



Occupational dermatoses

BACKGROUND Occupational contact dermatitis is a common condition often assumed to be 'part of the job'.

OBJECTIVE This article explores common causes of occupational contact dermatitis and details high risk occupations utilising local data. Tips for improved understanding and management of occupational contact dermatitis are also presented.

DISCUSSION General practitioners have an important part to play in the recognition and management of occupational contact dermatitis. Early diagnosis and treatment can improve the outcome in patients with occupational contact dermatitis.

Contact dermatitis is reported to comprise 90–95% of cases of occupational dermatoses.¹ It includes:

- irritant contact dermatitis (70–80%)
- allergic contact dermatitis (20–25%), and
- contact urticaria (<5% including immediate hypersensitivity reactions to food proteins and latex allergy).

This article will be confined to a discussion of occupational contact dermatitis. Other occupational dermatoses include infections, miliaria, psoriasis, paronychia, photosensitivity, stasis eczema, acne, chloracne, and depigmenting disorders.²

Occupational contact dermatitis

Occupational contact dermatitis often affects people in their 30s. In one study, two-thirds of cases were male, with 90% presenting with hand dermatitis.¹ Different rates of occupational contact dermatitis are reported in different countries, according to the reporting systems utilised. Nevertheless, there is general agreement that about 50–190 cases occur annually per 100 000 workers.³ Unfortunately, workers' compensation claims may be underestimated in Australia, as in our experience, many workers choose not to claim compensation.

A 1 year prevalence rate of 35 per 100 000 workers of occupational contact dermatitis in Australia was estimated from patients attending general practitioners in an area of southeast Melbourne (Victoria).⁴ Higher rates of occupational dermatitis have been obtained from studies of specific high risk industries.² High risk occupations, common allergens and irritants diagnosed with patch testing in over 2000 patients attending an occupational dermatology clinic in Melbourne are presented in *Table 1–3*.



Rosemary Nixon,

BSc, MBBS, MPH, FACD, FAFOM, is Director, Occupational Dermatology Research and Education Centre, Skin and Cancer Foundation, Melbourne, visiting dermatologist, Monash Medical Centre, and Honorary Senior Lecturer, Monash University and the University of Melbourne, Victoria. rnixon@occderm.asn.au

Kathryn Frowen,

RN, MOccHlth, is Manager, Occupational Dermatology Research and Education Centre, Victoria, and President, Australian College of Occupational Health Nurses.

Mignon Moyle,

BAppSc (AdvClinNsg), MBBS, is dermatology registrar, Box Hill Hospital, and Occupational Dermatology Research and Education Centre, Victoria.

Irritant contact dermatitis

Irritant contact dermatitis (ICD) may be classed as being acute or chronic. Acute ICD may occur to strong acids and alkalis (eg. wet cement). However, chronic or cumulative ICD is more commonly seen in occupational cases (*Table 3*).

In ICD, changes are largely confined to the hands (*Figure 1*), rarely is there facial or eyelid involvement.



Figure 1. Irritant contact dermatitis



Figure 2. Allergic contact dermatitis



Figure 3. Contact urticaria

Frequent wetting and drying of the skin is extremely irritating and people with past eczema are more likely to experience ICD. Avoidance of direct skin contact with irritants, modification of work processes and the use of appropriate protection can prevent ICD. For people with suspected occupational ICD, the introduction of an appropriate skin care program may ameliorate the dermatitis and prevent further aggravation.

Allergic contact dermatitis

Allergic contact dermatitis (ACD) (*Figure 2*) is a delayed hypersensitivity reaction as a result of exposure to a chemical that has the capacity to act as a skin sensitiser. The concentration of the chemical, the duration of skin contact, and an individual's susceptibility to develop this type of reaction all play a part. Chemical spills often initiate sensitisation when a worker has unusual or prolonged exposure to a chemical. The process of sensitisation takes about 7–21 days, so dermatitis does not develop at this stage; but the next time the worker is exposed to the chemical a rash will develop, usually within 24 hours.

As ICD involves significant skin barrier damage, it facilitates the development of sensitisation and thus often precedes ACD. Examples include cleaners who perform wet work and have contact with cleaning agents and develop ICD, prompting them to start wearing rubber gloves. They then become allergic to the rubber accelerators in the gloves. Similarly, people who work with cement may develop ICD from cement, only to develop ACD to hexavalent chromate (usually present in cement).

