

Eyelid Eczema in Senegal: Epidemiology, Clinical Phenotypes and Main Contact Allergens

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Abstract

Introduction: Eyelid eczema (EE) is a pruritic inflammatory dermatosis of the eyelids. It is a frequent reason for consultation in dermato-allergology. Its prevalence varies between 3% to 21%. The aims of this study were to determine the phenotype of eyelid eczema and to identify the various contact allergens.

Patients and Methods: This was a cross-sectional, multicenter study conducted over a 6-month period in two Dermatology departments and one Ophthalmology department in Dakar (Senegal). All patients with eyelid eczema have been included in the study.

Results: We collected 50 cases of eyelid eczema, representing a hospital frequency of 0.47%. The mean age was 23 years, with extremes of 8 months and 84 years, and the sex ratio was 0.66. Personal atopy has been noted in 84% of cases. Lesions were chronic in 32 cases (64%) and acute in 18 (36%). The upper eyelid was involved in 98% and the lower in 96%. Eyelid involvement has been isolated in 24% of cases, associated with facial involvement in 62% and hand involvement in 16%. Patch tests were positive in 100% of cases, the most frequent contact allergens being Potassium dichromate in 44.44%, Nickel in 38.88%, Hydroxyethyl methacrylate in 27.77% and Cobalt in 27.77% of cases. Positivity of personal products reinforced relevance in 5 cases.

Conclusion: Eyelid eczema is an inflammatory dermatosis of young women. The sources of allergens most frequently encountered in eyelid eczema are cosmetics and ophthalmic eye drops. Identifying the various contact allergens enables appropriate avoidance measures to be put in place.

Keywords: *Eyelid eczema; Contact allergens; Senegal*

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1. Introduction

Eyelid eczema (EE) is a pruritic inflammatory dermatosis of the eyelids, manifesting clinically as a pruritic, erythematous palpebral edema that may be accompanied by vesicles and oozing. In chronic cases, lichenification and hyperpigmentation may be observed [1]. Eyelid eczema is a frequent reason for consultation in dermatology, its prevalence varying between 2 to 21% with a female predominance [2-4]. Eyelid involvement is estimated to represent for between 8.6% and 18% of allergic contact dermatitis etiologies [5]. The epidermis of the eyelid is very thin, less than a millimeter thick, allowing allergens to penetrate. The hypodermis is thin, containing very few fatty lobules and a loose connective tissue [6]. This leads to oedema formation. There are usually one or more upper palpebral folds, which allow substances to accumulate in contact with the eyelid [7]. These anatomical features mean that the eyelids are particularly exposed to contact eczema, either directly or indirectly. The modes of sensitization are various, and products containing allergens can be broadly classified into three categories: topical ophthalmic products, cosmetics, hygiene products and industrial products responsible for occupational allergies [8].

Some eyelid allergens, such as isothiazolinones, acrylates and new ophthalmic therapeutics, have made their mark on the literature in recent years [9]. Questioning and clinical examination generally enable differential diagnoses to be ruled out, and the indication for allergological investigation to be established. Patch tests are used to identify the allergens responsible. Commercial batteries detect 37% to 73% of the allergens responsible for allergic contact dermatitis [10]. Hence the need to test patients' personal products. Eyelid eczema has rarely been reported in the medical literature [3,8,11]. The aims of this study were to determine the phenotype of eyelid eczema and to identify the main contact allergens involved.

2. Patients and Methods

This was a cross-sectional, multicenter study conducted over a six-month period from May 20 to November 20, 2022 in the dermatology and ophthalmology departments of Aristide Le Dantec hospital and the dermatology department of the Social Institute Hygiene. We included all patients with eyelid eczema of any age, characterized by acute or chronic eczema lesions. The diagnosis of acute eczema was known by the presence of pruritic erythematous vesicular oozing lesions of the eyelids. Chronic eczema was characterized by pruritic, even liquefied, erythematous-squamous lesions. Atopy has been suspected in patients with atopic equivalents (atopic dermatitis, asthma, allergic rhinitis, allergic conjunctivitis) and confirmed by positive pneumoallergen prick tests.

