

Eyelid Dermatitis: Common Patterns and Contact Allergens

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PRACTICE POINTS

- Eyelid dermatitis is a common dermatologic concern representing a broad range of inflammatory dermatoses, most often caused by allergic contact dermatitis (ACD).
- The most common contact allergens associated with eyelid dermatitis are metals (particularly nickel), fragrances, preservatives, acrylates, and topical medications, which may be found in a variety of sources, including cosmetics, ophthalmic medications, nail lacquers, and jewelry.
- Eyelid ACD is diagnosed via patch testing, and management involves strict allergen avoidance.

Eyelid dermatitis is a common dermatologic concern representing a broad range of inflammatory dermatoses. The most commonly reported cause of eyelid dermatitis is allergic contact dermatitis (ACD), a type IV delayed hypersensitivity reaction caused by exposure to external allergens that is diagnosed via epicutaneous patch testing. The most common contact allergens associated with eyelid dermatitis are metals, fragrances, preservatives, acrylates, and topical medications, which may be found in a variety of sources, including cosmetics, ophthalmic medications, nail lacquers, and jewelry. Management involves strict allergen avoidance with an emphasis on patient counseling. In this review, we discuss the clinical manifestation, evaluation, patch test considerations, and management of eyelid ACD to provide a valuable reference tool in the management of patients presenting with eyelid dermatitis.

Eyelid dermatitis is a common dermatologic concern representing a broad group of inflammatory dermatoses and typically presenting as eczematous lesions on the eyelids.¹ One of the most common causes of

eyelid dermatitis is thought to be allergic contact dermatitis (ACD), a type IV delayed hypersensitivity reaction caused by exposure to external allergens.² Although ACD can occur anywhere on the body, dermatitis on the face and eyelids is quite common.^{1,2} This article aims to explore the clinical manifestation, evaluation, and management of eyelid ACD.

Pathophysiology of Eyelid ACD

Studies have shown that ACD is the most common cause of eyelid dermatitis, estimated to account for 46% to 72% of cases worldwide.³⁻⁶ Allergic contact dermatitis is a T cell-mediated type IV hypersensitivity reaction to external antigens that manifests as eczematous lesions at the site of contact with the allergen that may spread.⁷ Allergic contact dermatitis is a common condition, and it is estimated that at least 20% of the general worldwide population has a contact allergy.^{8,9} Histologically, ACD manifests as spongiotic dermatitis, though this is not unique and also may be seen in atopic dermatitis (AD) and irritant contact dermatitis.² Allergic contact dermatitis is diagnosed via epicutaneous patch testing, and treatment involves allergen avoidance with or without adjuvant topical and/or systemic immunomodulatory treatments.⁷

The eyelids are uniquely prone to the development of ACD given their thinner epidermis and increased susceptibility to irritation. They frequently are exposed to allergens through the direct topical route as well as indirectly via airborne exposure, rinse-down products (eg, shampoos), and substances transferred from an individual's own hands. The occluded skin folds of the eyelids facilitate increased exposure to trapped allergens.^{10,11} Additionally, the skin of the eyelids is thin, flexible, highly vascularized, and lacking in subcutaneous tissue, making this area more susceptible to antigen penetration than other locations on the body.^{1,2,10,12,13}

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Clinical Manifestations

Eyelid ACD is more common in females than males, which is thought to be related to increased use of cosmetics and fragrances.^{1,3,12,14-16} Clinical manifestations may resemble eczematous papules and plaques.¹ Eyelid ACD commonly spreads beyond the eyelid margin, which helps to differentiate it from AD and irritant contact dermatitis. Symptoms of ACD on the eyelids typically include pruritus, redness, swelling, tearing, scaling, and pain.² Persistent untreated eyelid dermatitis can lead to eyelash loss, damage to meibomian glands, and hyperpigmentation.^{2,17,18}

Patterns of Eyelid ACD

Allergic contact dermatitis on the eyelids can occur due to direct application of allergens onto the skin of the eyelids, runoff of products from the hair/scalp (eg, shampoo), transfer of allergens from the hands, or contact with airborne allergens.^{1,2,11,12} Some reports have suggested that eyelid ACD more often is caused by products applied to the scalp or face rather than those applied directly to the eyelids.¹¹ Because the scalp and face are less reactive to contact allergens, in some cases the eyelids may be the only affected site.^{10,12,13}

