

**ACULAR LS- ketorolac tromethamine solution/ drops**  
**Allergan, Inc.**

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**HIGHLIGHTS OF PRESCRIBING INFORMATION**

**These highlights do not include all the information needed to use ACULAR LS<sup>®</sup> safely and effectively. See full prescribing information for ACULAR LS<sup>®</sup>.**

**ACULAR LS<sup>®</sup> (ketorolac tromethamine ophthalmic solution) 0.4% for topical ophthalmic use**  
**Initial U.S. Approval: 1991**

----- **INDICATIONS AND USAGE** -----

ACULAR LS<sup>®</sup> ophthalmic solution is a nonsteroidal, anti-inflammatory drug (NSAID) indicated for the reduction of ocular pain and burning/stinging following corneal refractive surgery. (1)

----- **DOSAGE AND ADMINISTRATION** -----

One drop of ACULAR LS<sup>®</sup> should be applied in the operated eye 4 times per day as needed for pain and burning/stinging for up to 4 days following corneal refractive surgery. (2.1)

----- **DOSAGE FORMS AND STRENGTHS** -----

Ophthalmic solution containing 4 mg/mL ketorolac tromethamine in a 10 mL size bottle filled with 5 mL of solution. (3)

----- **CONTRAINDICATIONS** -----

Hypersensitivity to any component of this product. (4)

----- **WARNINGS AND PRECAUTIONS** -----

- Delayed healing (5.1)
- Cross-sensitivity or hypersensitivity (5.2)
- Increased bleeding time due to interference with thrombocyte aggregation (5.3)
- Corneal effects including keratitis (5.4)

----- **ADVERSE REACTIONS** -----

The most common adverse reactions occurring in 1 - 5% of patients included conjunctival hyperemia, corneal infiltrates, headache, ocular edema and ocular pain. (6.1)

**To report SUSPECTED ADVERSE REACTIONS, contact Allergan at 1-800-433-8871 or the FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).**

**See 17 for PATIENT COUNSELING INFORMATION.**

**Revised: 6/2016**

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## FULL PRESCRIBING INFORMATION

### 1 INDICATIONS AND USAGE

ACULAR LS<sup>®</sup> ophthalmic solution is indicated for the reduction of ocular pain and burning/stinging following corneal refractive surgery.

### 2 DOSAGE AND ADMINISTRATION

#### 2.1 Recommended Dosing

The recommended dose of ACULAR LS<sup>®</sup> ophthalmic solution is one drop four times a day in the operated eye as needed for pain and burning/stinging for up to 4 days following corneal refractive surgery.

#### 2.2 Use With Other Topical Ophthalmic Medications

ACULAR LS<sup>®</sup> has been safely administered in conjunction with other topical ophthalmic medications such as alpha-agonists, antibiotics, beta-blockers, carbonic anhydrase inhibitors, cycloplegics, and mydriatics. Drops should be administered at least 5 minutes apart.

### 3 DOSAGE FORMS AND STRENGTHS

10 mL size bottle filled with 5 mL of ketorolac tromethamine ophthalmic solution 0.4% (4 mg/mL).

### 4 CONTRAINDICATIONS

ACULAR LS<sup>®</sup> solution is contraindicated in patients with previously demonstrated hypersensitivity to any of the ingredients in the formulation.

### 5 WARNINGS AND PRECAUTIONS

#### 5.1 Delayed Healing

Topical nonsteroidal anti-inflammatory drugs (NSAIDs) may slow or delay healing. Topical corticosteroids are also known to slow or delay healing. Concomitant use of topical NSAIDs and

topical steroids may increase the potential for healing problems.

## 5.2 Cross-Sensitivity or Hypersensitivity

There is the potential for cross-sensitivity to acetylsalicylic acid, phenylacetic acid derivatives, and other NSAIDs. There have been reports of bronchospasm or exacerbation of asthma associated with the use of ketorolac tromethamine ophthalmic solution in patients who have either a known hypersensitivity to aspirin/non-steroidal anti-inflammatory drugs or a past medical history of asthma. Therefore, caution should be used when treating individuals who have previously exhibited sensitivities to these drugs.

