



**HAL**  
open science

# Allergic Contact Dermatitis: a case series and review for the Ophthalmologist

Sharon Morris, Richard Barlow, Dinesh Selva, Raman Malhotra

► **To cite this version:**

Sharon Morris, Richard Barlow, Dinesh Selva, Raman Malhotra. Allergic Contact Dermatitis: a case series and review for the Ophthalmologist. *British Journal of Ophthalmology*, 2010, 95 (7), pp.903. 10.1136/bjo.2009.174607 . hal-00602288

**HAL Id: hal-00602288**

**<https://hal.science/hal-00602288>**

Submitted on 22 Jun 2011

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

1 **Allergic Contact Dermatitis: a case series and review for the Ophthalmologist**

2

3

4

5

6

7 Sharon Morris MRCOphth MRCSEd (i)

8 Richard Barlow MBBCh MD FRCP (ii)

9 Dinesh Selva MBBS(Hons), FRACS, FRANZCO (iii)

10 Raman Malhotra FRCOphth (i)

11

12

13

14 (i) Corneoplastic Unit, Queen Victoria Hospital, East Grinstead, UK.

15

16 (ii) St. John's Institute of Dermatology, □South Wing, Block 7, □St. Thomas' Hospital, □London SE1  
17 7EH. Tel +4420 7188 6408 Fax +44207 7188 6382.

18 (iii) Discipline of Ophthalmology & Visual Sciences, University of Adelaide and South Australian  
19 Institute of Ophthalmology, Adelaide, Australia.

20

21 Correspondence to:

22 Mr Raman Malhotra

23 Corneoplastic Unit,

24 Queen Victoria Hospital,

25 Holtye Road,

26 East Grinstead,

27 West Sussex, UK

28 RH19 3DZ

29 Tel +44 (0) 1342 414549

30 Fax +44 (0) 1342 414106

31 Email: raman.malhotra@qvh.nhs.uk

32

33 Keywords: Eyelids, immunology, inflammation, diagnostic tests/investigations

34

35 Word count: 2218

36

37

1 Licence for Publication

2

3 The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of  
4 all authors, an exclusive licence (or non exclusive for government employees) on a worldwide basis to  
5 the BMJ Publishing Group Ltd and its Licensees to permit this article (if accepted) to be published in  
6 BJO editions and any other BMJ PGL products to exploit all subsidiary rights, as set out in our licence  
7 (<http://group.bmj.com/products/journals/instructions-for-authors/licence-forms/>).

8

9

10

11

12 Competing Interest: None to declare.

1 Summary:

2

3 Eyelid dermatitis is most commonly caused by an allergenic response, potentially from exposure at  
4 another site, rather than from local toxicity. Yet allergic contact dermatitis (ACD) is a diagnosis often  
5 missed by ophthalmologists. We review the literature and detail our experience relating to the causes,  
6 clinical features and management of this condition.

7

8 Fourteen patients over a 2-year period that were referred to the oculoplastic service for a further  
9 opinion, were reviewed in a retrospective, non-comparative study. All patients underwent patch-  
10 testing for diagnosis. Eight out of the fourteen patients had delays of greater than 6 months from  
11 symptoms to diagnosis. In six of these, this was greater than 1 year. Similar delays are reported in the  
12 literature. 79% of our cases were referred by ophthalmologists. Although two of our patients were  
13 biopsied, this did not help in making the diagnosis. 13 patients had disease restricted to the eyelids  
14 though only five of these had direct contact of the allergen with the eyelids. Two patients were also  
15 sensitized to topical steroid creams prescribed for their treatment. All patients improved after removal  
16 of the allergen.

17

18 Further clinical features and management options from the literature are reviewed and discussed.

19

20

1 Introduction

2

3 Causes of an itchy, red eyelid include eczema and psoriasis, seborrhoeic dermatitis,  
4 meibomitis/blepharitis and rosacea, dermatomyositis, infections, infestations and malignancy.

5

6 Allergic contact dermatitis (ACD) is the commonest cause of eyelid dermatitis.<sup>1-4,6</sup> Whilst many  
7 patients never get to the stage of being referred to an ophthalmologist, up to 13% of all patients with  
8 ACD have been reported to present with eyelid involvement.<sup>1,2,3</sup> This may be the only affected site and  
9 may result in delayed diagnosis.<sup>4,5</sup> Eyelid inflammation tends to be attributed by ophthalmologists  
10 more typically, and potentially incorrectly, to local causes, such as topical medications and eye-drops.

