

Review Article

IRRITANT CONTACT DERMATITIS ON HANDS AND DIAGNOSIS OF IT: A REVIEW

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ABSTRACT

Hand hygiene (HH) is the single most important procedure that can be followed by healthcare workers (HCWs) to reduce the risk of spreading healthcare-associated infections. The irritating contact dermatitis (ICD) that occurs due to the rehashed presentation of HH products and technique is one reason often referred to for resistance. HH is the most vital method that can be followed by HCWs to reduce the possibility of spreading of infection in human being, followed by 50% of HCWs. Limited researches are published related to different features of irritant contact disorders among HCWs. This study concentrates mainly on the clinical application of irritant contact dermatitis on hands and its diagnosis based on an extensive research review process. It can be concluded from this review that by proper adherence and compliance to necessary HH techniques lead to skin damage and higher pathogen load. Therefore, it is important that HCWs should appreciate this concept and are given methods or tactics of expertise to avoid skin irritation and damage. Inability to provide proper policies, practices and guidelines to these workers may lead to adherence in case of an ICD appearance.

Keywords: Dermatitis, ICD, HH products, HCWs

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INTRODUCTION

Non-allergic inflammatory reaction of the skin to an outside agent is referred to as an irritant contact dermatitis (ICD). It can be acute or chronic. Acute ICD is divided into two subtypes: Acute irritant dermatitis of contact and Irritant reaction based on a common cause. Its chronic type is a multifactorial disease known as cumulative insult dermatitis, caused by mainly toxic chemicals. Although warm climate and mechanical factors can contribute as co-factors. Clinically, it causes critically vulnerable contact dermatitis, minor scaling of an outer layer of skin to redness, slight dermal edema to a skin lesion that may discharge serious matter and can't be differentiated from oversensitive contact dermatitis. Acute types of ICD can be itchy and painful and causes burning or stinging sensation. Sensitivity to irritants varies from individual to individual. Hand hygiene (HH) is the most vital approach that can be followed by healthcare workers (HCWs) to decrease the possibility of spreading infection in population. However, this simple practice is followed by not more than 50% of them [1, 2]. This non-compliance to HH is due to the formation of ICD by the harmful effects of frequent contact to HH products [3].

Conducting a clinically convincing study is challenging, without disturbing standard practice in the medical field. As a result, there are comparatively limited research publications regarding diverse characteristics of irritant contact disorders among HCWs under distinctive clinical situations [4, 5]. Though, in recent years, the number of articles published related to HH is significantly increased, various queries of HH products and policies to develop obedience with suggested guidelines stay unrequited.

The occurrence of ICD has been well acknowledged. According to Pittet and Boyce [6] 85% of health care workers has history of skin problems and 25% shown adverse effect as dermatitis.

Lempel *et al.* revealed that 55% of nurses in hospital and 65% of ICU staff found to have hand skin conditions [7]. According to a report found by Institute of Population Health at University of Manchester, UK, out of 1796 discovered cases of ICDs, 713 were in HCWs [8], in light of reports willfully put together by dermatologists somewhere in the range of 1996 and 2012 [9]. HCWs were 4.5 occasions bound to experience the ill effects of ICD in 2012, when the numbers were separated by year, as they were in 1996. This expansion was credited to a decrease in the drive toward MRSA.

Irritant vs. allergic contact dermatitis

Except perhaps in the earliest cases, it is extraordinarily difficult to distinguish between irritant and allergic contact dermatitis without the aid of patch testing: sometimes, a patient might even have a mixture of both. Allergic contact dermatitis is often the more severe and vesicular in its morphology, although its severity can vary from day to day, making the diagnosis even more complicated. Irritating contact dermatitis is often less severe and less vesicular but can become as severe as any allergic contact dermatitis when well-established.

Simple epidemiology can somewhat come to the rescue of a dermatologist. A contact allergen has to be very potent and highly unprotected against involving as many as a third of a workforce, whereas a chronic enough irritant often affects numbers approaching this proportion. Note that in every exposed person, irritants rarely cause dermatitis: there is far too much variation in individual susceptibility for this.

Distant spread — e. g., the face involved, as well as the hands — is far more common in allergic than irritant contact dermatitis, with eyelid swelling being particularly characteristic of allergy. Relapses are more common in allergic dermatitis than in irritants within days or even hours of renewed exposure. Undulant or relapsing and remitting courses are probably more common in irritant than in allergic dermatitis, while exposure continues. On topical corticosteroids, however, both can respond equally well (or badly).

