Hand dermatitis: a problem commonly affecting nurses

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Abstract

Hand dermatitis is regarded as one of the most often observed dermatological disorders among nurses. The factors that increase the risk of developing hand dermatitis are as follows: frequent washing hands, using disinfectants, wet-work conditions, exposure to medical substances, detergents and wearing rubber gloves. Most cases of occupational hand dermatitis is due to chronic exposure to irritants that cause the inflammation on the nonallergic pathway. Recurring contact to irritants disturbes the natural skin barrier and causes inflammation. There are reports showing the presence of skin barrier alterations among nurses working in operating room units. The most common contact allergens in the hospital environment include rubber, latex, medicaments and antiseptic products. In our study the incidence of self-reported hand dermatitis in hospital staff was very high. About 70% of respondents declared the presence of symptoms of hand eczema within the last 12 months and about 46% of the studied group had skin lesions at the moment of self-examination. Almost 75% of employees with hand dermatitis had observed the worsening of skin problems in relation to work and 79% reported improvement of skin changes during the leisure time. We also noted that a personal or family history of atopy increases the risk of developing hand dermatitis in nurses. We would also like to emphasize the psychological consequencies that affect nurses with hand dermatitis. According to our data 48% of hospital employees with hand eczema declare psychological distress caused by their skin lesions.

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Introduction

Hand dermatitis is regarded as one of the most often observed dermatological disorders among hospital staff [1-4]. This is mainly due to the frequent contact with irritant and/or allergenic substances that occurs during the work. The factors that increase the risk of developing hand dermatitis are as follows: frequent washing hands, using disinfectants, wet-work conditions, exposure to medical substances, detergents and wearing rubber gloves. Hand dermatitis which is usually diagnosed as contact dermatitis, is very common among nurses worldwide. Its prevalence in this population is assessed on about 10-48% [1-6] and depends on specificity of the hospital department. Hand dermatitis especially frequently affects nurses working on surgical, internal medicine, geriatric, obstetric or pediatric wards [6,7]. Recently conducted studies have shown the correlation between the incidence of hand dermatitis in hospital staff and frequency of hand washing and using soap, detergents and disinfectants [6,8-11].

Pathogenesis of contact dermatitis

Concerning the pathogenesis, contact dermatitis may be divided into two groups: allergic and irritant contact dermatitis. Most cases of occupational hand dermatitis is due to chronic exposure to irritants that cause the inflammation on the nonallergic pathway.

Irritant contact dermatitis

In this condition skin changes, usually of the chronic and recurrent course, develope as the result of frequent exposure to factors causing irritation or skin dryness, which lead to disfunction of natural skin barrier [12]. Recurring contact to irritants

Table 1. **Self-reported hand dermatitis in hospital staff**

Skin lesions		Number	Percentage (%)
Occurrence	within last 12 months	181	69.6
	on self-examination	120	46.2
Type	redness	162	89.5
	roughness	162	89.5
	fissures	46	25.4
	vesicles	20	11.0
	itching	57	31.5
Location	single	114	63.0
	multiple	67	37.0
	dorsum of the hand	116	64.0
	palmar surface	59	32.6
	lateral sites of fingers	45	24.8
	pulps of fingers	21	11.6
	around nail folds	28	15.5
Relation to work	worsening	136	75.2
	no change	45	24.8
Relation to leisure	improvement	143	79.0
time	no change	38	21.0
Psychological	yes	87	48.1
distress	no	94	51.9

disturbes the natural defense mechanisms of the skin and causes inflammation. Skin changes do not develop in every person exposed to the irritant factors and the severity of the lesions also differs in various patients. The course of the disease depends on the effectiveness of skin barrier (pH of the skin, the ability of water biding in the stratum corneum and lipid cover of the skin) and on the individual factors [12]. The decreased level of skin lipids or the disturbed lipid proportion in the epidermis lead to water binding impairment and facilitate the penetration of harmful substances. Frequent hand washing and exposure to detergents causes the damage of natural lipid layer of the skin which leads to xerosis and increased susceptibility to damaging factors. There are reports showing the presence of skin barrier alterations among nurses working in operating room units [12]. In the comparison with the control group transepidermal water loss (TEWL) was significantly higher, while stratum corneum hydration was significantly lower in examined nurses.

The severity of irritant contact dermatitis depends on the length and frequency of exposure to damaging factors and on the dose of irritant substances. After stopping the exposure the symptoms usually improve or dissapear. Skin lesions are limited only to the exposed skin areas.

