

Frequency of occupational contact dermatitis in an ambulatory of dermatologic allergy

Frequência da dermatite de contato ocupacional em ambulatório de alergia dermatológica

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Abstract: BACKGROUND: Occupational contact dermatitis (OCD) corresponds to 80% of the cases of skin diseases related to work.

OBJECTIVES - To determine: the frequency of OCD in an ambulatory of allergy not specific for occupational dermatosis; the profile of these patients according to age, gender, color, profession, atopic history, duration and localization of the dermatosis; the diagnosed types of contact dermatitis; the main allergens and to compare the frequency of the main antigens with the results obtained from patients examined in the same period of time, without DCO.

METHODS - During the three-year period from 2003 to 2006, 630 patients were examined and submitted to a battery of standardized contact patch tests and those who were diagnosed with OCD were selected.

RESULTS - Sixty-nine out of the 630 patients were diagnosed with OCD. The average age was 44.5 years. Forty-eight patients (70% of the cases) presented the disease on the hands. The most prevalent activities of patients suffering from the disease were household tasks (39%) and building construction (33%). The allergic contact dermatitis (ACD) occurred in 48 cases which represent 70% of the total number of cases and irritant contact dermatitis in 21 cases corresponding to 30% of the total number of cases. The main allergens were potassium dichromate 28 (41%), nickel sulfate 16 (23%) and carba-mix 16 (23%).

CONCLUSION - OCD was present in 10.9% of the patients. Concerning age the group in which the disease was more commonly found corresponded to the most productive group of the population. ACD corresponded to 48 cases, probably influenced by the long period of evolution of the dermatosis. Metal and rubber chemicals were the commonest allergens.

Keywords: Dermatitis, contact; Dermatitis, occupational; Patch tests

Resumo: FUNDAMENTOS: A dermatite de contato ocupacional (DCO) corresponde a 80% dos casos de dermatoses relacionadas ao trabalho.

OBJETIVOS - Determinar: a frequência de DCO em pacientes atendidos em ambulatório de alergia, não específico de dermatose ocupacional; o perfil dos pacientes de acordo com idade, sexo, cor, profissão, antecedentes atópicos, duração e localização da dermatose; os tipos de dermatite de contato; os principais alérgenos; e comparar as frequências dos principais sensibilizantes com os resultados obtidos em pacientes atendidos no mesmo período, sem DCO.

MÉTODOS - Durante o período 2003-2006, 630 pacientes foram atendidos e submetidos à bateria padrão de testes de contato. Selecionaram-se aqueles com DCO.

RESULTADOS - Sessenta e nove (10,9%) pacientes apresentaram DCO. A média de idade foi de 44,5 anos. As mãos foram acometidas em 48 (70%) casos. As profissões prevalentes foram do lar (27,39%) e construção civil (23; 33,5%). Dermatite alérgica de contato (DAC) ocorreu em 48 (70%) casos, e dermatite irritativa de contato (DIC), em 21 (30%). Os principais sensibilizantes foram o bicromato de potássio (28; 41%), sulfato de níquel (16; 23%) e carba-mix (16; 23%).

CONCLUSÕES - A DCO foi diagnosticada em 10,9% dos pacientes, sendo mais comum na faixa etária produtiva da população. DAC esteve presente em 48 casos, provavelmente influenciada pelo longo tempo de evolução da dermatose. Os metais e os componentes da borracha foram os principais sensibilizantes.