11

12 Eczema may result from exogenous/endogenous factors. Contact dermatitis is due to exogenous  
13 factors and can be irritant or allergic. Irritant contact dermatitis, e.g. toxic reactions to eyedrops, is  
14 caused by direct damage and penetration of the skin and represents only approximately 15% of  
15 patients with persistent eyelid features.<sup>2,3</sup> On the other hand, allergic contact dermatitis is a delayed  
16 type IV hypersensitivity reaction to a specific allergen and accounts for the majority.<sup>2,3,6,7,8</sup> Atopic  
17 eczema, which is endogenous, represents only 11-39%.<sup>2,3,9</sup>

18

19 Whilst this is well described in the dermatological literature, we believe that ophthalmologists are less  
20 aware of the periorbital manifestations and management of this condition. This descriptive study of 14  
21 patients referred to our oculoplastic units for a second/third opinion highlights this delay to diagnosis  
22 incurred prior to referral. In addition, we review the current literature and detail the important features  
23 of ACD.

24

25

26

27

28

1 Materials and Methods

2

3 A retrospective non-comparative case series was performed of patients referred between September  
4 2006 and September 2008 to two specialist oculoplastic centres. 14 consecutive patients with patch-  
5 test proven allergens from two independent units were included. The causes, clinical features,  
6 management and outcome are described in relation to these patients.

7

8 An up-to-date appraised review of the literature was performed, including research from the Ovid  
9 Medline and Embase databases. International papers were incorporated. Review articles, large case  
10 series and randomised controlled trials were included after appraisal by two separate authors. The  
11 main outcome measure was evidence-based literature with clinical relevance.

12

13

1 Results

2

3 We studied 14 patients (10 female, age range 5 - 72 years). Eleven patients were referred by an  
4 ophthalmologist for a second opinion and the remainder by their general practitioners. Clinical details  
5 of each patient are included in Table 1. All patients presented with bilateral upper and lower eyelid  
6 involvement, with one exception (Case 10) that had unilateral disease secondary to an eyebrow ring.  
7 Most complained of sore, itchy eyelids with swelling of the skin. Some showed lichenification and in  
8 two patients (Cases 2 and 6) post-inflammatory hyperpigmentation was the most striking feature. See  
9 Figures 1(a-f) and 2(a&b).

10

11 The duration of symptoms varied from 2 weeks to 4.5 years (median 1 year, mean 13 months). Eight  
12 patients had had symptoms for 6 months or more, of whom five gave a history longer than a year.  
13 Many had tried topical emollients and steroids but it was only upon withdrawal of the allergen that  
14 their disease improved. All of our patients were referred to a dermatologist for patch testing.

15

16 Two important features of our patients are the range and type of allergens involved. These included:  
17 quaternium-15, a constituent of shampoo; nail polish resin; nickel; fragrance-mix; balsam of Peru;  
18 benzalkonium chloride 0.1% in lubricant eyedrops; house dust mite; tixocortol pivalate, the steroid  
19 component found in hydrocortisone, Eumovate, Betnovate and Dermovate creams; and an excipient in  
20 Eumovate cream.

21

22

23

24

25

26

27

1 Discussion

2

3 Eyelid dermatitis is not uncommon; one author<sup>9</sup> reporting involvement in as many as 10% of all  
4 general dermatology out-patients. The differential diagnosis includes contact and atopic eczema,  
5 seborrhoeic dermatitis, blepharitis, rosacea, psoriasis, dermatomyositis, impetigo and cutaneous T-cell  
6 lymphoma.

7

8 Acute ACD may present with erythema and macules, papules and/or vesicles. However, blisters are  
9 rare on the eyelids. Lichenification, scaling and fissuring are features of more chronic disease. The  
10 incidence of ACD as a cause of eyelid dermatitis varies from 29-77% of patients reported,<sup>1,2,3,6,7,8,10</sup>  
11 and has been found to be the most likely cause if all 4 eyelids are involved.<sup>10</sup> It is more common in  
12 middle-aged patients with less pigmented skin. Amin, *et al*<sup>11</sup> reported 85.4% of their patients with  
13 ACD as caucasian in origin with the greatest prevalence in the 41-70 yr old age-range. Females are  
14 most frequently affected (61.8% - 90% of patients) because of use of cosmetics.<sup>1,2,6,7,8,10</sup>

15

16 Immune Process

17 Two stages are necessary in the development of ACD – an initial immune-mediated sensitization to  
18 the allergen and then elicitation of the inflammatory response. Sensitization involves penetration of an  
19 allergen through the skin and binding to Langerhans antigen-presenting cells. These cells migrate to  
20 the lymph nodes and sensitize naïve T lymphocytes, which then relocate themselves back in the skin  
21 but throughout the skin. The inflammatory response is elicited by re-exposure to the allergen.