Clinical application of irritant contact dermatitis on hands

They are divided into 3 parts—ICD and knowledge of skin function, ICD monitoring skills on

HCWs hands and Policies, practices and guidelines for HCWs to work on ICD related problems.

ICD and knowledge of skin function

This section of review was directed to provide an outline of skin structure and its functioning. The skin works as numerous capacities including obstruction capacities (e. g. water disaster, irritant introduction, light) and contamination control, sensation, basic help, and warm guidance. The peripheral layer, known as the stratum

corneum (SC), gives physical, mechanical, and immunological boundaries against natural abuse. The practical epidermis ceaselessly develops and reloads the boundary. The living cells discharge their substance to form lipid layers that collect fit between the cells as a fiddle. Right now, the cells "climb" from the lower layers are discharged or shed from the skin surface through desquamation. The arrangement is painstakingly customized and coordinate through flagging instruments to frame a fantastically flimsy and solid structure that takes up after an exhibit of "block and cement." Exceedingly huge powers are needed to demolish its respectability. Langerhans (cells which introduce antigens) are located in the appropriate layer (epidermis). They are a piece of the insusceptible framework and they "shield" the life form if the SC hindrance is abused. The SC obstruction shields cells from the direct natural introduction from the Langerhans and thus serves a fundamental capacity to control contamination.

ICD monitoring skills on HCWs hands

It is a test to check ICD during customary clinical practice without interfering with the typical HCW practices of assembling information. However, while researching about the effect of HH product, it was mentioned in various articles about how they observed ICD for the study. There were instances of independent reporting and self-reporting (Employee Health complaints monitoring). One of them examined 52 health care workers by preparing them to do HH by alcohol rubbing only or soap washing alone, in order to examine individual's hands by means of the Larson Skin Assessment Rating Scale. Thus, above research focused on appearance, sensation, reliability, and moistness of skin [10].

Policies, practices and guidelines for HCWs to work on ICD related problems

Pittet *et al.* stated on a hospital-related HH database that there is improvement in HH compliance as examined by observing alterations in infection rate related to health care and variations in HH product intake. Throughout research, HCWs were constantly instructed to access the Staff Health Division for any queries related to the usage of HH products. No remarkable skin destruction such as severe skin disorder and desiccation with excruciating extreme ICD, critically vulnerable or noxious reactions has been reported to the Staff Health Division, regardless of the uniformity extension amongst HCWs and the noteworthy progression in hand recording based on alcohol. This is an illustration of the observing and third-party intervention [10].

Current guidelines, practices, and policies

Guidelines

World Health Organization rules energize the use of salves and creams to treat side effects of ICD1; they not only urge HCWs to advise manufacturers on effects and similarity with antimicrobial HH products, but also urge HCWs to consider the unfavorably susceptible reactions that may occur when using lotions. The National Guideline on Dermatitis in the health care workplace of the Royal College of Physicians (United Kingdom) discusses the roles and effectiveness of pre-work (barrier) creams, conditioning creams, and ICD-affected HH procedures. While their findings indicate that pre-work creams have a positive overall impact on the quality and function of HCW skin, the impact of conditioning creams is less proven and may even cause further hand irritation, and they note the need for further research in the clinical setting. Murphy proposed 10 diverse self-reported tests which can be performed by an HCW to find out the cause of irritation in hand in a thesis for ongoing training for registered nurses. Steps included were-observation of hand washing and drying methods, inspection of environmental elements like cleansers or laundry cleansing agent, and also considering climate. The last step recommends that, the HCW should be sent to its individual physician or consultant for evaluation if there is still no sensible case history [11]. The "Just Clean Your Hand" is accomplished by Public Health Ontario, Canada. They incorporated a detailed assessment form for HH related skin complications. This may be used as tool to formulate a policy to avoid harmful methods or stuffs [12].

