Over-The-Counter Ophthalmic Drops: An Eye-Opening Cause of Eyelid Dermatitis

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BACKGROUND AND AIMS

Eyelid dermatitis represents a unique diagnostic challenge due to the thin periocular skin, increased permeability, and frequent exposure to topical agents, which amplify inflammatory responses even at low levels of exposure.[1,2] While cosmetics are well-recognized triggers, over-the-counter (OTC) ophthalmic drops remain an underrecognized cause of both allergic and irritant contact dermatitis, often resulting in delayed diagnosis and inappropriate management.[1-3]

This review characterizes the epidemiology, causative agents, pathophysiology, diagnostic challenges, and management implications of eyelid contact dermatitis associated with OTC ophthalmic drops.

MATERIALS AND METHODS

A focused literature review was conducted using PubMed and Embase, emphasizing preservative systems, active pharmaceutical ingredients, and diagnostic strategies including standard patch testing and patient product ('as is') testing.[1]

Allergic contact dermatitis from OTC ophthalmic drops is primarily a Type IV delayed hypersensitivity reaction mediated by T lymphocytes, typically presenting 24–72 hours after exposure.[3] Preservatives, such as benzalkonium chloride, play a central role by disrupting epidermal barrier integrity while simultaneously promoting sensitization, leading to overlapping irritant and allergic mechanisms.[4,5] Common offending agents include preservatives (benzalkonium chloride, thimerosal, parabens), antibiotics (neomycin, bacitracin), and excipients such as propylene glycol, many of which have well-documented sensitization potential (Table 1).[1]

Clinically, patients present with pruritic, erythematous, and edematous plaques involving the upper and/or lower eyelids, often with a characteristic 'tear-drip' distribution.[6] Conjunctival involvement may result in chronic blepharoconjunctivitis. Importantly, patients frequently fail to recognize OTC ophthalmic drops as potential triggers unless specifically questioned, contributing to diagnostic delay.[3] Diagnostic pitfalls commonly arise when clinicians focus exclusively on cosmetic exposures or rely solely on standard patch testing, which may fail to identify ophthalmic-specific allergens.[1,3]

RESULTS

Identification and avoidance of the offending agent remain the cornerstone of management.[5,7] Preservative-free or single-use ophthalmic formulations are preferred for patients requiring chronic therapy. Acute flares may be treated with low-potency topical corticosteroids, used cautiously in the periocular region. Early dermatologic involvement facilitates targeted allergen

Table 1: Common offending agents in over-the-counter ophthalmic drops associated with eyelid contact dermatitis.[3,5-7]

Category	Agent	Clinical relevance
Preservatives	Benzalkonium chloride	Present in ~70% of multi-dose OTC drops; irritant and allergenic; patch-test positivity 1.3–3.1%[5,6]
Preservatives	Thimerosal	Patch-test positivity ~9.7%; declining use but continued relevance[6]
Preservatives	Parabens	Less common sensitizers reported in eyelid ACD[7]
Preservatives	Chlorobutanol	Preservative associated with delayed hypersensitivity reactions[6]
Preservatives	EDTA	Chelating agent implicated in ophthalmic ACD[7]
Antibiotics	Neomycin	High clinical relevance; sensitization rates up to 2.6%[6]
Antibiotics	Tobramycin	Increasingly reported cause of periorbital ACD[5]
Antibiotics	Gentamicin	Aminoglycoside with potential cross-reactivity[5]
Antibiotics	Bacitracin	Recognized cause of eyelid ACD
Antihistamines/decongestants	Ketotifen	Delayed hypersensitivity reactions reported[3]
Antihistamines/decongestants	Pheniramine	Antihistamine associated with eyelid ACD[3]
Antihistamines/decongestants	Phenylephrine	Vasoconstrictor linked to eyelid edema and ACD[3]
Antihistamines/decongestants	Naphazoline	Primarily irritant reactions; occasional allergic responses[3]
Excipients/other	Propylene glycol	Common excipient and known contact allergen[7]
Excipients/other	Lanolin derivatives	Sensitization reported, especially in atopic patients[3]
Excipients/other	Sodium metabisulfite	Rare but documented cause of eyelid ACD[3]
Excipients/other	Packaging materials (e.g., latex droppers)	Rare but reported source of sensitization

ACD: allergic contact dermatitis; EDTA: ethylenediaminetetraacetic acid; OTC: over-the-counter.

identification, improves counseling, and enables interdisciplinary coordination with ophthalmology to prevent recurrent exposure.[7]

Despite increasing recognition, OTC ophthalmic drop-induced eyelid dermatitis remains a diagnostic blind spot. Barriers include low clinical suspicion, overlapping irritant and allergic mechanisms, and

incomplete allergen identification with standard testing approaches. Expanded diagnostic strategies, including ophthalmic-specific patch testing and direct product testing, may improve diagnostic accuracy and patient outcomes.[6,7]

CONCLUSION

In conclusion, OTC ophthalmic drops are a frequent yet underrecognized cause of eyelid contact dermatitis. Preservatives and topical antibiotics represent the most common culprits, with benzalkonium chloride playing a key role in barrier disruption and sensitization. Early recognition, targeted history-taking, and appropriate testing are essential to reduce morbidity and avoid unnecessary therapeutic escalation.[1]

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