

SCIENCE WORLD JOURNAL OF SKIN DISEASES AND VENEREOLGY



Demographic and Clinical Characteristics of Patients with Eyelid Eczema in a Referral Center from 2004 to 2018

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Article Information

Article Type:	Research	*Corresponding author:	Citation: Ida Alzira Gomes Duarte (2020)
Journal Type:	Open Access	Ida Alzira Gomes Duarte	Demographic and Clinical Characteristics of Patients with Eyelid Eczema in a Referral Center from 2004 to 2018. <i>Sci World J Skin Dis Venereol</i> , 1(1);1-4
Volume: 1	Issue: 1	Professor	
Manuscript ID:	SWJSDV-1-106	Casa de Sao Paulo	
Publisher:	Science World Publishing	Hospital and School of medicine Brazil	
Received Date:	24 September 2020	Email: iagd54@terra.com.br	
Accepted Date:	05 October 2020		
Published Date:	07 October 2020		

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ABSTRACT

Eyelid eczema have many etiologies, among them contact dermatitis. The investigation of suspect cases includes patients' history, clinical examination, and patch tests. The goals of this study were: to determine demographical and clinical characteristics of patients with eyelid eczema patch tested between 2004 and 2018; to determine established diagnoses; and to identify responsible allergens. Medical records of patients with eyelid eczema who underwent patch testing were analyzed. This study included 228 patients, of which 89.5% were women, with a mean age of 45 years. Regarding clinical condition, 64.5% presented eczema lesions in other body parts besides the eyelids, mainly in other facial sites (51.8%). Final diagnosis was allergic contact dermatitis (ACD) in 61%, atopic dermatitis (AD) in 12.7%, undefined in 12.3%, irritant contact dermatitis in 7.9%, superimposing of ACD and AD in 3.1%, and other diagnoses in 3.1% of patients. Regarding patch tests, 64.4% of patients had at least one relevant positive allergen, the major ones being: toluene-sulfonamide-formaldehyde resin, paraphenylenediamine, nickel sulfate, fragrance mix I, neomycin, and Kathon CG. As main etiologies in ACD cases, nail polish (36%), topical medicaments (27.2%), non-specified cosmetics (24.5%), hair dye (13.6%), metals (15.6%), rubber (6.8%), and shampoos (4%) could be identified. Thereby, results presented compatibility to data in the literature: predominance of women and most prevalent final diagnosis of cosmetic-related ACD. Thus, when dealing with patients with eyelid eczema, investigation with patch testing is fundamental.

INTRODUCTION

Eczema in the eyelid area are often a challenge for their several etiologies, such as allergic contact dermatitis (ACD), irritant contact dermatitis, atopic dermatitis (AD), seborrheic dermatitis, and psoriasis. Additionally, in some cases these diagnoses may overlap [1]. Contact dermatitis (both allergic and irritant) is quite frequent, being considered the most common eyelid eczema, which may be attributed to its thickness of only 0.55 mm (while 2 mm in other facial areas), favoring the penetration of allergens and irritants. Besides, the act of blinking leads to the accumulation of substances in the eyelid skin folds for an extended time, predisposing the patient to contact dermatitis. Other possible factors contributing to the occurrence of contact dermatitis are the tendency of touching this body area with fingers and the use of products on the eyelids such as cosmetics, make-up, and eye-care items [1,2].

The investigation of suspect cases of ACD includes patients' clinical history, detailed clinical examination, and patch testing, which confirms the diagnosis and determine the etiology of the ACD.

The main allergens causing eyelid ACD are present in products applied in contiguous areas such as the scalp (e.g., shampoos and conditioners), aeroallergens dispersed in the ambient (e.g., fragrances), products applied directly to the eyelids (e.g., eye drops, mascara, eyeshadow, false eyelashes), and products used in non-contiguous body areas (e.g., nail polish applied on fingernails) [2]. According to a 2013 German study with 4779 patients with eyelid eczema, the three main allergens found were nickel sulfate, toluene-sulfonamide resin, and thimerosal [3]. Other similar studies identified as major associated sensitizers: fragrances, balsam of Peru, metals, neomycin, toluene-sulfonamide resin, thimerosal, benzalkonium chloride and other preservatives [4,5].

Unfortunately, there are few Brazilian studies on the subject, which reinforces the importance of the present work.

The main goals of this study were: to determine the demographical and clinical characteristics of patients with eyelid eczema who underwent patch testing in reference services between 2004 and 2018; to determine the established diagnoses among the studied group; and to identify the main responsible allergens (in the cases of ACD).