Practices

In a comparative study done by Rocha *et al.* between the bacterial flora among nurses (n= 30) with healthy hands to damaged handed nurses (n= 30) with regular HH or gloves wearing. Damaged hands had a higher amount of microscopic bacteria. The authors proposed that since damage caused on the skin by HH as well as wearing gloves is associated with changes close by microbial verdure, their latent capacity dangers ought to be viewed as when establishments/clients are choosing products/definitions to guarantee hand skin wellbeing and ensuing consistency with their own cleanliness strategies [13] McGuckin *et al.* dealt with a HH item use checking program and noticed a drop in sanitizer use towards the starting of the new year (January/February) period. According to research participants, HCWs bring their personal sterilizers and lotions to workplace, as personal sensitizers have a desired fragrance or since portable products are easy to use. So, products provided to them for the duration of the holidays were favored over products provided by hospital. Thorough observation of products usage may disclose the practices of HCWs, which are needed to be noted in to comply with professional product use directives [14].

Policies

As per the directive of Veterans Affairs Department (US): "Suitable hand ointments or salves have to be freely accessible to diminish ICD. Products suggested for human use that does not decrease the suitability of other hand-cleaning products, such as antimicrobial mixtures such as chlorhexidine gluconate (CHG), should be given. A few salves are explicitly promoted as 'CHG agreeable.' Hand moisturizers or creams have to be good at the office with the gloves used [15]. HH policy at the Texas University Medical Branch-" Bottles and other big hand ointment vessels may develop contamination with pathogens. So, smaller disposable packs or ointment sachets should be used. Vulnerably harmful responses to hand-skin products can arise as switched type reactions, or as rapid responses. If an HCW doubts oversensitive contact dermatitis, they should be instructed to report to their staff Health Division and document about Hand Dermatitis. The HCW should be noted by employee welfare clinician. If on examination a vulnerable contact dermatitis is found then HCW should be take the matter to Supplies Manager whereby hand hygiene products to be replaced by a new item [16]. The California University Medical Center HH Policy-"Work-related Health Services are responsible for answering and assessing employees' complaints related to skin irritation and recommending another product. Housing facilities delivers one-hand ointment provider in the patient attention divisions. The patient attention division supervisors may demand extra ointment distributors. Lotion should be applied to the hands at least four times per day after each use. Make sure that it stays on skin for at least 30 min after each usage. Only lotion provided by UCSF to be used as they manufacture products that are designed to work organized on your skin [17].

Contact dermatitis diagnosis: a practice parameter-update 2015

Summary statement 1: consider ACD with differential determination in patients with interminable eczematous or non-eczematous dermatitis; [Recommendation quality: strong; c evidence]

Contact dermatitis may, on the premise, be associated with the clinical appearance of the sores, the dispersion of dermatitis and the absence of different etiologies, or the absence of related foundational signs. Acute CD features erythematous papules, vesicles, and lesions that are crusted. Recurring or persistent episodes of CD will change over time from acute inflammation of the skin to thickening, hardening, scaling and fissuring of the skin, exaggerating the normal markings known as lichenification. Pruritus is characteristic of both chronic and acute CDs, and constant rubbing of the skin contributes to lichenification. Histologically, CD shows intercellular edema of the epidermis known as spongiosis, with varying degrees of acanthosis (thickening of basal epidermal stratum and spinosum stratum) and superficial per vascular, lymphohistiocytic infiltration. ACD cannot be distinguished from ICD

by features on physical examination or histological findings. Patch testing and exposure history to contact allergens is required. Other dermatological conditions may resemble the clinical and additionally histological appearance of CD and these should be

considered in the differential determination (table I), which incorporates skin T-cell lymphoma. The cutaneous biopsy should be interpreted by a pathologist with expertise in dermatopathology, if necessary to differentiate CD from other forms of dermatitis.

Table I: Allergic contact dermatitis differential diagnosis (ACD)

