OCCUPATIONAL CONTACT DERMATITIS IN CLEANING WORKERS OUR FIRST APPROACH

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INTRODUCTION

Occupational dermatoses are one of the most prevalent occupational diseases. Hand eczema corresponds to 75%[1,2] of them, and contact urticaria, chloracne or infections[3] are less frequently observed. The most common jobs involved are health personnel, catering trade and hairdressers, specially nurses, cooks and apprentice. Wet work alters the skin barrier function, increasing the possibility of developing irritant contact dermatitis and sensitization to potential topical allergens, chemicals and proteins. Cleaning is a type of wet-work whose characteristics make cleaners ideal candidates to develop occupational contact dermatitis[4,5] Cleaning work may result in physical skin damage due to contact with soaps, detergents, some foods and other technical products. Domestic and industrial cleaning workers are more prone to developing irritant and allergic hand dermatitis as a consequence of exposure to baseline allergens, such as nickel, colophony and cosmetic ingredients. Moreover, although the cleaning activity takes place in houses, offices, schools or factories it represents a large proportion of declared and undeclared jobs. Therefore, it is difficult to carry out an official population-based observational clinical study.

AIM

To describe the dermatoses suffered by cleaning workers who were studied in our Contact Dermatitis Clinic at the Dermatology Department in the Hospital del Mar, from 2005 to 2009 and to assess their occupational relevance.

PATIENTS AND METHODS

A series of 2137 patients patch tested from January 2005 to December 2009 was reviewed. One hundred and three (n=103) of them were current cleaners and 70 were past cleaning workers. "Cleaning workers" were defined as people who worked as a cleaner at least, four to five hours a day. A "current" cleaning worker was defined as a person whose main job was to clean at the time of the medical consultation. A "past" cleaning worker was defined as a person whose main job during the last five years has been to clean, but who, at the time of the patch test study, he was developing another (non-cleaning) work. All clinical data were collected from their medical records. The clinical features were registered in the Spanish version of the multilingual WinAlldat® software. A cutaneous provocation tests protocol was designed using patch test and/or prick test, according to the underlying skin disease e.g. contact dermatitis and/or contact urticaria. Suffering from an occupational dermatosis was chosen as a dependent variable, whereas gender, age (years), past medical past history of atopic diathesis (rhinitis, asthma, atopic eczema) and cutaneous provocation tests results (patch test and/or prick test) were considered independent variables. Cases with occupational relevance according to the diagnosis and patch test results were identified.

For data management and descriptive analysis, the statistical software package SAS (version 9.1, SAS Institute, Cary NC USA) was used.

RESULTS

Tables 1 and 2 show a comparative analysis of MOAHLFA index among the evaluated groups. MOAHLFA: Male, Occupational Dermatoses, Atopy, Hands, Legs, Face, Age (more than 40 years).

Table 1. MOAHLFA index in "Current cleaners" compared with "never cleaning population".

Number of cases	Current Cleaners % of cases	Control Cases, nº	Never Cleaners % Control Cases	Index	Exit
6	5.83	635	32.41	M	1
5	3,88	147	7.50	O	2
4	3.88	182	9.29	A	3
9	8.74	332	16.95	H	4
8	7.77	143	7.30	L	5
12	11.65	252	12.86	F	6
71	68.93	1285	65.59	A	7

Table 2. MOAHLFA index values in "previous cleaners" compared with a "never cleaning population".

Number of cases	Previous Cleaners % of cases	Control Cases, nº	Never Cleaners % Control Cases	Index	Exit
2	2.86	635	32.41	M	1
6	7,14	147	7.50	O	2
1	1.43	182	9.29	A	3
11	15.71	332	16.95	H	4
9	12.86	143	7.30	L	5
9	12.86	252	12.86	F	6
59	84.29	1285	65.59	A	7

Number of cases, nº: absolute frequency of current cleaner (Table 1) / absolute frequency of previous cleaner (Table 2).
Percentage of cases: percentage of current cleaner (Table 1) / absolute frequency of previous (Table 2).
Control cases, nº absolute frequency of never cleaners.
% Control cases: percentage of never cleaner.

Table 3. Demographic and clinical characteristics from "current" cleaners compared with "past cleaners" and with patients who never worked as a "cleaner".