The specific pattern of dermatitis on or around the eyelids can provide clues to the allergenic source. Dermatitis present around the eyelids and periorbital region with involvement of the bilateral upper and lower eyelids suggests direct exposure to a contact allergen, such as makeup or other cosmetic products.¹ Unilateral involvement of only 1 eyelid can occur with ectopic transfer of allergens from the hands or nails.^{1,19} Involvement of the fingers or nails in addition to the eyelids may further suggest ectopic transfer, such as from allergens in nail polish.¹⁰ Unilateral eyelid dermatitis also could be caused by unique exposures such as a microscope or camera eyepiece.¹⁹ Distribution around the lower eyelids and upper cheeks is indicative of a drip or runoff pattern, which may result from an ophthalmic solution such as eye drops or contact lens solution.^{1,19} Finally, dermatitis affecting the upper eyelids along with the nasolabial folds and upper chest may suggest airborne contact dermatitis to fragrances or household cleaning products.^{1,11}

Common Culprits of Eyelid ACD

Common causes of eyelid ACD include cosmetic products, ophthalmic medications, nail lacquers, and jewelry.^{10,13,20} Within the broader category of cosmetics, allergens may be found in makeup and makeup removers, cosmetic applicators and brushes, soaps and cleansers, creams and sunscreens, antiaging products, hair products, nail polish and files, and hair removal products, among many others.^{10,13,16,20} Additionally, ophthalmologic and topical medications are common sources of ACD, including eye drops, contact lens solution, and topical antibiotics.^{10,13,21} Costume jewelry commonly contains allergenic metals, which also can be found in eyelash curlers, eyeglasses, toys, and other household items.^{22,23} Finally, contact

allergens can be found in items such as goggles, gloves, textiles, and a variety of other occupational and household exposures.

Allergic contact dermatitis of the eyelids occurs predominantly—but not exclusively—in females.^{16,20,24} This finding has been attributed to the traditionally greater use of cosmetics and fragrances among women; however, the use of skin care products among men is increasing, and recent studies have shown the eyelids to be a common location of facial contact dermatitis among men.^{16,24} Although eyelid dermatitis has not been specifically analyzed by sex, a retrospective analysis of 1332 male patients with facial dermatitis found the most common sites to be the face (not otherwise specified)(48.9%), eyelids (23.5%), and lips (12.6%). In this cohort, the most common allergens were surfactants in shampoos and paraphenylenediamine in hair dyes.²⁴

Common Allergens

Common contact allergens among patients with ACD of the eyelids include metals, fragrances, preservatives, acrylates, and topical medications.^{3,10,16,20,25-27} Sources of common contact allergens are reviewed in Table 1.

Metals—Metals are among the most common causes of ACD overall, and nickel frequently is reported as one of the top contact allergens in patients with eyelid dermatitis.^{16,27} A retrospective analysis of 2332 patients with eyelid dermatitis patch tested by the North American Contact Dermatitis Group from 1994 to 2016 found that 18.6% of patients with eyelid ACD had a clinically relevant nickel allergy. Sources of nickel exposure include jewelry, grooming devices, makeup and makeup applicators, and eyelash curlers, as well as direct transfer from the hands after contact with consumer products.¹⁶

Other metals that can cause ACD include cobalt (found in similar products to nickel) and gold. Gold often is associated with eyelid dermatitis, though its clinical relevance has been debated, as gold is a relatively inert metal that rarely is present in eye cosmetics and its ions are not displaced from objects and deposited on the skin via sweat in the same way as nickel.^{4,16,20,28-30} Despite this, studies have shown that gold is a common positive patch test reaction among patients with eyelid dermatitis, even in patients with no dermatitis at the site of contact with gold jewelry.^{20,29,31} Gold has been reported to be the most common allergen causing unilateral eyelid dermatitis via ectopic transfer.^{16,19,20,29} It has been proposed that titanium dioxide, present in many cosmetics and sunscreens, displaces gold allowing its release from jewelry, thereby liberating the fine gold ions and allowing them to desposit on the face and eyelids.^{30,31} Given the uncertain clinical relevance of positive patch test reactions to gold, Warshaw at al¹⁶ recommend a 2- to 3-month trial of gold jewelry avoidance to establish relevance, and Ehrlich and Gold²⁹ noted that avoidance of gold leads to improvement.

