

Prevention of Occupational Contact Dermatitis

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Received date: March 10, 2016; **Accepted date:** May 25, 2016; **Published date:** May 31, 2016

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Abstract

This article reviews the scientific research concerning occupational contact dermatitis and the related methods of prevention. The information provided herein clarifies some difficulties involved in the confirmation of diagnoses and creating strategies for prevention. Occupational skin diseases, most of which are contact dermatitis arising from exposure to a culpable agent, constitute more than 35% of all work-related disorders. Contact dermatitis can be classified as either the irritant or the unfavorably allergic type. Each type has an alternate pathogenesis, while the clinical presentation is the same. Once the hazardous elements that cause work-related contact dermatitis are identified, the dermatitis can be controlled in some patients. However, in other patients, it can be chronic and disabling. Failure to follow the outlined preventive programs will lead to high rates of occupational contact dermatitis.

Keywords: Occupational Contact Dermatitis, Prevention, Irritants, Allergens, Review

Introduction

Skin disorders comprise more than 35% of all occupationally acquired disorders [1,2]. Contact dermatitis (CD) is the most widely recognized work-related ailment in many countries, and occupational contact dermatitis (OCD) is underreported. Because it is so common, health care providers should be aware of this work-related illness. CD is responsive inflammation of the skin that occurs immediately after contact with a substance, such as chemical or biological compounds. Contact dermatitis can be caused by either direct irritation from a substance, which is known as irritant contact dermatitis (ICD), or contact with an unfavorable sensitizer, which is known as allergic contact dermatitis (ACD).

ICD is the most widely recognized work-related skin disorder, and it accounts for almost 80% of CD cases [1,3]. ICD can be acute, which involves a single presentation of a material, such as chemical burns (e.g., hydrofluoric acid or hydrochloric acid). Furthermore, phototoxic ICD is a response to ultraviolet A light in addition to a substance, and chronic ICD results from multiple contacts with irritant substances, which can include solvents, water, cleansers, and soluble bases [1,4,5].

ACD includes contact urticaria, which is a type I allergy that includes quick and transient confined swelling and redness that occurs after direct contact with a culpable substance, such as latex, certain foods (beans, eggs, and fish), anti-infection agents (penicillin and neomycin), and components of beautifying agents and medications (balsam of Peru and benzoic acid). ACD additionally includes type IV contact dermatitis, which appears 24–48 hours after contact with a culpable substance, such as chrome, nickel, epoxy resin, or additives in rubber, among others. ACD can be photoallergic, which requires UV light exposure after contact with an allergen.

Distinguishing between non-occupational contact dermatitis and OCD for clinical purposes is difficult. It is likewise difficult to distinguish ICD from ACD clinically. Both ICD and ACD present with

redness, itching, scaling, splitting, and fissuring of the skin, followed by vesiculation and overflowing of the affected areas. Hydrofluoric acid disorders are associated with hypocalcaemia and hypomagnesaemia, and contact urticaria appears as hives minutes to an hour after contact with the culpable substance [1,5–8]. No matter the subtype, atopy remains the absolute most vital component in assessment of work-related dermatitis [1,5–8].

OCD incidence suggests that preventive programs in the workplace should be improved. A three-level prevention program for OCD has accounted for positive reductions in incidence [1,5,7].

Primary Prevention to Reduce OCD Incidence

Primary prevention is an essential part of OCD prevention and is normally the most common method used by employers. Numerous OCD episodes could be controlled by working environment changes. Primary prevention measures include engineering control, personal protection, personal hygiene, work practices, health promotion, motivation, administrative control, and regulation.

Engineering control

Engineering control includes elimination, substitution, containment, or segregation of offending irritants or allergens. These measures should be performed wherever feasible. Chemical substitution involves replacing allergens and irritants with less toxic substances, and it is required by law. For instance, work that utilizes stainless steel, which contains minimal quantities of nickel, is unlikely to cause OCD in patients who are allergic to nickel. Therefore, those patients can work in such jobs. If contact occurs with allergens and irritants through the air via particulates, dust, mists, or vapors, ventilation might be sufficient to prevent OCD [1,5]. Primary prevention can also reduce these hazards through ergonomic workplace redesign [1,9,10].

Personal protection

Personal protective equipment, including gloves, boots, and workers' garments, should be chosen with consideration of the physical and resistance properties of the compounds being contacted as well as adaptability. Gloves are commonly used, yet numerous organic substances and solvents can infiltrate them. Thus, suitable gloves should be selected for specific work tasks. Clothing should be intermittently reviewed and discarded if openings and tears are found. Disposable garments are required to ensure reduced contact with allergens and irritants. On the other hand, protective attire can cause contact dermatitis through nonspecific friction from sweat ensnarement and rubbing of the apparel against the skin. Protective attire should not be the primary method of prevention unless engineering controls are not practical. The clinical utility of barrier creams is disputable and unsupported by clinical trials. The manufacturer's guidelines should be followed when these barrier creams are used. Many barrier creams remove sticky oils and grease, hence diminishing the need to wash with irritating water and soap. Barrier creams should only be used on normal, unirritated skin as they can exacerbate dermatitis if used on inflamed skin. A qaternium-18 bentonite moisturizer was observed to successfully counteract or lessen tentatively reactions to poison ivy and poison oak [1,9,10].

Personal hygiene

Washing hands with a mellow cleanser and water can successfully remove allergens and irritants from the skin. However, overuse or abuse of skin cleansing products can elicit or exacerbate contact dermatitis. Industrial solvents should not be used to clean skin. Eating, drinking, and smoking at work should be restricted to an assigned area in order to maintain a strategic distance between workers and allergens or irritants.

