Summary of Product Characteristics

KETONAL

(Ketorolac Trometamol 0.5% w/v Eye Drops, Solution)

1 Name of the medicinal product

KETONAL – Ketorolac Trometamol 0.5% w/v Eye Drops, Solution

2 Qualitative and quantitative composition

Each ml of solution contains ketorolac trometamol 5 mg (0.5% w/v).

Excipient(s) with known effect
Each ml contains benzalkonium chloride 0.02% w/v and propylene glycol 1.00 mg.

For the full list of excipients, see section 6.1.

3 Pharmaceutical form

Eye drops, solution.

A clear, colourless to pale yellow aqueous solution, practically free from particles, filled into a white plastic LDPE vial.

4 Clinical particulars

4.1 Therapeutic indications

KETONAL is indicated for the prophylaxis and reduction of inflammation and associated symptoms following ocular surgery.

KETONAL is indicated in adults.

4.2 Posology and method of administration

Posology

Post-operative inflammation
One drop instilled into the eye three times daily, starting 24 hours pre-operatively and continuing for up to three weeks post-operatively.

Paediatric population
There is no relevant use of KETONAL in the paediatric population in the indication for the prophylaxis and reduction of inflammation following cataract surgery.

Method of administration
Ocular use.

Instil one drop of the solution into the inferior conjunctival sac of the eye to be treated, while pulling the lower eyelid gently downwards and looking upwards.

If KETONAL is used concomitantly with other topical eye medications, there must be an interval of at least 5 minutes between the two medications.

Patients should be instructed to avoid allowing the tip of the dispensing container to contact the eye or surrounding structures, to avoid injury and contamination of the eye drops.

4.3 Contraindications

- Hypersensitivity to the active substance or to any of the excipients listed in section 6.1.

- The potential exists for cross-sensitivity to acetylsalicylic acid and other non-steroidal anti-inflammatory drugs. KETONAL is therefore contraindicated in individuals who have previously exhibited sensitivity to these medicinal products.

4.4 Special warnings and precautions for use

Bleeding tendency

It is recommended that KETONAL be used with caution in patients with known bleeding tendencies, or who are receiving other medicinal products which may prolong bleeding time.

Masking of infection

In common with other anti-inflammatory medicinal products, KETONAL may mask the usual signs of infection.

Wound healing and corneal effects

All non-steroidal anti-inflammatory drugs (NSAIDs) may slow down or delay wound healing. Concomitant use of NSAIDs and topical steroids can increase the potential for healing problems. Concomitant use of KETONAL and topical corticosteroids should be exercised with caution in patients susceptible to corneal epithelial breakdown.

Use of topical NSAIDs may result in keratitis. In some 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.

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

Post-marketing experience with topical NSAIDs also suggests that use for more than 24 hours prior to surgery, or use beyond 14 days post-surgery, may increase the risk for the occurrence and severity of corneal adverse events.

Bronchospasm and asthma

There have been post-marketing reports of bronchospasm or exacerbation of asthma in patients who have either a known hypersensitivity to acetylsalicylic acid or non-steroidal anti-inflammatory drugs, or a past medical history of asthma, associated with the use of ketorolac trometamol eye drops, which may be contributory. Caution is recommended in the use of KETONAL in these individuals (see section 4.8).

Excipients

This medicinal product contains benzalkonium chloride as a preservative, which may cause eye irritation. Contact lenses must be removed prior to application, with at least a 15-minute wait before reinsertion. Benzalkonium chloride is known to discolour soft contact lenses; contact with soft contact lenses must be avoided.

This medicinal product contains propylene glycol, which may cause skin irritation.

General

Undesirable effects may be minimised by using the lowest effective dose for the shortest duration necessary to control symptoms.

4.5 Interaction with other medicinal products and other forms of interaction

No interaction studies have been performed.

Ketorolac trometamol eye drops have been safely administered with systemic and ophthalmic medicinal products such as antibiotics, sedatives, beta blockers, carbonic anhydrase inhibitors, miotics, mydriatics, local anaesthetics and cycloplegics.

KETONAL may slow or delay healing. Topical corticosteroids are also known to slow or delay healing. Concomitant use of topical NSAIDs and topical corticosteroids may increase the potential for healing problems (see section 4.4).

4.6 Fertility, pregnancy and lactation

Pregnancy

There are no adequate data from the use of eye drops containing ketorolac trometamol in pregnant women. Studies in animals have shown reproductive toxicity. Inhibition of prostaglandin synthesis may negatively affect pregnancy and/or embryonal/foetal development and/or postnatal development. Although a very low systemic exposure is expected after the use of ketorolac eye drops, KETONAL is not recommended during pregnancy.

Breast-feeding

KETONAL should not be used during breast-feeding. Ketorolac trometamol is excreted in human milk after systemic administration.

Fertility

There are no adequate data on the effect of ketorolac trometamol on fertility in humans.

4.7 Effects on ability to drive and use machines

Transient blurring of vision may occur on instillation of the eye drops. Patients should not drive or use hazardous machinery unless their vision is clear.