22

23 Most environmental allergens are haptens – simple <500d electrophilic molecules that must link to  
24 proteins to form a complete antigen before they can sensitize.<sup>12</sup> There are more than 2800 known  
25 environmental allergens<sup>13</sup> but not all are haptens. If the hapten complexes with a non-immunogenic  
26 carrier, then tolerance is induced, rather than sensitization.<sup>14</sup> The carriers for contact allergens are  
27 HLA-DR or class II antigens on the surface of Langerhan's cells.<sup>15</sup>



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27

Because ACD is immune-mediated, compromised immunity is associated with decreased reactivity or energy. The ageing process modulates ACD, possibly due to a decrease in density of antigen presenting cells and production of proinflammatory cytokines.<sup>16</sup> In addition, children and infants can be affected by ACD. It is unclear when immunocompetence is achieved but patch testing has been performed in infants younger than 2 years of age.<sup>17</sup> More typically, ACD is seen in older children.

Investigation

Skin biopsies are unlikely to distinguish between ACD and other forms of eczema but may help to exclude impetigo and lymphoma. Irritant and allergic contact dermatitis both show spongiosis and a lymphocyte infiltrate. Acute irritant contact eczema usually shows more ballooning degeneration and necrotic keratocytes, whereas ACD shows more spongiosis of the epidermis.<sup>18</sup>

Patch testing is the key investigation used to identify allergens. Frequent contact allergens in eyelid ACD are shown in Table 2. Eyelids are particularly susceptible to ACD because the skin is thinner (thickness of 0.55mm) than on the rest of the face (2.0mm thick). This allows easier penetration of the allergen than at other sites and eyelid dermatitis may therefore be the only manifestation.<sup>11</sup> In addition eyelids may manifest a reaction without direct contact of the allergen at this site.

A thorough history should be taken to identify possible allergens. Details of cosmetics, hobbies and occupation may be relevant. The eyes, eyelids, face and hands (including nails) should be carefully examined.

Patch testing involves application of allergens under Finn Chambers® to the patient's back. Reactions are read at varying intervals. Standard batteries of patch tests, eg. European standard series, TRUE test and North American CD Group (NACDG) series,<sup>19</sup> do not include every relevant eyelid allergen and the test should be adjusted for each patient. Guin (2002) found that 66 out of a total of 167

1 patients with ACD would have remained undiagnosed if the TRUE test was used alone.<sup>9</sup> Similarly,  
2 Katz<sup>4</sup> found that the TRUE test alone would have detected only 37% of ACD allergens and NACDG  
3 only 42% of allergens. The most common relevant allergens are the patient's own personal care  
4 products.

5  
6 Whilst patch testing often provides the answer for the patient, interpretation should be performed by  
7 an experienced clinician. Untrained interpretation exposes the patient to incorrect over and under-  
8 testing, deceptive results and potentially unwanted sensitization. Interpretation involves being able to  
9 separate irritant and allergic reactions, determining the relevance of the antigen and the optimum  
10 reading time and appreciation of cross-reactions and co-reactivity.

11  
12 False positives can occur if the allergen causes an irritant rather than allergic response. The test may  
13 need to be repeated with the allergen at a lower concentration. In addition, even if a chemical is found  
14 to be allergenic it cannot be assumed that it is causative. The relevance of the antigen is important. A  
15 provocation test or repeat open application testing (ROAT) may be necessary. This involves the  
16 patient applying the commercial product to normal skin several times daily for 1-2 weeks.<sup>20</sup>

17  
18 Most false negative responses can be avoided by performing a second reading of the test sites 48 hours  
19 after the first one. Some studies advocate readings at 4-7 days, especially in elderly patients, to ensure  
20 any allergic response is elicited.<sup>21,22</sup> Neomycin reactions may take longer – one study showed that  
21 half are not evident until 96 hours.<sup>23</sup> In addition, if too low a concentration is used in testing,  
22 sensitization may not occur. Sensitization is dependent on dose of chemical per unit area of skin (up to  
23 a limit of 0.1cm<sup>2</sup>).<sup>24</sup> Concentrations of ophthalmic preparations may need to be tested at a higher  
24 level due to difficulty in penetrating the skin on the back.<sup>25</sup>

25  
26 Side effects of patch testing include a severe local reaction or flare reaction at a distant site, an “angry  
27 back/excited skin” syndrome where numerous positive reaction occur, pigment changes, scarring and

1 keloids, infections and potentially anaphylaxis.<sup>26</sup> For all of these reasons, patch testing should be  
2 performed by an experienced dermatologist. .

3

#### 4 Treatment

5 It is well established that patients may occasionally continue to have symptoms even after avoidance  
6 of the allergen.<sup>27,28</sup> Treatment for symptom relief is therefore required in addition to simply  
7 identifying responsible allergens.