Individual cleanliness should also incorporate general washing and cleaning of protective attire in light of the dangers of skin contact with allergens or irritants, particularly for soiled apparel [1,11].

Work practices

Covering work surfaces with spongy towels or sheets, cleaning the work surface with a suitable mechanical cleanser, and clearing or vacuuming dust and particulates are good work practices to reduce OCD. Cross reactions occur between many chemicals. Hence, it is important to know the names of these chemicals to prevent ACD [1].

Health promotion

Advancement of mindfulness and recognition of work exercises that introduce allergens and irritants are included in health promotion. Job training should include information about the symptoms and signs of contact dermatitis, appropriate methods of using defensive garments and barrier creams, and individual and work hygiene. Employee instruction on crisis techniques is also essential in the event of unintentional contamination from high-risk work. Training should include the presentation of videotape. This training should be initially performed before beginning work and intermittently repeated. Supervisors should be involved into the education program with concentrated training and security and prepare to serve as instructors at work who constantly emphasize wellbeing issues. Employee comprehension of preventive measures for CD through training is vital to prevent this condition [1,12–14].

Motivation

Motivation is an important measure that is a frequently neglected aspect of prevention programs. Despite education, a few workers do not pay attention to preventive practices since they do not view themselves as at danger for CD. Efforts should aim to stimulate self-motivation and consider personal lifestyles to convince exposed workers that they are at risk. Active support of union and safety officials is a critical element of motivational efforts. On the other hand, business inspiration ought to point that a protected workforce will ensure better laborer job completion and profitability, while lessening cost from workers' compensation [1,15].

Administrative control

Work shift rotation and task allocation among workers to avoid exposure to an offending substance are included in administrative control methods. Job changes, unless they result in complete avoidance of specific allergens, are unlikely to eliminate cases of CD. Administrative control would be the least likely method to minimize presentation to perilous substances in the working environment [1,15].

Regulation

Warning signs or labels should be placed on all containers or products in which hazardous chemicals or other substances may be encountered. Health hazards should be described clearly on the Material Safety Data Sheet. No regulatory requirements for skin exposure to potential hazards currently exist [1,15].

Secondary Prevention to Counteract Chronic Dermatitis and Intensification of the Condition

CD diagnoses are made using accurate, thorough medical history and careful clinical patient examination. It is important to obtain exposure history from work, home, and hobbies.

Patch tests with a standard tray and additional testing with specific allergens confirm or discount the allergic components responsible for contact dermatitis. Likewise right, unadulterated and stable patch test material is key to ensure proper patch test findings for the diagnosis of allergic contact dermatitis. If the patch test yields a positive result, whether or not the allergen is present in the work environment should be determined.

If the patch test result is negative and ACD is suspected, the clinical history should be reviewed, and an assessment of whether the allergen testing assessed all possible allergens should be performed. Otherwise, the patient should be diagnosed with ICD. Other potential outcomes leading to negative patch tests include an improper concentration of allergen utilized for testing, contact urticaria, photo-contact dermatitis, and use of systemic steroids. Visits to the working environment might reveal physical irritants, including temperature, moisture, or mechanical issues as well as chemical allergens and irritants. Workplace provocation testing can be performed if patch tests are negative and ACD is suspected [16].

Pre-employment screenings to avoid hiring new employees at danger for contact dermatitis (for example, atopy as a risk factor for ICD) is not effective and is also morally unacceptable, as the Americans with Disabilities Act discourages employers from denying work to persons with skin diseases as long as they are able to do the job. Patch testing of healthy new employees without a history of

contact dermatitis has no value and is even dangerous because the patch test can sensitize people to new allergens and irritants. On the other hand, vocational guidance should be considered and career choices should be examined for children with atopy as early as 10 years of age. At 14 years of age, most children know what occupation they want to perform in the future. Because of this, children with atopy should be directed away from most the aggravating occupations, such as hairdressing and auto-mechanics.

Observation at contact dermatitis facilities should be available to individuals who experience the adverse effects of contact dermatitis. Such facilities can gather patient information and identify new issues at an early stage through wellness surveys and clinical skin examinations to counteract OCD [17,18].

Tertiary Prevention to Minimize Disability

Treatment of contact dermatitis varies based on stage. ACD is best treated with astringent, topical or systemic steroids, and an antihistamine. Surgical debridement and skin grafting may be necessary in very rare cases, specifically when large ulcers develop as a result of contact with strong acids or bases at work. Chronic CD is managed using moisturizing creams for skin dryness and topical steroids. Antibiotics may be necessary if there is evidence of a secondary infection. In all cases, safeguarding and evasion of irritants and allergens should be implemented, when applicable. Whenever preventive and restorative measures fail, an assessment of skin impairment and disability should be performed. Rehabilitation efforts should aim to restore economic and vocational utility of the worker. The worker might need workers' compensation and incapacity benefits after identifying the cause of the issue, while considering retraining for another job.[1,19-22].

Conclusion

In conclusion, preventing and managing OCD requires a multidisciplinary approach. If OCD can be effectively treated and doctors can anticipate and manage this condition, it won't be as prevalent a problem and disabling as it currently is. Primary prevention of OCD is absolutely imperative to decrease introduction to irritants or allergens among workers. Once a prevention program is in place, work practices must be reviewed to ensure proper use of protective clothing and other protective mechanisms.

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