Dermatological condition	Differentiating features and clues to diagnosis
Irritant contact dermatitis	Glazed parched or scalded appearance Sharply circumscribed dermatitis Healing begins promptly on withdrawal of the offending agent Patch testing negative
Atopic dermatitis	Personal or family history of atopy Early age of onset Chronic and recurrent Dry, scaly very pruritic Typical distribution Facial in infancy Extensors in early childhood Flexural area in adolescence and adult
Seborrheic dermatitis	Distribution: area with sebaceous gland Scalp, periauricular, face (medical eyebrows, glabella, nasolabial folds) presternal trunk, interscapular. Blepharitis common Dandruff appears to be a precursor
Dyshidrotic eczema	Distinctive morphology: dull, yellowish-red, sharply demarcated lesion covered with greasy-looking scales Small (1-2 mm) vesicles, deep seated on nonerythematous base Palms, soles, and/or lateral aspects of fingers, often symmetrical Intensely pruritic and itching prodrome
Psoriasis	Persists for 2-3 w and then resolves by involution and desquamation Plaques typically have dry, thin, silvery-white, or micaceous scale Auspitz sign: removing scale reveals a smooth, red, glossy membrane with tiny punctate bleeding
Dermatitis herpetiformis	Genetic predisposition for gluten sensitivity Intensely pruritic Symmetrically grouped (herpetiform) papules and vesicles Elbows, knees, buttocks, scapula, scalp Direct immunofluorescence of the skin show granular IgA at dermal papillae and occasionally along the dermo-epidermal border.
Mycoses fungoides and cutaneous T-cell lymphoma	Patches with thin, wrinkled quality, often with reticulated pigmentation Pruritus varies from minimal or absent to common in premycotic phase and may precede MF by years. Often on lower trunk and buttocks Cutaneous biopsy required for confirmation.

Summary statement 2: Patch testing is the Best standard for confirming the diagnosis in patients associated with acd creation. [Recommendation quality: strong; c evidence]

ACD doubt is the initial phase in making the diagnosis. Fix testing shows where basic or auxiliary ACD is suspected in any patient with intense or constant dermatitis, which is regularly pruritus. For its diagnosis and subsequent administration the historical backdrop of this disease is important. Although clinical history may strongly advise the reason for ACD, it has moderate affectability (76 percent) and peculiarity (76 percent) in establishing the diagnosis. As the patient might be unaware of any applicable introduction, any eczematous injury could be compounded by a contact sensitizer for all intents and purposes. Such a prurigo nodularis can also be related to no eczematous ejections with positive PT, which is clinically important. Studies have shown the value of fix testing in babies suffering from constant dermatitis [18]. Fixed testing was shown to be practical whenever carried out directly from the bat over the span of infection in patients with incessant ACD by reducing the cost of prediagnostic treatment. Treated CD patients affirmed by fix testing show altogether more noteworthy improvement in the dermatology-explicit personal satisfaction than patients who have not been fix trying. Skin prick testing does not take on a job in the assessment of ACD, but is regularly helpful in patients with unfavorably susceptible CU.

Summary Statement 3: review home and working environment for various contact allergens wellsprings other than the individual products used by an acd-associated patient. [Strength of recommendation: moderate; d evidence]

The specific idea of the length of each movement and the event of comparative skin impacts in colleagues may provide pieces of information on the potential reasons for the work related to ICD or

ACD. Important changes in the workplaces that cause new direct exposures of the skin to chemicals, including fumes and exhaust, must be tested. A few occupations (e. g. medical clinic workers) require visiting hand washing, and the use of cleansing specialists can negotiate skin obstruction and lead to aggravated hand dermatitis. Since the specialist may be uninformed of explicit chemicals to which the individual in question is uncovered, it may be useful to have MSDS acquired from the producer; as it may be, key sharpening fixations found at low fixations are regularly overlooked [19].

Summary Statement 4: Assess patients, particularly those with hand dermatitis, for both irritant and unfavorably susceptible causes. [Recommendation quality: strong; evidence c]

Detergents are common causes of hand dermatitis due to skin barrier disruption and are often associated with hand ICD. Though there are some detergent-related reports of ACD, careful evaluation suggests that allergic responses are rare. Irritants that disrupt the skin barrier may then penetrate into the epidermis resulting in keratinocyte membrane injury and the release of inflammatory cytokines, what's more, add ICD upgrading. This skin hindrance interruption also allows allergens to enter, and subsequent immunological reactions to be enlisted [20].

CONCLUSION

From this review, it can be established that by proper adherence to essential Hand Hygiene techniques may lead to skin damage and higher bacterial flora (pathogenic organisms). Therefore, it is important that HCWs should appreciate and recognize this theory and are given approaches of skills and expertise to avoid skin irritation and damage. Though several administrative associations address Irritant Contact Dermatitis as an obstacle to Hand Hygiene,

there was no agreement among these gatherings as rules for the announcement or control of ICDs by Health Care Workers. Inability to avail proper policies and guidelines to these workers may lead to adherence in case of an Irritant Contact Dermatitis appearance. Compliance to Hand Hygiene is a multimodal method that may change as we find an absent link to increasing compliance and maintaining it.

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AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

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