Fragrances—Fragrances represent a broad category of naturally occurring and man-made components that often

are combined to produce a desired scent in personal care products.³² Essential oils and botanicals are both examples of natural fragrances.³³ Fragrances are found in numerous products including makeup, hair products, and household cleaning supplies and represent some of the most common contact allergens.³² Common fragrance allergens include fragrance mixes I and II, hydroperoxides of linalool, and balsam of Peru.^{12,32,34} Allergic contact dermatitis to fragrances typically manifests on the eyelids, face, or hands.³³ Several studies have found fragrances to be among the top contact allergens in patients with eyelid dermatitis.^{3,12,20,25,34} Patch testing for fragrance allergy may include baseline series, supplemental fragrance series, and personal care products.^{32,35}

Preservatives—Preservatives, including formaldehyde and formaldehyde releasers (eg, quaternium-15 and bronopol) and methylchloroisothiazolinone/methylisothiazolinone, may be found in personal care products such as makeup, makeup removers, emollients, shampoos, hair care products, and ophthalmologic solutions and are among the most common cosmetic sources of ACD.^{13,36-39} Preservatives are among the top allergens causing eyelid dermatitis.²⁰ In particular, patch test positivity rates to methylchloroisothiazolinone/methylisothiazolinone have been increasing in North America.⁴⁰ Sensitization to preservatives may occur through direct skin contact or transfer from the hands.⁴¹

Acrylates—Acrylates are compounds derived from acrylic acid that may be found in acrylic and gel nails, eyelash extensions, and other adhesives and are frequent causes of eyelid ACD.^{4,10,42} Acrylate exposure may be cosmetic among consumers or occupational (eg, aestheticians).^{42,43} Acrylates on the nails may cause eyelid dermatitis via ectopic transfer from the hands and also

may cause periungual dermatitis manifesting as nail bed erythema.¹⁰ Hydroxyethyl methacrylate is one of the more common eyelid ACD allergens, and studies have shown increasing prevalence of positive reaction rates to hydroxyethylmethacrylate.^{10,44}

Topical Medications—Contact allergies to topical medications are quite common, estimated to occur in 10% to 17% of patients undergoing patch testing.⁴⁵ Both active and inactive ingredients of topical medications may be culprits in eyelid ACD. The most common topical medication allergens include antibiotics, steroids, local anesthetics, and nonsteroidal anti-inflammatory drugs.⁴⁵ Topical antibiotics such as neomycin and bacitracin represent some of the most common causes of eyelid dermatitis^{4,10} and may be found in a variety of products, including antibacterial ointments and eye drops.¹ Many ophthalmologic medications also contain corticosteroids, with the most common allergenic steroids being tixocortol pivalate (a marker for hydrocortisone allergy) and budesonide.^{10,20} Topical steroids pose a particular dilemma, as they can be either the source of or a treatment for ACD.¹⁰ Eye drops also may contain anesthetics, β -blockers, and antihistamines, as well as the preservative benzalkonium chloride, all of which may be contact allergens.^{21,39}

Differential Diagnosis of Eyelid Dermatitis

Although ACD is reported to be the most common cause of eyelid dermatitis, the differential diagnosis is broad, including endogenous inflammatory dermatoses and exogenous exposures (Table 2). Symptoms of eyelid ACD can be nonspecific (eg, erythema, pruritus), making diagnosis challenging.⁴⁶

Atopic dermatitis represents another common cause of eyelid dermatitis, accounting for 14% to 39.5% of cases.^{3-5,49}

TABLE 1. Sources of Common Allergens Causing Eyelid Dermatitis^{4,10,22}

Source	Allergens				
	Metals	Fragrances	Preservatives	Acrylates	Topical medications
Cosmetic applicators/eyelash curlers	×				
Eye drops			×		×
Hair products		×	×		
Hair removal products		×	×		
Household cleaning products		×	×		
Jewelry	×				
Makeup	×	×	×		
Makeup remover		×	×		
Nail cosmetics			×	×	
Nail files	×				
Soaps/cleansers		×	×		