8

9 Treatment should include emollients, treatment of secondary infection if present and down-regulation  
10 of the immune response. Topical anti-pruritics should be avoided because of the risk of secondary  
11 sensitization.<sup>29</sup>

12

13 Glucocorticosteroids are usually the primary choice for immune modulation and their effective  
14 treatment of ACD is well documented.<sup>30,31,32</sup> Inflammation is reduced by suppressing the recruitment  
15 of polymorphonuclear leukocytes and reversing capillary permeability. Topical steroids are usually  
16 sufficient and treatment should be limited to 2-3 weeks duration. Low potency steroids such as  
17 hydrocortisone and desonide are safer on the face, though stronger steroids such as clobetasone  
18 propionate or betamethasone dipropionate are used for moderate-severe disease.<sup>33</sup> Longstanding  
19 application of topical steroids is associated with skin atrophy, telangiectases and acneiform reactions.  
20 If more than 20% of the body surface area is involved, or if there are bullae or extensive facial  
21 involvement, then treatment should be considered with systemic steroids.

22

23 It is important to be aware that topical steroids may themselves be allergenic, as seen in case 12. One  
24 study<sup>34</sup> of 31 patients with ACD that had worsened or shown no response to topical corticosteroid  
25 treatment found that 22% had a positive patch test result to the steroid itself. In other studies,<sup>35,36</sup> the  
26 steroid has been implicated in 0.2-5%.

27

1 Ascomycins such as tacrolimus (TK506) (Protopic ointment 0.03% or 0.1%) and pimecrolimus (ASM  
2 981) (Elidel cream) have recently been introduced as treatment options and provide a solution for thin-  
3 skin areas, eg. the face and eyelids.<sup>37,38</sup> They are topical calcineurin inhibitors and cause a reduction  
4 in interleukin, leukotriene, histamine and serotonin release, thereby effectively suppressing the  
5 immune response.<sup>29,39</sup> Both agents target the human epidermal Langerhans cell<sup>40</sup> and have been  
6 shown to inhibit the elicitation phase of ACD in a mouse model.<sup>41</sup> In addition, a study in humans  
7 found that tacrolimus also suppresses the sensitization phase.<sup>42</sup> Tacrolimus ointment at concentrations  
8 of both 0.03% and 0.1% has been found to be an effective treatment for nickel-induced steroid  
9 resistant ACD in adult and paediatric patients. Safety and efficacy of usage has also been reported in  
10 children of two years or older.<sup>12</sup> A 0.1% concentration is probably more effective<sup>43,44,45</sup> but is more  
11 frequently a cause of itching and burning. These rapidly decrease after the first week of treatment.  
12 Although Cyclosporin A is also a successful calcineurin inhibitor, it has limited penetration through  
13 the epidermis and limited topical application for this condition.<sup>30,46,47</sup>  
14  
15 Ascomycins have been compared with topical steroids. A small double-blind RCT pilot-study<sup>48</sup>  
16 examining nickel ACD looked at 4 treatment groups - pimecrolimus 1% cream, tacrolimus 0.1%  
17 ointment, clobetasol 0.05% ointment, triamcinolone 0.1% ointment - and two control groups of topical  
18 vehicle application. No statistically significant differences were found between any of the groups,  
19 although the treatment groups showed a clear trend towards being more effective than control.  
20 However, Saripalli et al<sup>49</sup> induced nickel ACD in patients and found that tacrolimus was significantly  
21 more effective than vehicle. Alomar et al<sup>50</sup> corroborated this finding. Similarly, pimecrolimus at  
22 0.2% and 0.6% formulations has successfully treated nickel-induced ACD.<sup>51</sup>  
23  
24 Other treatments options for more widespread disease away from the eyes, patients that are  
25 unresponsive to the above treatments, or for those who cannot avoid the provoking factors include  
26 phototherapy – PUVA (oral psoralen photochemotherapy) and shortwave UVB light. In addition, use

1 of Grenz rays<sup>52</sup> and systemic immunosuppressants<sup>53</sup> such as azathioprine and mycophenolate mofetil  
2 have been described in ACD.

3

4 In our study, all of the patients improved with removal of the allergen with/without a short course of  
5 topical immunosuppressants.

6

7 In conclusion, eyelid dermatitis may be the only dermatological manifestation of ACD. (See summary  
8 table3). Delay in diagnosis commonly hinders appropriate treatment and avoidance of allergens. In  
9 our experience, marked delays were due to lack of awareness of the condition by referring  
10 ophthalmologists. Improved awareness is essential. In addition, it should be remembered that the  
11 corticosteroids used to treat ACD may in fact be causative themselves, and patients who are  
12 unresponsive to treatment ought to have corticosteroids included as potential allergens in their patch  
13 testing.

14

15

16

1    Legends to Figures

2

3    1a-c: These images correspond to Case 4 in the series who was found allergic to her nail polish. Note the bimedial upper and lower lid erythema and  
4    thickening. Examination of her fingernails revealed periungual vesiculation (1c).