The diagnosis of atopic dermatitis was clinical, based on questioning and clinical examination. It was based on the United Kingdom Working Party criteria [12]. A questionnaire has been administered to the study population, recording epidemiological, clinical, therapeutic and evolutionary data. Allergological tests were carried out in the dermatology-allergology exploration unit at Le Dantec Hospital. The tests consisted of patch tests to the European Standard Battery (ESB) and to personal products. Pneumoallergen prick tests and specific Immunoglobulin E (IgE) assays (if respiratory skin tests were negative). The test has been considered relevant when there was a product-related clinical event. Relevance was "current" when sensitization explained all or part of the patient's current symptomatology. Relevance was "old" when the patient's clinical history included a dermatitis related to this sensitization, which disappeared when the product was avoided. When relevance was not found, we

spoke of "sensitization" to the contact allergen. To improve relevance, we looked for the presence of the allergen on the personal product's list of ingredients. The concordance between the positivity of the personal product and the positivity of an EGS allergen reinforced the diagnosis of contact eczema of the eyelids. Data entry and analysis have been performed by using SPSS version 18 software. Chi-square and Fisher tests have been used according to their conditions of applicability, with a significance level of $p < 0.05$.

3. Results

We recorded 50 patients, representing a hospital frequency of 0.47%. The patients were male in 20 cases and female in 30, i.e. a sex ratio of 0.66. The mean age of the patients was 23 years, with extremes of 8 months and 84 years. The [2-14] and [18-40] age groups were the most represented (FIG. 1). Personal atopy has been noted in 84% of cases, with allergic rhinitis in 26, allergic conjunctivitis in 29, asthma in 15 and food allergy in 20. Exposure to pet dander was noted in 16 cases.

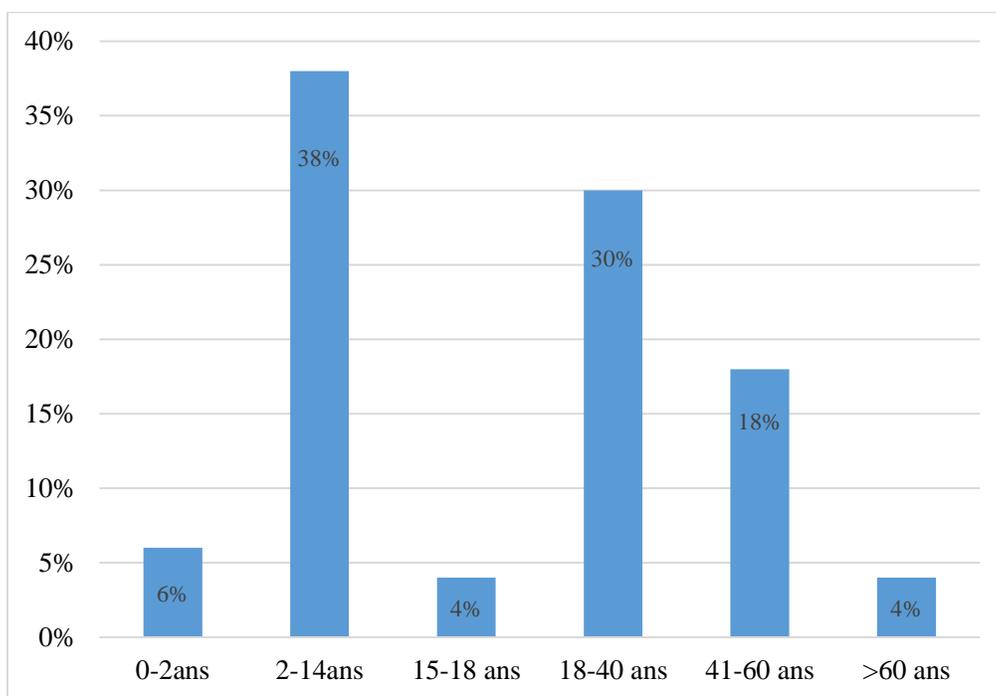


FIG. 1. Distribution of cases according to age groups.