4.8 Undesirable effects

Summary of the safety profile

The most frequent adverse reactions reported with the use of ketorolac trometamol eye drops are transient stinging and burning on instillation.

Tabulated list of adverse reactions

The frequency of adverse reactions documented during clinical trials of ketorolac trometamol and through post-marketing experience is given below. Frequencies are defined as: very common (≥ 1/10), common (≥ 1/100 to < 1/10), uncommon (≥ 1/1,000 to < 1/100), rare (≥ 1/10,000 to < 1/1,000), very rare (< 1/10,000) and not known (cannot be estimated from the available data).

System Organ Class	Frequency	Adverse reaction
Immune system disorders	Common	Hypersensitivity, including localised allergic reactions
Nervous system disorders	Common	Headache
Eye disorders	Very common	Eye irritation (including burning sensation), eye pain (including stinging)
	Common	Superficial (punctate) keratitis, eye and/or eyelid oedema, ocular pruritus, conjunctival hyperaemia, eye infection, eye inflammation, iritis, keratic precipitates, retinal haemorrhage, cystoid macular oedema, eye trauma, increased intraocular pressure, blurred and/or diminished vision
	Uncommon	Corneal ulcer, corneal infiltrates, eye dryness, epiphora
	Not known	Corneal damage, e.g. thinning, erosion, epithelial breakdown and perforation*; ulcerative keratitis; eye swelling; ocular hyperaemia
Respiratory, thoracic and mediastinal disorders	Not known	Bronchospasm or exacerbation of asthma**

* Occasional post-marketing reports of corneal damage, including corneal thinning, corneal erosion, epithelial breakdown and corneal perforation, have been received. These occurred mainly in patients using concomitant topical corticosteroids and/or with predisposing co-morbidity (see section 4.4).

** There have been post-marketing reports of bronchospasm or exacerbation of asthma in patients who have either a known hypersensitivity to acetylsalicylic acid or non-steroidal anti-inflammatory drugs, or a past medical history of asthma, associated with the use of ketorolac trometamol eye drops, which may be contributory.

None of the typical adverse reactions reported with systemic non-steroidal anti-inflammatory agents (including ketorolac trometamol) have been observed at the doses used in topical ophthalmic therapy.

Reporting of suspected adverse reactions
Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions to the National Regulatory Authority.

4.9 Overdose

No case of overdose has been reported. Overdose is unlikely to occur via the recommended method of administration.

If the contents of the container are accidentally ingested, fluids should be taken to dilute the medicinal product, and symptomatic and supportive treatment given as required.

5 Pharmacological properties

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Ophthalmologicals; anti-inflammatory agents, non-steroids.

ATC code: S01BC05

Mechanism of action
Ketorolac trometamol is a non-steroidal anti-inflammatory agent demonstrating analgesic and anti-inflammatory activity. Ketorolac trometamol inhibits the cyclo-oxygenase enzyme, which is essential for the biosynthesis of prostaglandins, and has been shown to reduce prostaglandin levels in the aqueous humour after topical ophthalmic administration.

Pharmacodynamic effects
Ketorolac trometamol given systemically does not cause pupil constriction. Results from clinical studies indicate that ketorolac trometamol eye drops have no significant effect on intra-ocular pressure.

5.2 Pharmacokinetic properties

Absorption
Following topical ocular administration in the rabbit, the mean concentration of total radioactivity in the aqueous humour was 0.856 microgram-equivalents/ml at 0.5 hours and 1.607 microgram-equivalents/ml at 2 hours. The tmax was 3.38 hours, the Cmax 1.905 microgram-equivalents/ml, the AUC (0–8 hours) 9.39 microgram-equivalents.hour/ml, the total AUC 13.53 microgram-equivalents.hour/ml, and the half-life 3.77 hours. The absolute ocular bioavailability was 3.7%.

After topical ocular doses in the rabbit, the half-life of total radioactivity in the aqueous humour was longer than after intracameral injection. This suggests that topical dosing may lead to a reservoir effect in the corneal epithelium, with continued flux of the medicinal product from the reservoir into the aqueous humour.

Distribution
After ophthalmic doses were administered to rabbits, peak concentrations of radioactivity were achieved within 1 hour in the ocular tissues and were highest in the cornea (6.06 microgram-equivalents/ml). At 1 hour, the majority of the radioactivity (0.9% of the administered dose) was recovered from the sclera (0.58%) and cornea (0.24%), with smaller amounts recovered from the aqueous humour (0.026%), vitreous humour (0.023%), retina-choroid (0.018%), iris-ciliary body (0.007%) and lens (0.002%). Relative to plasma AUC values, the AUCs in rabbits were higher for cornea (104-fold), sclera (27-fold), iris-ciliary body (5.8-fold), retina-choroid (5.6-fold) and aqueous humour (3.3-fold), and approximately one-half in the vitreous humour and lens. After ophthalmic administration, concentrations of product-related radioactivity were higher in the ocular tissues and lower in plasma compared with those after intravenous dosing.