Palavras-chave: Dermatite de contato; Dermatite ocupacional; Testes do emplastro

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INTRODUCTION

Occupational disease is of great importance in Brazil due to its political and social aspects and because of that four ministries are involved in its control: Ministry of Labour, Ministry of Justice, Ministry of Health and Ministry of Social Security. Occupational dermatosis is considered one of the main professional diseases, being occupational contact dermatitis responsible for 80% of the cases.^{1,2}

Some factors such as age, sex, race, atopic antecedents, temperature and level of humidity in the working environment predispose individuals to it and can be related to the development of occupational contact dermatitis (OCD). Besides that, direct causes such as physical and chemical agents might cause or worsen it.^{1,3,6}

Around 90% of the cases of OCD are on the hand, being irritative contact dermatitis the most common type. A wet working environment contributes to the initiation of the disease.^{6,7}

The following aspects are important to make a precise diagnosis of OCD: 1) case history of occupational exposure to irritative or allergenic agents identified in the working environment; 2) concurrence of the beginning of the disease with the period of occupational exposure; 3) correlation among location of the lesions and contact areas with the main suspect agents; 4) improvement of the dermatosis with removal from the working environment and worsening with return to work and 5) a positive contact test also relevant with the case history and clinical condition of the patient.^{3,7,8}

The objectives of this work were: 1) to verify the frequency of OCD in patients examined in an ambulatory of skin allergies; 2) to evaluate the profile of patients according to age, sex, race, atopic antecedents, professional activity, evolution time and location of the dermatosis; 3) to verify the different types of contact dermatitis diagnosed; 4) to demonstrate which are the main sensitizing substances and 5) to compare the frequencies of the main sensitizers with the results obtained from patients treated in the same period of time, without suffering from OCD.

PATIENTS AND METHODS

During the three-year period from 2003 to 2006 630 patients were treated in the Allergy Sector of the Clinic of Dermatology of the "Santa Casa" Hospital, São Paulo. According to the case history, relating dermatosis with work and compatible clinical condition, the patients suffering from OCD were selected. Retrospectively, data referring to age, sex, race, atopic antecedents, profession, length and location of the dermatosis were collected.

All patients had contact tests done, with a stan-

dardized battery of tests (Patch tests) preconized by the "Grupo Brasileiro de Estudo em Dermatite de Contato" (GBEDC-1996)⁹ produced by *FDA-Allergenic* (RJ-Brazil), and it was composed of 30 substances. The tests were carried out on the superior dorsum, using type *FINN CHAMBERS*[®] plaster. Reading of the test was considered within 96 hours.

Data were analyzed with the use of *Microsoft Office Excel* (2003).

Patients with a positive contact test and relevant case history were characterized as carriers of allergic contact dermatitis (ACD). Those, with negative tests were diagnosed with irritative contact dermatitis (ICD).

Statistics analysis of results comparing carriers of occupational dermatosis with carriers of dermatosis not related to work was performed using the chi-squared method.

RESULTS

Among the 630 patients tested, 69 (10,9%; IC 8,67 – 13,72) presented OCD.

Distribution according to age varied from 18 to 78 years of age, with an average of 44,5 years. It was observed that 44 (64%) were men and 25 (36%) were women. As for skin colour, 32 (46%) were white, 27 (39%) were mulattos and 10 (15%) negroes.

Atopic antecedents were observed in 37,6% (26/69) of cases.

The most prevailing professions were: 27 (39%) household workers, 23 (33,5%) workers from the civil/building construction, four (6%) metallurgists, three (4%) carpenters, three (4%) hairdressers (Table 1). 91,5% of the OCD were related to working in wet environment.

TABLE 1: Distribution of patients suffering from occupational contact dermatitis according to profession

Profession	N	%
Household tasks/cleaning	27	39
Civil/Building construction*	23	33,5
Metallurgist*	4	6
Carpenter	3	4
Hairdresser*	3	4
Cook *	2	3
Chemist*	2	3
Health Professionals*	2	3
Ploughman	1	1,5
Loader	1	1,5
Clerk	1	1,5
Total	69	100

* work in a wet environment.

Data: Clínica de Dermatologia da Santa Casa de São Paulo, 2003-2006.

The time of evolution of the dermatosis varied from two to 312 months, with a median of 12 months.