Sheep dander has been involved in 11 cases, cat dander in 3 cases and dog dander in 2 cases. The use of new cosmetic products was noted in 25 cases. TABLE 1 illustrates the distribution of cases according to exposure to a new cosmetic product. Ophthalmic eye drops were used in 6 cases. TABLE 2 illustrates the different ophthalmic eye drops used. Pruritus was the main reason for consultation in 47 cases (94%); the elementary lesions were erythema in 37 cases, post-inflammatory hyperpigmentation in 28 cases, lichenification in 18 cases, papules in 17 cases, and vesicles and oozing in 12 cases. The clinical presentation was isolated contact eczema of the eyelids in 16 cases (32%), contact eczema of the face with eyelid involvement in 12 cases (24%) and atopic eczema of the eyelids in 22 cases (44%). Lesions were chronic in 32 cases (FIG. 2) and acute in 18 (FIG. 3 & 4). Patch tests were positive in 18 cases (36%). Poly-sensitization was present in 17 cases (94.4%). The

predominant contact allergens were potassium dichromate (FIG. 5) in 8 cases, and nickel (FIG. 6) in 7 cases. Patch test-positive allergens are shown in TABLE 3. Tests to personal products were positive in 5 cases to antihistamine eye drops and toilet soap (TABLE 4). Respiratory prick tests were positive in 14 cases, and concerned house dust mites in 28 cases, molds in 2 cases and animal dander in 3 cases.

The mites were *Dermatophagoides pteronyssinus* in 11 cases, *Dermatophagoides farinae* in 9 cases and *Blomia tropicalis* in 8 cases. Specific IgE antibodies were positive for pneumallergens in 3 cases and for trophallergens in 2 cases. The relevance of the tests was current in 13 cases and long-standing in 11 cases. The topical treatments used were topical steroids and skin moisturizers in 41 cases and tacrolimus in one case. Systemic corticosteroids drugs were administered in 3 cases. Favorable progress noted in 35 cases (70%).



FIG. 2. Chronic atopic eczema of the eyelids.



FIG. 3. Acute atopic eczema of the eyelids.



FIG. 4. Acute eczema of the eyelids with ketotifen eye drops.



FIG. 5. The potassium dichromate patch test positivity.



FIG. 6. Nickel patch test positivity.

TABLE 1. Breakdown of cases by exposure to a new product.

	Personal products	Number	Percentage (%)
Cosmetics	Cream	12	24
	Soap/ shower gel	12	24
	Oil	2	4
	Fragrance	2	4
	Mascara	2	4
	Cosmetic foundation	2	4
	Manicure	1	2
	Make-up remover	1	2
	Eyeshadow	1	2
	Detergents	7	14
Dishwashing products	Dishwashing liquid	3	6

TABLE 2. Exposure to ophthalmologic topical.

Ophthalmic topical		Number
Antibiotic	Gentamicin eye drops	1
	Azithromycin eye drops	1
	Fusidic acid gel	1
	Tobramycin eye drops	1
Topical stéroïds	Prednisolone acetate eye drops	1
Non stéroïdal anti-inflammatory drugs	Indometacin 0.1% eye drops	1
Combination of steroid and antibiotic	Dexaméthasone and Néomycin sulfate and Polymyxin B sulfate	2
Antihistaminic	Ketotifen eye drops	2
	Olopatadine eye drops	1
	Sodium chromoglicate eye drops	1
Anhydrase carbonique inhibitor+ bétabloquant	Dozolamide and Timolol eye drops	1

TABLE 3. Positive allergens in patch tests.

	Number	Percentage (%)
Metals		
Potassium dichromate	8	44,44
Nickel	7	38,88
Cobalt	5	27,77
Plastic resins		
Hydroxyethylmethacrylate	5	27,77
Tert-Butylphenolformaldehyde resin (PTBP)	4	22,22
Epoxy Resin, Bisphenol A	3	16,66
Drug		
Néomycine	4	22,22
Tixocortol21 Pivalate	3	16,16
Colorants		
Para phenilene diamine	3	16,66
Textile Dye	1	5,55
Fragrances		
Perou Balsam	3	16,66
Fragrance Mix I (FM I)	3	16,66
Fragrance Mix II (FM II)	2	11,11
Colophan	1	5,55
Curators		
Quaternum	3	16,66
Methylisothiazolinone	2	11,11
Paraben Mix	2	11,11
Methylisothiazolinone+ Methylchloroisothiazolinone	2	11,11
Formaldehyde	1	5,55
Excipient		
Lanolin Alcohol	3	16,66
Rubber components		
Mercaptobenzothiazole	5	27,77

TABLE 4. Breakdown by relevance of allergological tests.