Allergic contact dermatitis

The most common contact allergens in the hospital environment are rubber, latex, medicaments and antiseptic products [11]. Contact dermatitis is a IV type of allergy. The pathogenesis of this disease is biphasic. In the first phase (induction) the skin is penetrated by small particules called haptens. Haptens combine with proteins and become allergens. These antigens are phagocytosised by Langerhans cells and presented to lymphocytes T. Lymphocytes proliferate and create the specifically sensitized memory cells. In the second phase, after the repeated contact with the antigen, memory cells initiate the inflammatory reactions. The crucial for the developing skin lesions are Th1 lymphocytes and their cytokines. They activate inflammatory cells, increase proliferation of other lymphocytes and antigen presenting cells and influence many other proinflammatory processes.

The severity of allergic contact dermatitis does not depend on the dose of allergenic substance nor on the length of exposure. Even the short contact with antigen activates the lymphocytic memory cells and leads to developing the inflammatory process. Cessation of that exposure does not lead to immediate improvement because further phases of the allergic inflammation develop without direct influence of the antigen. Moreover, a few days after the exposure to allergenic substances the skin lesions may even worsen and may appear on the not exposed skin areas.

Occupational hand dermatitis may initiate as irritant contact dermatitis and further develop to allergic dermatitis. Skin barrier alterations due to irritation facilitate the penetration of allergenic substances into the skin which lead to induction of IV type allergic reactions.

Own experience

Our group has been interested in the problem of hand dermatitis in hospital staff for a few last years. Recently we have published a study regarding this problem [13]. The 260 hospital employees were included into this study (mostly nurses). Among this group there were 245 females and 15 males aged 21-55 years with a mean of 37.4 years. The job seniority ranged from 0.5 to 38 years (mean 13 years). The majority of nurses worked in surgical or internal departments. The data were analyzed statistically with Chi^2 test and Mann-Whitney U-test. The incidence of self-reported hand dermatitis in our survey was very high. About 70% of respondents declared the presence of symptoms of hand eczema within the last 12 months and about 46% of the studied group had skin lesions at the moment of self-examination. This is a very high propotion which is simmilar to the reports from other countries or even higher [1-6]. The most frequent skin changes were redness and rough skin (89.5%). Other observed symptoms included: itching (31.5%), fissures (25.4%), and the most seldom reported vesicles (11%). Although the most frequent location of lesions was dorsum of hands (64%), 37% of respondents with hand dermatitis had several affected sites on the hands. The symptoms were strictly associated with work, only 3.5% of the respondents claimed that the skin changes had appeared before they started to practice their present professions. Almost 75% of employees with hand dermatitis observed the worsening of skin problems in relation to work and 79% reported improvement of skin changes during the leisure time. The detailed results are summarized in *Tab. 1*.

There are many suggestions regarding the predisposing

factors to hand eczema in hospital staff. Several studies showed that usage of rubber gloves, detergents, disinfectants or wet-work conditions may predispose to hand dermatitis [3,10,11]. In our study [13] the influence of neither of the above mentioned factors was confirmed statistically. However, we indicated that a personal or family history of atopy increases the risk of developing hand dermatitis in nurses. Hand eczema was reported more frequently in hospital employees with allergic rhinitis ($p<0.0001$) and people with allergic conjunctivitis ($p<0.001$). Skin lesions were also significantly more often present in patients with family history of these diseases ($p<0.002$ and $p<0.001$) and in patients with positive family history of atopic dermatitis ($p=0.02$). Thus, based on the above described results, we are pointing out the importance of atopy as an additional predisposing factor to hand dermatitis. This is in agreement with other reports [4,5]. Patients with atopic dermatitis suffer from excessive skin dryness. The level of urea and ceramides in the epidermis of atopic patients is decreased. Thus the skin barrier is disturbed which leads to better skin penetration by damaging substances.

These results suggest that the problem of hand dermatitis in nurses is really of great importance. The skin lesions may hamper professional duties and may be the reason of prolonged absences [1,2]. We would also like to emphasize the psychological consequencies that affect nurses with hand dermatitis. According to our data 48% of hospital employees with hand eczema declare psychological distress caused by their skin lesions [14]. The patients feel embarrassment or irritability due to the skin changes, which disturb both social and professional aspects of life. The level of psychological distress depended on the severity of the disease. Symptoms of hand dermatitis in patients who reported the distress were significantly more severe than in those without psychological problems ($p=0.0016$). The average number of years in the job was also significantly higher in these subjects ($p=0.01$).

Conclusions

Hand dermatitis is a serious clinical problem in the population of nurses. It seems to be of great importance to introduce educational programmes to clarify the predisposing factors and to introduce prophylactic procedures (wearing of gloves, reducing of washing the hands with detergents and soaps, usage of repary hand creams).

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