Systemic absorption
After ophthalmic doses in the rabbit, ketorolac was absorbed rapidly into the systemic circulation (tmax 15 minutes). Plasma half-lives after ophthalmic doses (6.6–6.9 hours) were longer than those after intravenous administration (1.1 hours), suggesting that removal of the medicinal product from the eye into the venous circulation may be rate-limiting. By comparison of levels in the aqueous humour after intracameral injection with plasma levels after intravenous administration, ketorolac was shown to clear more rapidly from plasma (6 ml/min) than from the anterior chamber (11 microlitres/min).

In the cynomolgus monkey, peak plasma levels of ketorolac occurred 1.1 hours after the ophthalmic dose. The plasma half-life of ketorolac was similar after ophthalmic (1.8 hours) and intravenous (1.6 hours) doses. The majority of the ophthalmic dose was excreted in urine (66% in the rabbit and 75% in the monkey), with a small amount in faeces (11% in the rabbit and 2% in the monkey). The extent of systemic absorption after ophthalmic dosing averaged 73% in the rabbit and 76% in the cynomolgus monkey.

Biotransformation
After ophthalmic administration in rabbits, ketorolac represented the major component (more than 90%) of radioactivity in the aqueous humour and plasma, and the p-hydroxy metabolite accounted for 5% of radioactivity in plasma. Ketorolac was also the major component (96%) of plasma radioactivity after ophthalmic dosing in monkeys.

After ophthalmic dosing in the rabbit, 72%, 17% and 6% of the total radioactivity in urine comprised intact ketorolac, p-hydroxy ketorolac and other polar metabolites, respectively. After intravenous dosing, the relative proportions of total radioactivity in urine averaged 6% as intact ketorolac, 68% as p-hydroxy ketorolac and 22% as polar metabolites. In the monkey, intact ketorolac and its polar metabolite accounted for 32% and 65% of the total radioactivity in urine, respectively, after ophthalmic dosing, and 50% and 49% after intravenous dosing. The metabolism of ketorolac was therefore qualitatively similar after ophthalmic and intravenous administration in both the monkey and the rabbit.

Characteristics in patients
Ketorolac trometamol solutions (0.1% or 0.5%) or vehicle were instilled into the eyes of patients approximately 12 hours and 1 hour prior to surgery. Concentrations of ketorolac in the aqueous humour sampled at the time of surgery were at the lower limit of detection (40 ng/ml) in 1 patient and below the quantitation limit in 7 patients dosed with 0.1% ketorolac trometamol. The average aqueous humour level of ketorolac in patients treated with 0.5% ketorolac trometamol was 95 ng/ml. Concentrations of prostaglandin E2 in the aqueous humour were 80 pg/ml, 40 pg/ml and 28 pg/ml in patients treated with vehicle, 0.1% ketorolac trometamol and 0.5% ketorolac trometamol, respectively.

In a 21-day multiple-dose (three times daily) tolerance study in healthy subjects, only 1 of 13 subjects had a detectable plasma level pre-dose (0.021 microgram/ml). In another group of 13 subjects, only 4 subjects showed very low plasma levels of ketorolac (0.011 to 0.023 microgram/ml) 15 minutes after the ocular dose. The higher levels of ketorolac in the aqueous humour, together with very low or undetectable plasma levels after ophthalmic doses, indicate that use of ketorolac trometamol by the ophthalmic route in the treatment of ocular disorders results in low systemic absorption in patients.

5.3 Preclinical safety data

Non-clinical data reveal no special hazard for humans based on conventional studies of safety pharmacology, repeated-dose toxicity, genotoxicity, carcinogenic potential, and toxicity to reproduction and development.

Acute, sub-acute and chronic studies of ketorolac trometamol eye drops in experimental animals have established the safety of the medicinal product. Ketorolac trometamol eye drops were found to be non-irritating, did not demonstrate a local anaesthetic effect, did not influence the healing of experimental corneal wounds in rabbits, did not enhance the spread of experimental ocular infections with Candida albicans, Herpes simplex virus type 1 or Pseudomonas aeruginosa in rabbits, and did not increase the ocular pressure of normal rabbit eyes.

6 Pharmaceutical particulars

6.1 List of excipients

- Disodium edetate
- Sodium chloride
- Propylene glycol
- Benzalkonium chloride
- Purified water

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

36 months.

6.4 Special precautions for storage

Store below 30°C. Protect from light.

Keep out of the sight and reach of children.

6.5 Nature and contents of container

White plastic LDPE vial containing 5 ml of solution, sealed and packed in a carton with a package insert.

Not all pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

No special requirements.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

7 Marketing authorisation holder

National Pharmacy Ltd

Colchester Park

P.O. Box 17843-00500

Nairobi

Kenya

8 Marketing authorisation number

CTD13092

9 Date of first authorisation/renewal of the authorisation

22.07.2026

10 Date of revision of the text

22.07.2026