## 5.3 Increased Bleeding Time

With some NSAIDs, there exists the potential for increased bleeding time due to interference with thrombocyte aggregation. There have been reports that ocularly applied nonsteroidal anti-inflammatory drugs may cause increased bleeding of ocular tissues (including hyphemas) in conjunction with ocular surgery.

It is recommended that **ACULAR LS**<sup>®</sup> ophthalmic solution be used with caution in patients with known bleeding tendencies or who are receiving other medications, which may prolong bleeding time.

## 5.4 Corneal Effects

Use of topical NSAIDs may result in keratitis. In some susceptible patients, continued use of topical NSAIDs may result in epithelial breakdown, corneal thinning, corneal erosion, corneal ulceration, or corneal perforation. These events may be sight threatening. Patients with evidence of corneal epithelial breakdown should immediately discontinue use of topical NSAIDs and should be closely monitored for corneal health.

Postmarketing experience with topical NSAIDs suggests that patients with complicated ocular surgeries, corneal denervation, corneal epithelial defects, diabetes mellitus, ocular surface diseases (e.g., dry eye syndrome), rheumatoid arthritis, or repeat ocular surgeries within a short period of time may be at increased risk for corneal adverse events which may become sight threatening. Topical NSAIDs should be used with caution in these patients.

Postmarketing experience with topical NSAIDs also suggests that use more than 1 day prior to surgery or use beyond 14 days post-surgery may increase patient risk for the occurrence and severity of corneal adverse events.

## 5.5 Contact Lens Wear

**ACULAR LS**<sup>®</sup> should not be administered while wearing contact lenses.

# 6 ADVERSE REACTIONS

The following serious adverse reactions are described elsewhere in the labeling:

- Delayed Healing [see *Warnings and Precautions* (5.1)]
- Cross-Sensitivity or Hypersensitivity [see *Warnings and Precautions* (5.2)]
- Increased Bleeding Time [see *Warnings and Precautions* (5.3)]
- Corneal Effects [see *Warnings and Precautions* (5.4)]

## 6.1 Clinical Studies Experience

Because clinical studies are conducted under widely varying conditions, adverse reaction rates observed in the clinical studies of a drug cannot be directly compared to rates in the clinical studies of another drug and may not reflect the rates observed in practice.

The most frequently reported adverse reactions for **ACULAR LS**<sup>®</sup> ophthalmic solution occurring in approximately 1 to 5% of the overall study population were conjunctival hyperemia, corneal infiltrates,

headache, ocular edema, and ocular pain.

The most frequent adverse reactions reported with the use of ketorolac tromethamine ophthalmic solutions have been transient stinging and burning on instillation. These reactions were reported by up to 40% of patients participating in clinical trials.

Other adverse reactions occurring approximately in 1 to 10% of the time during treatment with other ketorolac tromethamine ophthalmic solutions included allergic reactions, corneal edema, iritis, ocular inflammation, ocular irritation, superficial keratitis, and superficial ocular infections.

Other adverse reactions reported rarely with the use of ketorolac tromethamine ophthalmic solutions included: corneal ulcer, eye dryness, and visual disturbance (blurry vision).

## 6.2 Postmarketing Experience

The following adverse reactions have been identified during postmarketing use of ketorolac tromethamine ophthalmic solutions in clinical practice. Because they are reported voluntarily from a population of unknown size, estimates of frequency cannot be made. The reactions, which have been chosen for inclusion due to either their seriousness, frequency of reporting, possible causal connection to topical ketorolac tromethamine ophthalmic solutions or a combination of these factors, include bronchospasm or exacerbation of asthma, corneal erosion, corneal perforation, corneal thinning and corneal melt, and epithelial breakdown [see *Warnings and Precautions (5.2, 5.4)*].