5    1d-f: Images 1d and 1e show another patient from our case series with the typical bimedial upper and lower lid erythema in a 'butterfly' distribution. 1f:  
6    Histology specimen from the same patient (H&E stain, x10 magnification). Lichenification, hyperkeratinization, non-specific generalized inflammatory  
7    cell infiltrate and a thickened cornea stratum are seen.

8

9

10

11    2a: This patient was referred by an ophthalmologist for upper blepharoplasties, but ACD was found to be causative. Bilateral upper lid erythema is  
12    clearly visible in this photo.

13    2b: This patient demonstrates subtle features of eyelid 'eczematous' dermatitis and medial lower lid ectropion can also be seen. This clinical appearance  
14    had prompted repeated prescriptions of steroid cream treatment prior to his presentation to our unit. He was found patch test positive to Eumovate cream.

15

1 Acknowledgements

2

3 Thanks are given to Eduardo Calonje and Bill Barrett for their assistance in histopathological  
4 examination.

<b>Case</b>	<b>Age (years)</b>	<b>Clinical Features</b>	<b>Symptoms to diagnosis</b>	<b>Patch Testing Positive Results</b>	<b>Management</b>	<b>Outcome</b>
1	46	Sore, itchy upper and lower eyelids with erythematous scaling and thickening medially in butterfly pattern. No benefit with steroid/anti-fungal creams/emollients.	1.5 years	Quaternium-15, nickel sulphate, caine mix, formaldehyde, colophony, methylchloroisothiazolinone and methlisothiazolinone, L'Oreal Cleansing Experience, Lancome Teinte SPF 15.	Cessation of shampoo, moisturizer and make-up products containing allergens. Reducing regime of Betnovate ointment od 2 days, Betnovate RD od for 3 days, then 1% hydrocortisone od.	Dramatic improvement within 1 month
2	20	Bilateral periocular dermatitis with cicatricial medial ectropion. Inner canthal skin lichenification. No resolution with steroid ointments or moisturizers to the skin.	4.5 years	Aerosol fragrance-mix	Avoidance of allergen, regular emollients, Betnovate and Eumovate cream.	Periorbital eczema and entropion resolved
3	74	Itchy eczematous dermatitis of eyelids, mild eczematous changes to cheeks and behind ear.	9 months	Caine mix, fragrance mix, nickel and carba mix, E45 itch relief cream, Eumovate (no reaction to Diprobate/hydrocortisone)	Avoidance of allergens, Diprobate ointment to wash and moisturize tds, hydrocortisone ointment 0.5 – 2.5% depending on redness.	Clinically much improved within 2 months
4	45	Bilateral, itchy, asymmetric erythematous eyelids. No other dermatitis elsewhere on body/face except periungual vesicles on fingers.	2 months	Nail polish; toluene-sulfonamide formaldehyde resin	Changed to “hypoallergenic” polyester resin nail polish, 1% hydrocortisone ointment tds to eyelids.	Complete resolution within 2 weeks.
5	72	Mild intermittent erythema and eczematous eyelid changes.	1 year	Apitol, chloroethylene and ethylene diamine	Stopped mascara wear. No response to Elidel 1% or hydrocortisone 1% use. Tacrolimus 0.3% given.	Resolution of symptoms within 1 month
6	50	Episodic eyelid rashes, puffiness and skin darkness.	1 year	Nickel, fragrance, balsam of Peru and imidazolidinyl urea preservative	Avoidance of allergens.	Complete resolution
7	49	Eyelid puffiness, episodic itchy erythematous eyelid skin. Occasional neck rash.	3 years	Methylchloroisothiazolinone and methlisothiazolinone, from shampoo and her Crème de la Mere foundation	Avoidance of products.	Improved within 2 months



<b>Table 1 - full details of our case series (continued)</b>						
<b>Case</b>	<b>Details</b>	<b>Clinical Features</b>	<b>Symptoms to diagnosis</b>	<b>Patch Testing Positive Results</b>	<b>Management</b>	<b>Outcome</b>
8	56	Bilateral periocular dermatitis, itchy lids with some lichenification.	4 months	Fragrance-mix	Ceased aftershave lotion, hydrocortisone 1% ointment tds to eyelids.	Resolved within 4 weeks
9	61	Periocular dermatitis and bilateral conjunctival inflammation since starting ocular lubricants.	2 weeks	Benzalkonium chloride 0.1% aq.	Topical lubricants stopped, predsol 0.5% qds both eyes and topical hydrocortisone 1% tds to eyelid skin.	2 week resolution
10	23	Left-sided eyelid and eyebrow dermatitis, following insertion of eyebrow ring.	4 weeks	Nickel	Removal of piercing, 0.1% betamethasone valerate ointment bd.	Complete resolution
11	5	Bilateral lichenified itchy eyelids.	6 months	House dust mite	Measures to decrease exposure (mattress/pillow protectors, cleaning of floors, open windows daytime, washing stuffed toys etc.). Topical hydrocortisone 1% tds to skin.	Partial resolution over 2 months
12	52	Bilateral upper and lower eyelid erythema and oedema. Failed treatment with hydrocortisone 1% ointment.	14 months	Tixocortol pivalate (found in hydrocortisone, Eumovate, Betnovate and Dermovate ointments), quaternium-15	Avoidance of allergens.	Full resolution within 2 months
13	50	Bilateral upper lid erythema – referred for consideration of blepharoplasties.	6 months	Parabens and lanolin	Avoidance of face creams. Reducing regime of hydrocortisone 1% ointment.	Complete resolution
14	28	Sore, itchy, erythematous upper and lower eyelids.	1 year	Nickel sulphate	Avoidance of her eyelash curlers. No topical creams necessary.	Complete resolution