Allergic contact dermatitis can occur at any time of a person's career, after many years of contact with a substance or after a few exposures. It is diagnosed by patch testing, usually performed at dermatology clinics. Management of ACD in the workplace includes:

- substitution of the allergen where possible
- engineering controls to decrease exposure to the allergen, and
- the use of appropriate skin protection. (Gloves may not always provide protection from a particular allergen: expertise is often required in selecting the most appropriate gloves for a work task).

Contact urticaria

Contact urticaria (*Figure 3*) is an immediate hypersensitivity reaction seen most commonly to latex proteins in disposable, powdered latex gloves, and also to contact with food proteins, eg. on the hands of chefs

and bakers. Hairdressers may also develop immediate reactions to bleach.

Atopic individuals are more likely to develop immediate hypersensitivity reactions. Repeated episodes of contact urticaria may lead to dermatitis. It is essential that disposable latex gloves be nonpowdered, as powder may facilitate the development of latex allergy.

Management issues

Making the connection

Unfortunately, general practitioners do not always have the time to take a full occupational history – which may reveal important exposures to skin irritants, allergens, or both. It is always worth enquiring when a patient presents with a skin condition as to what they actually do at work.

In a Canadian study of patients with occupational contact dermatitis, in 17% of cases dermatologists recommended that patients with occupational dermatitis change work, however, only 5% had enquired about the history of exposure.⁵ Similarly, in 12% of cases, GPs had recommended job change, but only 5% had taken an exposure history.⁵ Workers who do not know the cause of their skin condition may change jobs and encounter the same allergen in subsequent employment, so it is important to make as accurate a diagnosis as possible.

There are often a number of causative factors in occupational contact dermatitis, eg. ACD, ICD, latex allergy, and endogenous eczema may all coexist. It is generally impossible to clinically diagnose these conditions therefore testing is usually necessary, often if only to exclude allergy. The final diagnosis is reached as a result of testing and clinical assessment.

Instituting optimal skin protection and care

Crucial to a skin care program is appropriate skin protection in the form of gloves. These must be specific to the chemicals to which the worker is exposed. Sometimes sweating and the use of unlined rubber or leather gloves can cause ICD and/or ACD, so the use of either lined or cotton gloves under these occlusive gloves is preferred. Vinyl gloves do not protect adequately against infectious agents. If nonlatex gloves are to be used, disposable nitrile gloves are preferred.

Skin care programs include the use of an appropriate soap substitute and moisturising cream using a lipid rich cream or greasy ointment. If there is skin inflammation, the use of topical steroids in an ointment base rather than a cream base is recommended. A greasy soap substitute such as emulsifying ointment is recommended and is readily obtained from pharmacies.

Table 1. Most common occupations of patients with significantly work related contact dermatitis

Health care workers
Metal workers
Machine operators
Food handlers
Hairdressers
Motor mechanics
Concreters/bricklayers
Printers
Florists/nursery assistants
Dentists/dental assistants

There are alternative proprietary nonsoap cleansers available that do not irritate the skin and leave the skin slightly moisturised. Moisturising creams, such as 10% olive oil in sorbolene are preferred to lotions in pump-packs that are less greasy and less effective. Use of a moisturiser after work and before bed is advised. Lotions presented in pump packs are sometimes useful during the day for quick, frequent applications, especially in people performing wet work such as in the health care or hairdressing sectors.

In many cases, appropriate first line treatment combining all these aspects will settle the dermatitis and no further investigations will be required. However, if the dermatitis fails to settle, then ACD needs to be considered. As there is evidence that duration of dermatitis is a poor prognostic factor for occupational contact dermatitis,⁶ early referral for diagnostic patch testing is optimal.

Suspecting allergic contact dermatitis

If a worker presents with an itchy rash that has spread away from its initial site and is not responding to treatment, then ACD should be suspected. This is especially true if the patient is exposed to known allergens such as rubber chemicals in protective gloves, epoxy resins in surface coatings or glues, or hairdressing chemicals such as colour, bleach and perming solution. In these cases GPs should be highly suspicious of the likelihood of allergy. In such situations, ACD is more commonly encountered than ICD.