CASUISTRY AND METHODS

The present work has been approved by the Research Ethics Committee of the corresponding institution (CAE 97162518.1.0000.5479).

Data from medical records of patients treated by specialized services at quaternary-care hospitals between 2004 and 2018 were retrospectively assessed, with selected patients being the ones diagnosed with eyelid eczema and patch tested.

The analysis of the selected medical records allowed the collection of information related to patients, patch tests, and final diagnosis. The analyzed data were: age, gender, ethnicity, occupation, personal and familiar atopy-related history, dermatosis evolution period, presence of lesions in other body areas, patch test result, final diagnosis, and etiology (in the cases of ACD).

Patch testing followed the methodology of application and reading recommended by the International Contact Dermatitis Research Group (ICDRG). According to the anamnesis, the most used allergen series during the tests were the following battery tests: Brazilian (30 substances/FDA-Allergenic/ RJ-Brazil), cosmetics (10 substances/ FDA-Allergenic/ RJ-Brazil), Latin-American (24 substances/ Chemotechnique Diagnostics/ Malmö-Sweden), hair-related (15 substances/ IPI ASAC/ SP-Brazil) and, when possible, separate allergens and patients' products were also added. In every case, either Finn Chambers (Smart Practice-USA) or Allergo Chambers (Neoflex, São Paulo-Brazil) were used.

The obtained data was organized in a Microsoft Excel spreadsheet and transferred to the SPSS software (version 13.0). A Chi-square test with a significance level of 5% was applied.

RESULTS

The present study included 228 patients in total, of which 204 (89.5%) were female and 24 (10.5%) were male. The mean age of patients was 45 years. Regarding ethnicity, 114 (50%) were white, 42 were black (18%), 68 were brown (30%), and 4 were yellow (1.75%).

Regarding history of atopy, 91 (39.9%) presented personal history while 66 (28.9%) showed familiar occurrences.

Dermatosis evolution periods had a median value of 12 months, with a maximum of 528 months and a minimal of 0.5 month (15 days), with 47% occurrences above the median and 39% below.

Regarding clinical condition, 148 (64.5%) patients presented eczema lesions in body parts other than the eyelids, such as facial areas in 118 (51.8%), arms in 82 (36%), hand in 52 (22.8%), legs in 47 (20.6%), trunk in 43 (18.9%), and scalp in 24 (10.5%), with some patients presenting occurrences in more than one location. Of these, 6 patients presented lesions with a typical distribution pattern in photoexposed areas.

Final diagnosis was ACD in 139 (61%), AD in 29 (12.7%), undefined in 28 (12.3%), irritant contact dermatitis in 18 (7.9%), superimposing of ACD and AD in 7 (3.1%), and other diagnoses in 7 (3.1%) of the evaluated patients.

Of 228 cases, 183 (80.3%) had at least one positive patch test. However, after setting the relevance, this number dropped to 147 patients (64.4%) with at least one relevant positive result, of these 94 (41.2%) with a single relevant positive result, 31 (13.6%) with two, and 22 (9.6%) with three or more. Allergens with relevant positive results are described in Table 1.

Among the patients with final diagnosis of ACD, the main etiologies identified were nail polish in 53 (36%), topical medicaments in 40 (27.2%), non-specified cosmetics in 36 (24.5%), hair dye in 20 (13.6%), metals in 23 (15.6%), rubber in 10 (6.8%), and shampoos in 6 (4%).

Professional occupation of the analyzed patients are presented in Table 2. In seven of the analyzed cases, the final diagnosis was classified as occupational dermatosis: 3 manicurists, 1 massage therapist, 1 installer of aluminum frames, 1 floor covering installer, and 1 construction worker.

DISCUSSION

The majority of the investigated patients with eyelid eczema are women (89.5%), which is compatible to the literature and justified by a higher use of cosmetic products by the feminine public, since

Table 1: Relevant allergens found in patch tests in patients with eyelid eczema.