Atopic dermatitis of the eyelids classically manifests with lichenification of the medial aspects of the eyelids.⁵⁰ Atopic dermatitis and ACD may be difficult to distinguish, as the 2 conditions appear clinically similar and can develop concomitantly.⁵¹ Additionally, atopic patients are likely to have comorbid allergic rhinitis and sensitivity to environmental allergens, which may lead to chronic eye scratching and lichenification.^{1,51} Clinical features of eyelid dermatitis suggesting allergic rhinitis and likely comorbid AD include creases in the lower eyelids (Dennie-Morgan lines) and periorbital hyperpigmentation (known as the allergic shiner) due to venous congestion.^{1,52}

Seborrheic dermatitis is an inflammatory reaction to *Malassezia* yeast that occurs in sebaceous areas such as the groin, scalp, eyebrows, eyelids, and nasolabial folds.^{1,53,54}

Irritant contact dermatitis, a nonspecific inflammatory reaction caused by direct cell damage from external irritants, also may affect the eyelids and appear similar to ACD.¹ It typically manifests with a burning or stinging sensation, as opposed to pruritus, and generally develops and resolves more rapidly than ACD.¹ Personal care products are common causes of eyelid irritant contact dermatitis.¹⁶

Patch Testing for Eyelid ACD

The gold standard for diagnosis of ACD is patch testing, outlined by the International Contact Dermatitis Research Group.⁵⁵⁻⁵⁷ Patch testing generally is performed with standardized panels of allergens and can be customized either with supplemental panels based on unique exposures or with the patient's own personal care products to increase the sensitivity of testing. Therefore, a thorough history is crucial to identifying potential allergens in a patient's environment.

False negatives are possible, as the skin on the back may be thicker and less sensitive than the skin at the location of dermatitis.^{2,58} This is particularly relevant when using patch testing to diagnose ACD of the eyelids, where the skin is particularly thin and sensitive.² Additionally, ingredients of ophthalmic medications are known to have an especially high false-negative rate with standard patch testing and may require repeated testing with higher drug concentrations or modified patch testing procedures (eg, open testing, scratch-patch testing).^{1,59}

Treatment

Management of ACD involves allergen avoidance, typically dictated by patch test results.¹⁰ Allergen avoidance may be facilitated using online resources such as the Contact Allergen Management Program (<https://www.acdscamp.org/>) created by the American Contact Dermatitis Society.^{10,18} Patient counseling following patch testing is crucial to educating patients about sources of potential allergen exposures and strategies for avoidance. In the case of eyelid dermatitis, it is particularly important to consider exposure to airborne allergens such as fragrances.¹⁶ Fragrance avoidance is uniquely difficult, as labelling standards in the United States currently do not require disclosure of specific fragrance components.³³

TABLE 2. Differential Diagnoses of Eyelid Dermatitis^{1,46-48}

Endogenous	Exogenous
Atopic dermatitis	Airborne contact dermatitis
Cutaneous T-cell lymphoma	Allergic contact dermatitis
Dermatomyositis	Contact urticaria
Psoriasis	Fixed drug eruption
Rosacea	Infection
Seborrheic dermatitis	Irritant contact dermatitis

Additionally, products labelled as unscented may still contain fragrances. As such, some patients with fragrance allergy may need to carefully avoid all products containing fragrances.³³

In addition to allergen avoidance, eyelid ACD may be treated with topical medications (eg, steroids, calcineurin inhibitors, Janus kinase inhibitors); however, these same topical medications also can cause ACD due to some ingredients such as propylene glycol.¹⁰ Topical steroids should be used with caution on the eyelids given the risk for atrophy, cataracts, and glaucoma.¹

Final Interpretation

Eyelid dermatitis is a common dermatologic condition most frequently caused by ACD due to exposure to allergens in cosmetic products, ophthalmic medications, nail lacquers, and jewelry, among many other potential sources. The most common allergens causing eyelid dermatitis include metals (particularly nickel), fragrances, preservatives, acrylates, and topical medications. Eyelid ACD is diagnosed via patch testing, and the mainstay of treatment is strict allergen avoidance. Patient counseling is vital for successful allergen avoidance and resolution of eyelid ACD.

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