Other important occupational allergens include chromate, nickel, fragrance, the surfactant coconut diethanolamide (found in hand cleaners), colophony or rosin (the sticky substance in many adhesives), cobalt, acrylates, and preservatives in water based substances.

Referral

If patients are not responding to treatment or there is a high degree of suspicion about exposure to an allergen, patch testing should be considered. Dermatologists in Australia (not allergists) traditionally perform patch testing to diagnose ACD. As this is a delayed hypersensitivity reaction, testing involves placing appropriately diluted chemicals on the patient's back for 48 hours. The patches are removed and the back read for any reactions. A second reading is performed 48–120 hours later.

By contrast, allergists perform prick testing on the volar aspect of the forearm to investigate immediate hypersensitivity reactions. These are important in diagnosing causative factors in asthma and hayfever such as house dust mite, pollens and grasses. Substances are also prick tested on the forearms in the investigation of contact urticaria. The procedure takes 20–30 minutes. Rarely, severe reactions may occur with prick testing. Alternatively, blood tests by way of radio-allergosorbent testing (RAST) may be performed to investigate allergens including foods that come in contact with the skin.

Latex allergy

Latex allergy became an issue in the late 1980s when the advent of universal precautions caused a worldwide demand for the use of powdered disposable latex gloves. Cheaper gloves were produced with higher amounts of protein and these were more allergenic. It was subsequently found that glove powder facilitates transfer of a latex allergen from the glove to the skin. There were 'epidemics' of latex allergy causing skin symptoms, hayfever-like symptoms, asthma, and anaphylaxis.⁷

Latex allergy is an immediate hypersensitivity reaction, ie. contact with latex will generally cause skin redness, burning and itching within about 15 minutes. It can have a huge impact on the lives of those affected, eg. wearing 'MedicAlert' identification, using latex free theatre facilities for surgical procedures, and having doctors and dentists only use nitrile gloves. It also makes wearing condoms and the blowing up of balloons impossible. These patients will often be allergic to banana, kiwi fruit, avocado and chestnut, which contain similar amino acid sequences to latex proteins.

It is also very important that anyone wearing rubber gloves be suspected of not only having ACD to accelerators used in rubber gloves, but also contact urticaria to latex (preferably screened with RAST).

Table 2. Most common relevant occupational allergens

<p>Thiurams (rubber products) Chromate (cement and leather tanning) Epoxy resin (surface coatings and glues) Para-phenylenediamine (hair dye) Ammonium persulfate (hair bleach) Nickel (jewellery, some metal objects, electroplating) Glycerol monoethoxyglycolate (perming solution) Fragrance (used in many products) Coconut diethanolamide (detergent used in shampoos, liquid soaps, cutting oils) Colophonium/colophony/rosin (glue, tape, wood, cosmetics) Formalin (clothing, preservatives, cooling fluids) Mercaptobenzothiazole (rubber products) Cobalt (jewellery) Diazolidinylurea (formalin releasing preservative in creams, lotions, shampoos) Hydroxyethyl methacrylate (glues)</p>

Table 3. Most common causes of work related ICD

<p>Detergents and soap Water and wet work Solvents Cutting oils Heat and sweating Dusts and fibres Acids and alkalis Oxidising agents/reducing agents Paper towels and paper products Cement, both wet and dry</p>

Recognising those at high risk

People with a history of atopic eczema are more likely to develop ICD.⁸ It is generally thought that skin atopy at least doubles the risk of developing occupational contact dermatitis, and exposure to skin irritants in occupations where wet work predominates causes a four-fold risk in atopics. These people are also at risk of immediate hypersensitivity reactions (eg. latex, food proteins, inhalant allergens), although they probably develop ACD at the same rate as nonatopic individuals.

There has been little awareness about communicating this increased risk of occupational contact dermatitis to teenagers with a past history of eczema when choosing a career. In particular, when surveyed in Melbourne, career counsellors

had little awareness of this issue.⁹ Guidelines have been produced to highlight personal risk categories for occupational dermatitis (*Table 4*), and online resources have been developed (www.occderm.asn.au).

Many people with an atopic history will be able to work in their chosen career, but should be aware of the hazards and risks of developing dermatitis if they do not look after their skin.