## 8 USE IN SPECIFIC POPULATIONS

### 8.1 Pregnancy

#### Risk Summary

There are no adequate or well-controlled studies with **ACULAR LS<sup>®</sup>** in pregnant women. No evidence of teratogenicity has been observed in rats or rabbits with **ACULAR LS<sup>®</sup>** at clinically relevant doses.

### 8.2 Lactation

#### Risk Summary

It is not known whether ketorolac when given topically is present in human milk. Because many drugs are excreted in human milk, caution should be exercised when **ACULAR LS<sup>®</sup>** is administered to a nursing woman.

### 8.4 Pediatric Use

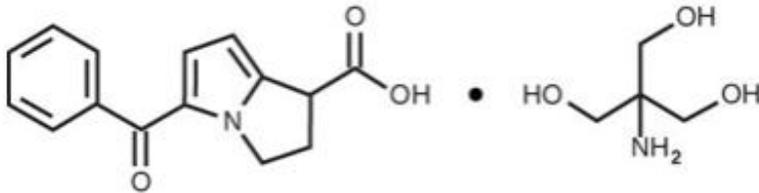
Safety and effectiveness of ketorolac tromethamine in pediatric patients below the age of 3 have not been established.

### 8.5 Geriatric Use

No overall differences in safety or effectiveness have been observed between elderly and other adult patients.

## 11 DESCRIPTION

**ACULAR LS<sup>®</sup>** (ketorolac tromethamine ophthalmic solution) 0.4% is a member of the pyrrolo-pyrrole group of nonsteroidal anti-inflammatory drugs (NSAIDs) for ophthalmic use. Its chemical name is (±)-5-Benzoyl-2,3-dihydro-1*H*-pyrrolizine-1-carboxylic acid, compound with 2-amino-2-(hydroxymethyl)-1,3-propanediol (1:1), and its molecular weight is 376.40. Its molecular formula is C<sub>19</sub>H<sub>24</sub>N<sub>2</sub>O<sub>6</sub> and it has the following structure:



**ACULAR LS<sup>®</sup>** ophthalmic solution is supplied as a sterile isotonic aqueous 0.4% solution, with a pH of approximately 7.4. **ACULAR LS<sup>®</sup>** ophthalmic solution contains a racemic mixture of R-(+) and S-(-)-ketorolac tromethamine. Ketorolac tromethamine may exist in three crystal forms. All forms are equally soluble in water. The pKa of ketorolac is 3.5. This white to off-white crystalline substance discolors on prolonged exposure to light. The osmolality of **ACULAR LS<sup>®</sup>** ophthalmic solution is 290 mOsm/kg.

Each mL of **ACULAR LS<sup>®</sup>** ophthalmic solution contains: **Active:** ketorolac tromethamine 0.4%. **Preservative:** benzalkonium chloride 0.006%. **Inactives:** edetate disodium 0.015%; octoxynol 40; purified water; sodium chloride; and hydrochloric acid and/or sodium hydroxide to adjust pH.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Ketorolac tromethamine is a nonsteroidal anti-inflammatory drug which, when administered systemically, has demonstrated analgesic, anti-inflammatory, and anti-pyretic activity. The mechanism of its action is thought to be due to its ability to inhibit prostaglandin biosynthesis.

### 12.3 Pharmacokinetics

One drop of 0.5% ketorolac tromethamine ophthalmic solution was instilled into one eye and one drop of vehicle into the other eye TID in 26 healthy subjects. Five of 26 subjects had detectable concentrations of ketorolac in their plasma (range 11 to 23 ng/mL) at day 10 during topical ocular treatment.

Two drops of 0.5% ketorolac tromethamine ophthalmic solution instilled into the eyes of patients 12 hours and 1 hour prior to cataract extraction achieved a mean ketorolac concentration of 95 ng/mL in the aqueous humor of 8 of 9 eyes tested (range 40 to 170 ng/mL).

