC 50383-265-05

Loteprednol Etabonate Ophthalmic Suspension, 0.5%

Rx only

5 mL

LOTEPREDNOL ETABONATE

loteprednol etabonate suspension/ drops

Product Information

Product Type	HUMAN PRESCRIPTION DRUG	Item Code (Source)	NDC:50383-265
Route of Administration	OPHTHALMIC		

Active Ingredient/Active Moiety

Ingredient Name	Basis of Strength	Strength
LOTEPREDNOL ETABONATE (UNII: YEHI1EZ96K6) (LOTEPREDNOL - UNII:Z8CBU6KR16)	LOTEPREDNOL ETABONATE	5 mg in 1 mL

Inactive Ingredients

Ingredient Name	Strength
WATER (UNII: 059QF0KO0R)	
GLYCERIN (UNII: PDC6A3C0OX)	
TYLOXAPOL (UNII: Y27PUL9H56)	
EDETATE DISODIUM (UNII: 7FLD91C86K)	
POVIDONE K30 (UNII: U725QWY32X)	
BENZALKONIUM CHLORIDE (UNII: F5UM2KM3W7)	
SODIUM HYDROXIDE (UNII: 55X04QC32I)	
HYDROCHLORIC ACID (UNII: QTT17582CB)	

Product Characteristics

Color	WHITE (White to Off White)	Score	
Shape		Size	
Flavor		Imprint Code	
Contains			

Packaging

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:50383-265-05	1 in 1 CARTON	04/18/2019	
1		5 mL in 1 BOTTLE, DROPPER; Type 0: Not a Combination Product		
2	NDC:50383-265-10	1 in 1 CARTON	04/18/2019	
2		10 mL in 1 BOTTLE, DROPPER; Type 0: Not a Combination Product		
3	NDC:50383-265-15	1 in 1 CARTON	04/18/2019	
3		15 mL in 1 BOTTLE, DROPPER; Type 0: Not a Combination Product		

Marketing Information

Marketing	Application Number or Monograph	Marketing Start	Marketing End
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Category	Citation	Date	Date
ANDA	ANDA207609	04/18/2019	

Labeler - Akorn (117696873)

Registrant - Akorn Operating Company LLC (117693100)

Establishment

Name	Address	ID/FEI	Business Operations
Akorn		117696873	MANUFACTURE(50383-265)

Revised: 3/2022

Akorn