1

2

3

4 Table 2 – Common contact allergens particularly relevant to eyelid ACD

Allergen	Source
Gold sodium thiosulfate 0.5%	Jewellery / metal
Fragrance and preservative	Cosmetics, shampoos, soaps, moisturizers, lotions
Nickel	Jewellery, eyelash curlers, traces in make-up
Thiuram mix	Rubber of eyelash curlers
Cocamidopropyl betaine 1% (CAPB), Amidoamine 0.1%, Quarternium-15 2%	Preservatives and surfactants in shampoos
Tosylamide formaldehyde resin	Fingernail polish, adhesives, glues, bonding agents
Neomycin	Topical medications
Benzalkonium chloride	Topical medications, face washes, hand scrubs, cosmetics
Dust mites or animal dander	Make-up brushes

5

6

7 Table 3 - Summary Table

Recommended 4-step Approach to Management of Suspected ACD		
1	History	Ask about known allergens, types of cosmetics, occupational and leisure pursuits. Remember allergens may not necessarily be those in direct contact with the eye.
2	Examination	Eyelids and nails – may not have localized nailbed changes. Check for artificial nails.
3	Refer for patch testing	Standard patch testing batteries should be supplemented with patient’s own cosmetics or particular allergens from history. Allow 48-96 hours prior to result reading.
4	Treatment	Cessation of allergen contact. Symptom relief – emollients, topical antipruritics, oral antihistamines. A 2-3 week course of topical steroids or tacrolimus/pimecrolimus use.

## 1 References

- 
- <sup>1</sup> Cooper SM, Shaw S. Eyelid dermatitis: an evaluation of 232 patch test patients over 5 years. *Contact Dermatitis* 2000;42(5):291-3.
- <sup>2</sup> Valsecchi R, Imberti G, Martino D, *et al.* Eyelid dermatitis: an evaluation of 150 patients. *Contact Dermatitis* 1992;27(3):143-7.
- <sup>3</sup> Nethercott JR, Nield G, Holness DL. A review of 79 cases of eyelid dermatitis. *J Am Acad Dermatol* 1989;21(2 Pt 1):223-30.
- <sup>4</sup> Katz AS, Sherertz EF. Facial dermatitis: patch test results and final diagnoses. *Am J Contact Dermat* 1999;10(3):153-6.
- <sup>5</sup> Koo L, Peng D, Chang E. Solving the mystery of the itchy eyelid. *Review of Ophthalmology* [serial online] 2006; 13(11). Available at [http://www.revophth.com/index.asp?page=1\\_13163.htm](http://www.revophth.com/index.asp?page=1_13163.htm). Accessed January 11, 2006.
- <sup>6</sup> Guin JD. Eyelid dermatitis: a report of 215 patients. *Contact Dermatitis* 2004;50(2):87-90.
- <sup>7</sup> Ockenfels HM, Seemann U, Goos M. Contact allergy in patients with periorbital eczema: an analysis of allergens. Data recorded by the Information Network of the Departments of Dermatology. *Dermatology* 1997;195(2):119-24.
- <sup>8</sup> Shah M, Lewis FM, Gawkrödger DJ. Facial dermatitis and eyelid dermatitis: a comparison of patch test results and final diagnoses. *Contact Dermatitis* 1996;34(2):140-1.
- <sup>9</sup> Guin JD. Eyelid dermatitis: experience in 203 cases. *J Am Acad Dermatol* 2002;47(5):755-65.
- <sup>10</sup> Ayala F, Fabbrocini G, Bacchilega R., *et al.* Eyelid dermatitis: an evaluation of 447 patients. *Am J Contact Dermat* 2003;14(2):69-74.
- <sup>11</sup> Amin KA, Belsito DV. The aetiology of eyelid dermatitis: a 10-year retrospective analysis. *Contact Dermatitis* 2006;55(5):280-5.
- <sup>12</sup> Landsteiner K, Chase MW. Studies on the sensitization of animals with simple chemical compounds, IX: skin sensitization induced by injection of conjugates. *J Exp Med* 1941;73:431-8.
- <sup>13</sup> deGroot AC. Patch testing: test concentrations and vehicles for 2800 allergens. Amsterdam:Elsevier;1986.
- <sup>14</sup> Katz DH, Davie JM, Paul WE, *et al.* Carrier function in anti-hapten antibody responses. IV. Experimental conditions for the induction of hapten-specific tolerance or for the stimulation of anti-hapten anamnestic responses by "nonimmunogenic" hapten-polypeptide conjugates. *J Exp Med* 1971;134(1):201-23.
- <sup>15</sup> Nalefski EA, Rao A. Nature of the ligand recognized by a hapten- and carrier-specific, MHC-restricted T cell receptor. *J Immunol* 1993;150(9):3806-16.
- <sup>16</sup> Belsito DV, Dersarkisian RM, Thorbecke GJ, *et al.* Reversal by lymphokines of the age-related hyporesponsiveness to contact sensitization and reduced Ia expression of Langerhans cells. *Arch Dermatol Res* 1987;279:S76-80.