Persistent postoccupational dermatitis

Unfortunately, for reasons that are currently unclear, 10–15% of people with occupational contact dermatitis will continue to experience dermatitis regardless of the avoidance of initiating factors. This condition is known as 'persistent postoccupational dermatitis'.¹⁰ While further work is being undertaken to understand this condition, the duration of dermatitis before avoidance of causative

factors would appear to be an important factor in the development of the condition. Sadly, insurers sometimes do not understand that occupational dermatitis can fail to improve even once a worker has left work, and in such cases workers' compensation may be denied.

Conclusion

It is important to make an accurate diagnosis so that management of occupational contact dermatitis can be optimised. There may be more than one clinical diagnosis present. Irritant contact dermatitis, ACD and latex allergy may complicate underlying atopic eczema, or hand eczema.

Understanding the role of work factors, the institution of an appropriate skin care routine, recognition of high risk occupations, understanding the importance of referral for appropriate testing, and advising atopics about their risk of occupational dermatitis are important

Table 4. A practical guide for occupational pre-employment counselling of people with atopic dermatitis⁸

Step 1. Definition of personal risk

Highest risk

Moderate to severe atopic dermatitis with hand involvement

Chronic hand eczema

Previous change of work due to ICD

Moderately increased risk

Atopic dermatitis without hand involvement

Hand eczema, also known as dyshidrosis or pompholyx

Allergic rhinitis or asthma in occupations at increased risk of type 1 allergies, eg. baker

Mucosal atopy – not known with certainty

Slightly increased risk

Evidence of low threshold for nonspecific irritants:

- wool intolerance
- itch due to sweating
- unusually dry skin

Family history of atopy – not known with certainty

Step 2. Occupational counselling for each risk category

For people at highest risk

Occupations with wet work or other exposure to irritants are likely to cause problems. Workers need to have strict skin care regimens and protect their skin from the outset to avoid dermatitis. Early referral to a specialist occupational dermatologist is needed if dermatitis develops

For people with moderate increased risk

Technical, organisational and personal protective measures may be adequate. Regular follow up examinations with the GP and encouragement to continue with good skin care is highly recommended

For people with a slightly increased risk

Personal protective equipment and a good skin care routine advisable

steps to better management. Early recognition and diagnosis of occupational contact dermatitis is necessary to reduce the suffering from this often preventable and debilitating condition.

Conflict of interest: none declared.

Acknowledgment

The Occupational Dermatology Research and Education Centre is funded by the Australian Government Department of Health and Ageing, as the National Collaborative Centre for Research and Education into Occupational Contact Dermatitis.

References

1. Keil JE, Shumes E. The epidemiology of work related disease in South Carolina. *Arch Dermatol* 1983;119:650–4.
2. English JSC. Occupational dermatoses. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. *Rook's textbook of dermatology*. 7th ed. Blackwell Science, 2004;21:1–25.
3. Diepgen TL, Coenraads PJ. The epidemiology of occupational contact dermatitis. *Int Arch Occup Environ Health* 1998;72:496–506.
4. Keegel T, Cahill J, Noonan A, Dharmage S, Saunders H, Frowen K, Nixon R. Incidence and prevalence rates for occupational contact dermatitis in an Australian suburban area. *Contact Dermatitis* 2005; in press.
5. Holness L. Health care services use by workers with work related contact dermatitis. *Dermatitis* 2004;15:18–24.
6. Halbert AR, gebauer KA, Wall KM. Prognosis of occupational chromate dermatitis. *Contact Dermatitis* 1992;27:214–9.
7. Warshaw EM. Latex allergy. *J Am Acad Dermatol* 1998;39:1–24.
8. Coenraads PJ, Diepgen D. Risk for hand eczema in employees with past or present atopic dermatitis. *Int Arch Occup Environ Health* 1998;71:7–13.
9. Saunders H, Keegel T, Nixon R, Frowen K. Career counsellors and occupational contact dermatitis. *Contact Dermatitis* 2003;48:189–190.
10. Wall LM, Gebauer KA. A follow up study of occupational skin disease in West Australia. *Contact Dermatitis* 1991;24:241–3.

Email: afp@racgp.org.au

AFP