## 14 CLINICAL STUDIES

In two double-masked, multi-centered, parallel-group studies, 313 patients who had undergone photorefractive keratectomy received **ACULAR LS<sup>®</sup>** 0.4% or its vehicle QID for up to 4 days. Significant differences favored **ACULAR LS<sup>®</sup>** for the reduction of ocular pain and burning/stinging following photorefractive keratectomy surgery.

Results from clinical studies indicate that ketorolac tromethamine has no significant effect upon intraocular pressure.

The safety and effectiveness of **ACULAR LS<sup>®</sup>** in post-cataract surgery patients has not been established.

## 16 HOW SUPPLIED/STORAGE AND HANDLING

**ACULAR LS<sup>®</sup>** (ketorolac tromethamine ophthalmic solution) 0.4% is supplied sterile, in white opaque plastic LDPE bottles with white droppers, with a gray high impact polystyrene (HIPS) caps as follows:

5 mL in 10 mL bottle

NDC 0023-9277-05

**Storage:** Store at 15°-25°C (59°-77°F). Protect from light.

## 17 PATIENT COUNSELING INFORMATION

### **Slow or Delayed Healing**

Inform patients of the possibility that slow or delayed healing may occur while using nonsteroidal anti-inflammatory drugs (NSAIDs).

### **Avoiding Contamination of the Product**

Instruct patients to avoid allowing the tip of the bottle to contact the eye or surrounding structures because this could cause the tip to become contaminated by common bacteria known to cause ocular infections. Serious damage to the eye and subsequent loss of vision may result from using contaminated solutions.

Also, to avoid the potential for cross-contamination, the patient should be advised to use one bottle for each eye following bilateral ocular surgery. The use of the same bottle of topical eye drops for both eyes following bilateral ocular surgery is not recommended.

### **Contact Lens Wear**

Advise patients that **ACULAR LS**<sup>®</sup> solution should not be administered while wearing contact lenses.

### **Intercurrent Ocular Conditions**

Advise patients that if they develop an intercurrent ocular condition (e.g., trauma or infection) or have ocular surgery, they should immediately seek their physician's advice concerning the continued use of **ACULAR LS**<sup>®</sup>.

### **Concomitant Topical Ocular Therapy**

Advise patients that if more than one topical ophthalmic medication is being used, the medicines should be administered at least 5 minutes apart.

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### **Principal Display Panel**