- 
- <sup>17</sup> Motelese A, Manzini BM, Donini M. Patch testing in infants. *Am J Contact Dermatitis* 1995;6:153-6.
- <sup>18</sup> Pacor ML, Di Lorenzo G, Martinelli N, *et al.* Tacrolimus ointment in nickel sulphate-induced steroid-resistant allergic contact dermatitis. *Allergy Asthma Proc* 2006;27(6):527-31.
- <sup>19</sup> Marks JG, Belsito DV, DeLeo VA, *et al.* North American Contact Dermatitis Group patch test results for the detection of delayed-type hypersensitivity to topical allergens. *J Am Acad Dermatol* 1998;38(6 Pt 1):911-8.
- <sup>20</sup> Epstein WL. The use test for contact hypersensitivity. *Arch Dermatol Res* 1982; 272:279-81.
- <sup>21</sup> Przybilla B, Burg G, Thieme C. Evaluation of the immune status in vivo by the 2,4-dinitro-1-chlorobenzene contact allergy time (DNCB-CAT). *Dermatologica* 1983;167(1):1-5.
- <sup>22</sup> Geier J, Gefeller O, Wiechmann K, *et al.* Patch test reactions at D4, D5 and D6. *Contact Dermatitis* 1999;40(3):119-26.
- <sup>23</sup> Belsito DV, Storrs FJ, Taylor JS, *et al.* Reproducibility of patch tests: a US multicenter study. *Am J Contact Dermatitis* 1992;3:193-200.
- <sup>24</sup> White SI, Friedmann PS, Moss C, *et al.* The effect of altering area of application and dose per unit area on sensitization by DNCB. *Br J Dermatol* 1986;115:663-8.
- <sup>25</sup> Zug K. Dermatological diagnosis and treatment of itchy red eyelids. *Surv Ophthalm* 1996;40:293-306.
- <sup>26</sup> Storrs FJ. Technical and ethical problems associated with patch testing. *Clin Rev Allergy Immunol* 1996; 14:185-198.
- <sup>27</sup> Halbert AR, Gebauer KA, Wall LM. Prognosis of occupational chromate dermatitis. *Contact Dermatitis* 1992;27(4):214-9.
- <sup>28</sup> Pryce DW, Irvine D, English JS, *et al.* Soluble oil dermatitis: a follow-up study. *Contact Dermatitis* 1989;21(1):28-35.
- <sup>29</sup> Belsito DV. The diagnostic evaluation, treatment, and prevention of allergic contact dermatitis in the new millennium. *J Allergy Clin Immunol* 2000;105:409-20.
- <sup>30</sup> Funk JO, Maibach HI. Horizons in pharmacologic intervention in allergic contact dermatitis. *J Am Acad Dermatol* 1994;31(6):999-1014.
- <sup>31</sup> Hachem JP, De Paepe K, Vanpee E, *et al.* Efficacy of topical corticosteroids in nickel-induced contact allergy. *Clin Exp Dermatol* 2002;27(1):47-50.
- <sup>32</sup> Queille-Roussel C, Duteil L, Padilla JM, *et al.* Objective assessment of topical anti-inflammatory drug activity on experimentally induced nickel contact dermatitis: comparison between visual scoring, colorimetry, laser Doppler velocimetry and transepidermal water loss. *Skin Pharmacol* 1990;3(4):248-55.
- <sup>33</sup> Li LY, Cruz PD Jr. Allergic contact dermatitis: pathophysiology applied to future therapy. *Dermatol Ther* 2004;17(3):219-23.