Exhibition source	Incriminated personal product	Positive allergens
Cosmetics	« Shaniqua » eyeshadow and mascara	Nickel
	Eyeshadow and mascara	Nickel and cobalt
	« Coco pulp » soap	Paraben mix, fragrance Mix 2
	False eyelashes	Hydroxyethyl methacrylate
	« Fanico » soap	Fragrance Mix 1
	« Nivea » cream	Quaternum
	Permanent varnish	Hydroxyethyl methacrylate
Professional products	Bleach	Bichromate de potassium
	Tilesetters (glues)	PTBP
	Macon (ciment)	Potassium dichromate
Medecines	Topical stéroïds	Tixocortol-21-pivalate
	« Orchazid » eye drops	Ketotifen
	« Maxidrol » eye drops	Neomycin

4. Discussion

We report 50 cases of eyelid eczema in pigmented phototypes, representing a hospital frequency of 0.47%. The reported prevalence of eyelid eczema varies between 3% and 21% according to American and European series [2,13-15]. According to some authors, eyelid eczema accounts for 4.6% of facial eczema [16]. The average age of our patients was 23. In the literature, the average age of patients with eyelid eczema ranged from 40 to 66 [4,17]. We noted two peaks in the frequency of eyelid eczema. The first includes children aged between 2 to 14 with eyelid eczema as part of atopic dermatitis, and the second adults aged between 18 and 40 with contact eyelid eczema. Some authors report that eyelid eczema is more common in adults in their forties [13,14]. The predominance of women seems to be linked to the high using of cosmetic products by women [2, 4, 5, 16,18]. In our series, personal atopy was noted in 84% of cases. Atopy is a factor in eyelid eczema and the main cause in children [19]. In the literature, atopy was the cause of eyelid dermatitis in 14% of cases in Valsecchi's study [19] 23% in

Nethercott [15] and 39.5% according to Svensson [20]. In our study, 48.83% of contact dermatitis cases were atopic. It is known that atopic patients are at high risk of developing allergic contact dermatitis [21]. Indeed, alteration of the cutaneous barrier during atopic dermatitis facilitates allergen penetration [22]. Around 73% of patients have several positive aeroallergens on Atopy patch-tests [26]. In the literature, the most frequent clinical signs are eyelid erythema and conjunctival hyperemia [17]. Ophthalmological involvement in our series was noted in 50%, dominated by limboconjunctivitis endemic to the tropics, conjunctival hyperemia and periorbital edema. Chronic eczema lesions were more frequent in 64%, secondary to a delay in consultation.

With regard to patch test positivity, potassium dichromate, nickel, hydroxyethylmethacrylate and cobalt were the most frequent allergens in our study. Sources of chromium exposure included bleach, leather, metal alloys, matches, cement, tattoo ink, implants, prostheses and the paper industry. It is also found in paints, make-up products and cell phones. Nickel was the second allergen reported in our series. Its prevalence has been estimated at 17.5% by some authors [23]. Nickel is frequently found in objects applied to the eyelids, such as eyelash curlers and products such as mascara, eye shadow, contact lens cleaning solutions and eyebrow pencils [24]. The third allergen in our study was hydroxyethyl methacrylate. This allergen is found in artificial nails and nail varnishes. Acrylates can also be found in other products, including adhesives, glues (notably those used to fix false eyelashes) and paints [25]. To detect allergens absent in standardized batteries such as ophthalmic topicals, it is important to test patients' personal products [4,5]. In the series by Assier [3], in 19% of patients followed for eyelid eczema, the allergy was identified only after testing their personal products. We noted positive tests on personal products in 5 cases.

The ophthalmic eye drops most frequently implicated in eyelid eczema are aminoglycosides (tobramycin, neomycin, polymyxin B), chloramphenicol, topical steroids, but also beta-blockers and prostaglandin analogues [8]. In recent years, tobramycin has been prescribed more frequently than neomycin, chloramphenicol and polymyxin B, which considerably increases tobramycin sensitization. [8]. In our series, 6 patients had been exposed to ophthalmological eye drops prior to lesion onset. Two of them were allergic to neomycin eye drops. Contact dermatitis to ketotifen eye drops is rare but possible [26]. In our series, we report a case of eyelid eczema to ketotifen collyrium marketed under the name "Orchazid Collyre", with a positive Patch test. Sensitization is more marked with the use of topical antihistamines [26].

5. Conclusion

Eyelid eczema is a frequent complaint in dermato-allergology. Chronic forms have often been noted in Senegal, with young women predominating. Metals such as chromium and nickel are the most common contact allergens in our study. The causes of eyelid eczema are most often linked to cosmetic products and topical ophthalmic medications.

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