Allergen	Quantity	Positive frequency
Toluene-sulfonamide-formaldehyde resin	52	33.76%
Paraphenylenediamine	21	9.21%
Nickel sulfate	19	8.33%
Fragrance mix I	16	7.00%
Neomycin	15	6.57%
Kathon/methylisothiazolinone	15	6.57%
Formaldehyde	12	5.26%
Promethazine	9	3.94%
Tiuram-mix	8	3.50%
Ethylenediamine	6	2.63%
Carba-mix	6	2.63%
Lanolin	5	2.19%
Potassium bichromate	5	2.10%
Ketoconazole	4	NA
Balsam of Peru	4	1.70%
Epoxy resin	3	1.31%
Quinoline-mix	3	1.31%
Propylene glycol	3	1.31%
Colophony	3	1.31%
Cocamidopropyl betaine	3	11.11%
P-aminophenol	2	NA
Laurylglucoside	2	NA
Patient's nail polish	2	NA
Budesonide	2	7.40%
Benzocaine	2	0.87%
Triethanolamine	1	0.64%
Thixocortol pivalate	1	3.70%
Fragrance mix II	1	3.70%
Palladium	1	3.70%
M-aminophenol	1	NA
Thiomorpholine	1	NA
Irgasan	1	0.43%
Decyl glucoside	1	NA
Patient's eye drop	1	NA

NA: Not applicable (tests using separate allergens/substances that were not considered in the routine of other patients, on an occasional basis, thus being impossible to determine their positive frequency).

Table 2: Professional occupations of patients with eyelid eczema

Occupation	Frequency	%
Housekeepers	85	37.3
Students	33	14.5
Office workers	27	11.8
Retired/unemployed	14	6.1
Tailors/dressmakers	11	4.8
Health workers	10	4.4
Salespeople	8	3.5
Cooks	7	3.1
Caregivers	4	1.8
Manicurists	4	1.8
Teachers	4	1.8
Waiters/waitresses	3	1.3
Drivers	3	1.3
Bodyguards	3	1.3
Hairdressers	2	0.9
Floor covering installer	1	0.4
Artisan.	1	0.4
Caretaker(warden)	1	0.4
Street fair salesperson	1	0.4
Florist	1	0.4
Installer of aluminum frames	1	0.4
Laboratory worker	1	0.4
Massage therapist	1	0.4
Excavator operator	1	0.4
Construction worker	1	0.4
Total	228	100

the most frequent final diagnosis was ACD due to cosmetics [6,7]. This reasoning also explains the observed larger percentage of concomitant involvement of dermatosis in other facial areas (51.8%) and upper members (arms in 36% and hands in 22.8% of patients), which are body areas of greater direct contact with ACD-causing cosmetic items.

The main diagnoses of the analyzed patients were ACD (61%), AD (12.7%), and irritant contact dermatitis (7.9%). Although there is a disparity in the diagnosis frequencies in similar studies, there is a consensus of the higher frequency of ACD (ranging from 30 to 77%), followed by AD (with values around 10%), which is in accordance to the literature [6]. One must also consider that ACD may be overestimated due to the fact that the selected population comes from patch testing medical clinics, which possibly indicates that patients with clinical conditions pertaining to other dermatoses have not been referred to the investigation of associated ACD. Yet, other diagnoses such as rosacea, psoriasis, and seborrheic dermatitis were observed (3.1%). On a significant parcel of patients (12.3%), it was impossible to establish a sure diagnosis and, among the reasons for such result, one may consider the difficulty of accessing complementary series of tests a few years ago in the field.

Positive frequency and relevance in patch tests was 64.5%, a similar value to the one observed in the literature. In a prospective French study with 264 patients with eyelid eczema, 56.4% of them had at least one relevant positive result in patch tests [7].

The use of the standard Brazilian series and the cosmetic series in patch tests allowed the diagnosis of the great majority of ACD cases (84.3%). However, it is important to highlight that the use of

Latin-American series, hair-related and other separate substances occurred in a smaller portion of the analyzed population, since they have been adopted only since 2014. Two European studies considered the elaboration of specific corresponding series for eyelids adding relevant allergens that were absent in routine tests [7,8]. It is also worth mentioning the possibility of adding patients' own products to patch tests, depending on each case, as occurred in 3 patients of the group (2 with nail polish and 1 with eye drops).

Every consulted study in the literature show the cosmetic category as the main cause of eyelid ACD, most frequently due to fragrances and preservatives. The major allergens found in this work were: gold sodium thiosulfate, fragrance mix, balsam of Peru, nickel sulfate, neomycin, and Kathon CG [6,9]. Therefore, the present casuistry is compatible to results found in the literature, also indicating cosmetics as the main etiology of ACD cases: nail polish in 36% of patients, non-specified cosmetics in 24.5%, and hair dyes in 13.6%. Toluene-sulfonamide-formaldehyde resin, paraphenylenediamine, nickel sulfate, fragrance mix I, neomycin, and Kathon CG were identified as the most frequent relevant allergens. Although sensitizers from fragrances and preservatives were also observed, toluene-sulfonamide-formaldehyde resin from nail polish and paraphenylenediamine from hair dyes were even more frequent. The only observed allergen in other studies that was absent in this casuistry was gold sodium thiosulfate, since the battery tests used in this study do not include such substance.