- 
- <sup>34</sup> Gonul M, Gul U. Detection of contact hypersensitivity to corticosteroids in allergic contact dermatitis patients who do not respond to topical corticosteroids. *Contact Dermatitis* 2005;53(2):67-70.
- <sup>35</sup> Wilkinson SM, Heagerty AHM. A prospective study into the value of patch and intradermal tests in identifying topical corticosteroid allergy. *Br J Dermatol* 1992;127:22-25.
- <sup>36</sup> Doooms-Goossens A, Morren M. Results of routine patch testing with corticosteroids series in 2073 patients. *Contact Dermatitis* 1992;26:182-191.
- <sup>37</sup> Fleischer AB Jr. Treatment of atopic dermatitis: role of tacrolimus ointment as a topical noncorticosteroidal therapy. *J Allergy Clin Immunol* 1999;104(3 Pt 2):S126-30.
- <sup>38</sup> Sengoku T, Morita K, Sakuma S, *et al.* Possible inhibitory mechanism of FK506 (tacrolimus hydrate) ointment for atopic dermatitis based on animal models. *Eur J Pharmacol* 1999;379(2-3):183-9.
- <sup>39</sup> Nghiem P, Pearson G, Langley RG. Tacrolimus and pimecrolimus: from clever prokaryotes to inhibiting calcineurin and treating atopic dermatitis. *J Am Acad Dermatol* 2002;46(2):228-41.
- <sup>40</sup> Panhans-Gross A, Novak N, Kraft S, *et al.* Human epidermal Langerhans' cells are targets for the immunosuppressive macrolide tacrolimus (FK506). *J Allergy Clin Immunol* 2001;107(2):345-52.
- <sup>41</sup> Meingassner JG, Fahrngruber H, Bavandi A. Pimecrolimus inhibits the elicitation phase but does not suppress the sensitization phase in murine contact hypersensitivity, in contrast to tacrolimus and cyclosporine A. *J Invest Dermatol* 2003;121(1):77-80.
- <sup>42</sup> Lauerma AI, Maibach HI, Granlund H, *et al.* Inhibition of contact allergy reactions by topical FK506. *Lancet* 1992;340(8818):556.
- <sup>43</sup> Cheer SM, Plosker GL. Tacrolimus ointment. A review of its therapeutic potential as a topical therapy in atopic dermatitis. *Am J Clin Dermatol* 2001;2(6):389-406.
- <sup>44</sup> Kang S, Lucky AW, Pariser D, *et al.* Long-term safety and efficacy of tacrolimus ointment for the treatment of atopic dermatitis in children. *J Am Acad Dermatol* 2001;44(1 Suppl):S58-64.
- <sup>45</sup> Reitamo S, Ortonne JP, Sand C, *et al.* A multicentre, randomized, double-blind, controlled study of long-term treatment with 0.1% tacrolimus ointment in adults with moderate to severe atopic dermatitis. *Br J Dermatol* 2005;152(6):1282-9.
- <sup>46</sup> Surber C, Itin P, Buchner S, *et al.* Effect of a new topical cyclosporine formulation on human allergic contact dermatitis. *Contact Dermatitis* 1992; 26:116-119.
- <sup>47</sup> Singh S, Aiba S, Manome H, *et al.* The effects of dexamethasone, cyclosporine, and vitamin D<sub>3</sub> on the activation of dendritic cells stimulated by haptens. *Arch Dermatol Res* 1990; 291:548-554.
- <sup>48</sup> Bhardwaj SS, Jaimes JP, Liu A, *et al.* A double-blind randomized placebo-controlled pilot study comparing topical immunomodulating agents and corticosteroids for treatment of experimentally induced nickel contact dermatitis. *Dermatitis* 2007;18(1):26-31.
- <sup>49</sup> Saripalli YV, Gadzia JE, Belsito DV. Tacrolimus ointment 0.1% in the treatment of nickel-induced allergic contact dermatitis. *J Am Acad Dermatol* 2003;49(3):477-82.

---

<sup>50</sup> Alomar A, Puig L, Gallardo CM, *et al.* Topical tacrolimus 0.1% ointment (protopic) reverses nickel contact dermatitis elicited by allergen challenge to a similar degree to mometasone furoate 0.1% with greater suppression of late erythema. *Contact Dermatitis* 2003;49(4):185-8.

<sup>51</sup> Queille-Roussel C, Graeber M, Thurston *Met al.* SDZ ASM 981 is the first non-steroid that suppresses established nickel contact dermatitis elicited by allergen challenge. *Contact Dermatitis* 2000;42(6):349-50.

<sup>52</sup> Lindelof B, Liden S, Lagerholm B. The effect of Grenz rays on the expression of allergic contact dermatitis in man. *Scand J Immunol* 1985;21:463-469.

<sup>53</sup> Sharma VK, Chakrabarti A, Mahajan V. Azathioprine in the treatment of Parthenium dermatitis. *Int J Dermatol* 1998;37:299-302.