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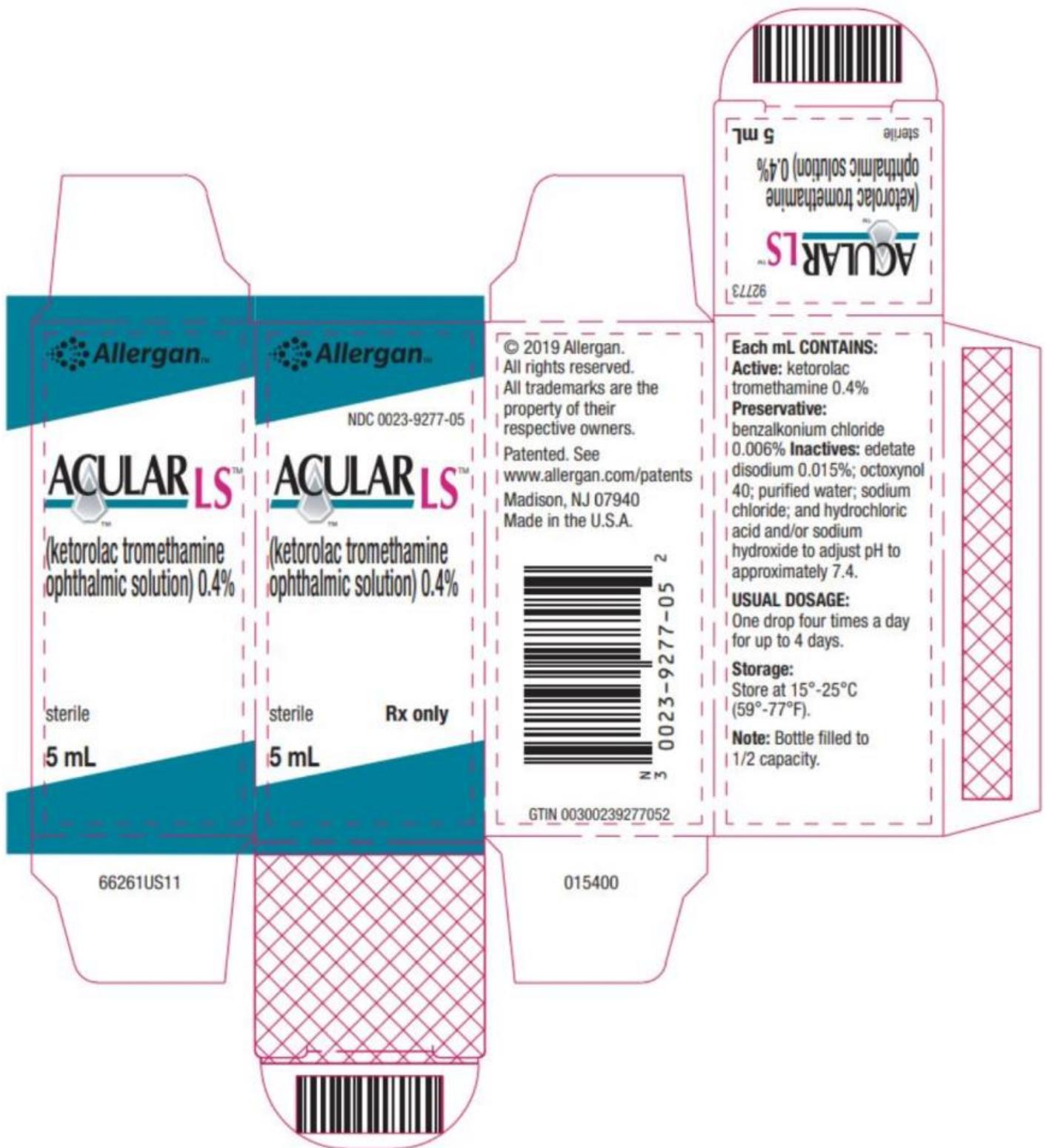
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ACULAR LS<sup>®</sup>

(ketorolac tromethamine  
ophthalmic solution) 0.4%

sterile Rx only

5 mL



## ACULAR LS

ketorolac tromethamine solution/ drops

### Product Information

<b>Product Type</b>	HUMAN PRESCRIPTION DRUG	<b>Item Code (Source)</b>	NDC:0023-9277
<b>Route of Administration</b>	OPHTHALMIC		

**Active Ingredient/Active Moiety**

Ingredient Name	Basis of Strength	Strength
KETOROLAC TROMETHAMINE (UNII: 4EVE5946BQ) (KETOROLAC - UNII:YZI5105V0L)	KETOROLAC TROMETHAMINE	4 mg in 1 mL

**Inactive Ingredients**

Ingredient Name	Strength
EDETATE DISODIUM (UNII: 7FLD91C86K)	
OCTOXYNOL-40 (UNII: 9T1C662FKS)	
WATER (UNII: 059QF0KO0R)	
SODIUM CHLORIDE (UNII: 451W47IQ8X)	
BENZALKONIUM CHLORIDE (UNII: F5UM2KM3W7)	
HYDROCHLORIC ACID (UNII: QTT17582CB)	
SODIUM HYDROXIDE (UNII: 55X04QC32I)	

**Packaging**

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:0023-9277-05	1 in 1 CARTON	08/19/2003	
1		5 mL in 1 BOTTLE, DROPPER; Type 0: Not a Combination Product		

**Marketing Information**

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
NDA	NDA021528	08/19/2003	

**Labeler** - Allergan, Inc. (144796497)

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