Toluene-sulfonamide-formaldehyde resin found in nail polish was the most common relevant allergen among the ones analyzed, with a large difference of frequency compared to others. It is the resin responsible for giving strength and shine to the product, reason why it is frequently used. Lesions as a result of eyelid eczema, in those cases, occur due to face-touching habits. As using nail polish is very common in Brazil, this allergen causes sensitization in a significant parcel of the population, with significantly higher occurrences than in other countries [8]. Yet there are other potential allergens in nail polish such as phthalates and acrylates (in case of more modern gel polish), which are routinely not used in patch tests but might be considered in the investigation of patients with relevant history [6,8].

Another common allergen in cases of ACD was paraphenylenediamine, found in most permanent hair dyes. It is interesting mentioning that only 7 of 21 patients with a relevant positive test patching presented concomitant lesions in the scalp, showing that patients with ACD due to hair dye may manifest eczema only in the eyelids, other facial areas, and the cervical region. A possible reason for the absence of scalp compromising might be the greater number of regulatory T-cells in the follicles, lowering the provoking of dermatitis in that area [10].

Still on relevant sensitizers found in cosmetic products of eyelid ACD cases, fragrances (herein represented by the fragrance mix I) and preservatives Kathon CG (methylisothiazolinone + methylchloroisothiazolinone) and formaldehyde were also observed. These are widely used allergens, present in products applied to areas close to the eyelids, such as shampoos, soaps, moisturizers, among others. Fragrances can still act as aeroallergens in products such as perfumes, causing conditions in exposed areas that resemble photosensitivity reactions. They compose the group with the highest positive frequency in similar studies conducted in other countries [6,8,9].

Regarding topical medications (27.2% of eyelid ACD cases), the main allergens were neomycin and promethazine, besides others in lower frequency: ethylenediamine, lanolin, ketoconazole, budesonide, benzocaine, and thixocortol pivalate. Topical medications can cause ACD due to direct contact (use of eye drops or accidental contact after application in other area) or even sensitization at a distance [6]. Some of them, such as promethazine and ketoconazole, can even cause photosensitivity reactions, thus provoking eczema lesions in photoexposed areas, including eyelids. It is also worth mentioning that some less frequent topical medications were tested in only part of cases and, therefore, may have an underestimated frequency.

The allergen with the highest total positive outcome in the analyzed tests was nickel sulfate, although its frequency was lower among the relevant positive test results (15.6% of eyelid ACD cases). It is the major sensitizer worldwide and its relevance in those cases are disputable in the literature. Its presence in metal products may be the cause of eyelid ACD cases by direct contact (e.g., eyelash curler) and as makeup contaminants (e.g., eye shadow). Additionally, accidental transfers of nickel from the hands to the eyelids are also a common occurrence [8,9]. Other less common allergens were tiuram-mix and carba-mix, present in rubber, besides surfactants such as cocoamidopropylbetaine, laurylglucoside and decylglucoside, present in shampoos, which are eyelid ACD causing products widely reported in the literature [9,11]. Regarding the latter, due to fact that the hair battery was used only in some patients, it was impossible to state conclusions on the frequency of these allergens in the analyzed patients.

Regarding the association with professional occupations, seven of the analyzed cases resulted in occupational ACD: 3 manicurists (2 due to toluene-sulfonamide-formaldehyde resin in nail polish and 1 due to nickel sulfate in metallic utensils); 1 massage therapist (due to kathon present in massage lotions); 1 construction worker (due to potassium bichromate in cement and carba/tiuram-mix in rubber gloves); 1 installer of aluminum frames and 1 floor covering installer (both due to epoxy resin in glues and grout).

CONCLUSION

The present study showed that, among patients with eyelid eczema patch tested between 2004 and 2018, there was a predominance of women and the most prevalent final diagnosis was allergic contact dermatitis. Cosmetics were the main causing group of ACD, followed by topical medicaments. The most frequent relevant allergens were toluene-sulfonamide-formaldehyde resin, paraphenylenediamine, nickel sulfate, fragrance mix I, neomycin, and Kathon CG.

Thus, when dealing with patients with eyelid eczema, investigation with patch testing is fundamental. Although most cases may benefit from only using standard Brazilian and cosmetic series tests, other complementary series showed relevant results in diagnoses and should be considered depending on patient history.

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