	Current Cleaners	Past Cleaners	Other Jobs
Number of patients studied	103	70	1.964
Female / Male	96 / 6	68 / 2	1329 / 635
Median age	49,32 (± 18.56)	49,28 (± 18.53)	49,31 (± 18.60)
Atopic dermatitis	3.88% (n=4)	1.43% (n=1)	9.27% (n=182)
Symptoms time (most frequent)	37.86% (n=39) 1 year	34.29% (n=24) 1 year	36.50% (n=717) 1 year
Dermatitis location: Most frequent body site	Trunk 42.71% (n=44)	Trunk 35.71% (n=25)	Trunk 57.11% (n=1121)
First diagnosis	Allergic Contact Dermatitis	Allergic Contact Dermatitis	Allergic Contact Dermatitis
Most common	25.24% (n=26)	30% (n=21)	40.78% (n=880)
First diagnosis	Urticaria	Irritant Contact Dermatitis	Irritant Contact Dermatitis
2d frequency	12.62% (n= 13)	10% (n=7)	15.27% (n=300)
First diagnosis	Drug Intolerance	Urticaria	Urticaria
3d frequency	9.71% (n=10)	7.14% (n=5)	14.59% (n=286)
Second diagnosis	Allergic Contact Dermatitis	Allergic Contact Dermatitis	Urticaria
Most frequent	18.4% (n=19)	17.17% (n=12)	12.98% (n=255)

Table 4. Occupational Dermatosis.in Cleaners. Cases with occupational relevance.

	CASES	GENDER	AGE	ATOPY	DIAGNOSIS	PART OF BODY	PATCH TEST POSITIVE
CURRENT CLEANERS	1	M	48	NO	ACD	Palmar Side of finger hands	Peru Balsam Thiomersal
	2	F	35	NO	ICD	Fingertips	Nickel
	3	F	48	NO	ICD	Fingertips	No
	4	F	49	NO	ACD	Trunk	Fragrances Mix 1
PREVIOUS CLEANERS	1	F	?	NO	ICD	Hands	Nickel
	2	M	37	ASTHMA	ICD	Fingertips	No
	3	F	72	NO	ICD	Palmar side of finger hands	No
	4	F	46	NO	ACD	Fingertips	Fragrances Mix
	5	F	85	NO	SD	Legs	No

M: male, F: female, ACD: Allergic contact dermatitis, ICD: Irritant contact dermatitis, SD: Stasis dermatitis.

Tabla 5. Allergens most frequently detected in "current cleaner" and "previous cleaner" workers.

Substance name	Vehicle	Concentration	Current Cleaning	Previous Cleaning
Methylchloroisothiazolinone Methylisothiazolinone (MCI/MI)	AQU	0,01	**0**	**1**
Quaternium 15	PET	15	**0**	**1**
Benzocaine	PET	5	**1**	**1**
Clioquinol (Iodochlorhydroxyquine)	PET	5	**0**	**1**
Fragrance mix	PET	8	**2**	**10**
Epoxy resin	PET	1	**0**	**1**
Dibromoglutaro nitrile + 2-Phenoxyethanol	PET	1	**1**	**1**
Formaldehyde	AQU	1	**0**	**1**
Potassium dichromate	PET	0,5	**1**	**1**
Cobalt (II)-chloride, 6*H2O	PET	1	**1**	**4**
Mercaptobenzothiazole	PET	2	**1**	**0**
N-Isopropyl-N'-phenyl-p-phenylene diamine (IPPD)	PET	0,1	**1**	**0**
Nickel (II)-sulfate hexahydrate	PET	5	**13**	**13**
Balsam of Peru (Myroxolon pereirae)	PET	25	**0**	**1**
Thiomersal (Thimerosal)	PET	0,1	**2**	**0**
Tixocortol-pivalate	PET	1	**0**	**1**

DISCUSSION

As far as we know, a limited number of studies evaluating the prevalence of occupational dermatoses in cleaning workers have been published in the medical literature. The limited amount of information usually comes from some special settings (hospitals). Cleaning workers are a group of individuals having a frequent contact with water and chemical products and presenting a high risk for the development of occupational dermatitis. In our study, the demographic, professional and clinical characteristics of one hundred seventy three cleaning workers were reviewed and compared with a group of 1.964 non-cleaning workers.

94% and 97% of current and previous cleaning workers were women with a range age between 31 to 80 years-old. No differences in the mean age of patients included in the current, previous and never cleaner group were detected. The ratio female/male was 16/1 and 34/1 for current and previous cleaning workers, respectively.

A lower percentage of patients with atopic dermatitis was detected among current and previous cleaners (3.88% and 1.43%, respectively) in comparison to the never cleaner workers group (9.27%). The percentages of atopic patients in the group of cleaners were also lower than those observed in the general population. Current cleaners presented a lower frequency of hand dermatitis (8.74%) and occupational relevance (3.88%) than individuals who had other jobs (hand dermatitis: 16, 95%, occupational relevance: 7, 5%). Atopic dermatitis is considered to be a predisposing factor for developing contact dermatitis in wet-working individuals. Nevertheless, these differences could not be demonstrated among "past cleaners" and the "never-cleaners groups". No significant differences with respect to the other MOAHLFA parameters were detected.

The trunk was the most frequent site of involvement. No significant differences between the different groups could be demonstrated... In our study, regardless the work activity, different dermatoses such as generalized eczema, cutaneous drug adverse reactions, urticaria or even glosodynia were patch tested. In those cases showing an occupational relevance, the hand (and especially the fingertips) was the most frequently site of disease involvement, both in current and past cleaners.

Allergic contact dermatitis was the most common diagnosis in both current and previous cleaning workers (25.24% and 30%, respectively), followed by irritant contact dermatitis (6.7% and 10%, respectively). When occupational relevance was considered the most frequent diagnosis was irritant contact dermatitis.

Other relevant diagnoses included atopic eczema, urticaria and *pruritus sine materia*. Similar to our results, Fisher in 1990, detected in 1656 home-help-services employees (93% of them, women) hand eczema (22, 4%), dry skin (64, 5%), itchy skin (30, 5%) or erythema with skin irritation (33, 7%) among other diseases.

Positive baseline patch test results to rubber allergens (n=7: mercapto mix, thiuram mix, mercaptobenzotiazol, carba mix and N-Isopropyl-N'-phenil-p-phenylene diamine), fragrances/cosmetic allergens (n=7: fragrance mix 1, fragrance mix 2, lyral, balsam of Peru, colophony, lanolin) and preservatives (n=6: paraben, MCI/MI, dibromoglutaronitrile/2-phenoxyethanol, formaldehyde, quaternium 15,thiomersal) were the most common contact allergens found in cleaning workers. In those cases with occupational relevance, nickel sulphate and fragrances mix were the most frequently detected positive patch test reactions and no positive results for rubber allergens were observed. In most cleaning workers who developed an occupational irritant contact dermatitis, patch test showed negative results. (Table 4)

Several limitations of our study should be pointed out: It was performed in a single Reference Institution (Department of Dermatology) and included individuals who had required dermatological medical care that probably are different from the general population.

CONCLUSION

Cleaning workers have an occupational risk to develop occupational contact dermatitis induced by contact irritants and allergens. Water, contamination, friction and rubbing of the skin, soaps or detergents are potential irritant factors. Furthermore, cleaning work also increases the risk of exposure to almost all baseline allergens. In this study we observed that the main site of involvement of occupational dermatitis developing in cleaning workers is the hands. As expected, irritant dermatitis was the most frequent diagnosis with occupational relevance. When a positive patch test reaction was found, the responsible allergen was usually present in the professional activity. Nevertheless such allergens are commonly responsible of contact allergy also in costumers. Cleaners workers are also exposed to them outside the work e.g. during domestics activities. This should be considered when evaluating the occupational relevance of a particular skin eruption.

This study is just a first approach evaluating the different skin disorders observed in a cleaning workers group with occupational dermatitis in a selected population. We would like to stress the need to perform additional studies focused on the different dermatoses suffered from cleaning workers and to compare the obtained results from those observed in other wet-work working populations. A detailed analysis of the potential irritant and sensitizing chemical products employed would be useful. In order to prevent these skin disorders, different preventive measures have been recommended. The assessment of their compliance among cleaning workers during daily work seems advisable.

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