Concerning the location of the dermatosis, some patients presented more than one site, being in 48 cases (70%) on the hands, followed by arms in 21 cases (30%), legs in eight cases (12%), feet in five cases (7%) and cephalic segment in four (6%) (Table 2).

Among the 69 patients, 48 (70%) presented at least one positive test, relevant with the case history, characterizing ACD. Twenty-one patients (30%) presented all tests negative being diagnosed with ICD.

There were done 30 contact tests per patient, which totals 2070 tests in the 69 patients, being 108 of these tests positive and 1962 negative. Among the 561 patients presenting non-occupational dermatitis, 16830 tests (30 per patient) were done, resulting in 469 positive tests and 16361 negative ones. Comparative analysis between the two groups showed statistical significant difference, demonstrating a larger number of positive tests among OCD carriers ($x^2=35.98$ $P<0,00000$).

The main relevant sensitizers for OCD were: potassium bichromate with 28 (41%) positive tests, nickel sulfate with 16 (23%), carba-mix 16 (23%), cobalt chloride 14 (20%), tiuram-mix 13 (19%), PPD-mix seven (10%), formaldehyde five (7%), epoxy resin (7%), mercaptobenzothiazole four (6%) (Table 3).

Comparing the frequency of sensitization with a larger number of positive tests between the groups with and without occupational dermatitis, it was observed a difference statistically significant among the following substances: potassium bichromate ($x^2=102,8$ $P<0,000000$), carba-mix ($x^2=40,35$ $P<0,0000001$), cobalt chloride ($x^2=16,45$ $P<0,00005$), tiuram-mix ($x^2=30,47$ $P<0,00000$), PPD-mix ($x^2=5,49$ $P<0,01$), mercaptan-mix ($x^2=4,16$ $P<0,03$), epoxy resin ($x^2=20,65$ $P<0,000005$). (Table 3).

DISCUSSION

Occupational dermatoses represent a loss in the health of workers. In developed countries, it is estimated that around 1% of the workers suffer from

TABLE 2: Distribution of patients suffering from occupational contact dermatitis according to localization

Localization	N	%
Hands	48	70
Arms	21	30
Legs	8	12
Feet	5	7
Head	4	6

* some patients presented more than one site
Data: Clínica de Dermatologia da Santa Casa de São Paulo, 2003-2006.

occupational dermatoses. In Brazil, the frequency of the most important occupational dermatoses is similar to the frequency found in other countries.¹

In this present study, 10,9% of the contact dermatitis were classified as OCD. The age group of the population in which it was more commonly found corresponded to the age group with higher professional activity

Within the group studied here, men presented a higher frequency of occurrence of the disease (OCD). This finding is considered a controversial finding in many published works. As some studies show a higher frequency of hand ICD in women that work in wet environments, others do not present significant differences in relation to sex.^{4,10} Discordancies among studies are probably due to the different types of population studied.

In this work, 37,5% of the patients presented atopic antecedents. Individuals with atopic antecedents presented a higher risk of developing contact dermatitis.³ Atopic dermatitis lesions lead to alterations in the skin protection barrier, favouring the penetration of irritative and sensitizing substances.

Wet working conditions favoured occurrence of OCD in 91,5% of the patients studied, which is in accordance with other publications.^{11,12}

It is observed, in different studies, a long period of duration of the symptoms before the diagnosis. Patients with chronic exposition presented persistent dermatitis when compared with individuals with shorter duration of symptoms.⁵ The long time of evolution of the dermatosis can be one of the factors to explain the higher frequency of ACD observed among the patients studied. The alteration of the skin protection barrier favours the penetration of sensitizer.

Concerning the location of the disease, the hands were the site where it was more commonly found (70% of cases), finding similar to the findings of other groups of patients suffering from contact dermatitis already described in the medical literature.^{2,4,5,7} Numerous studies report ICD on the hands as the most frequent form of OCD, with high prevalence among workers of the cleaning sector, due to their acute exposure to irritative agents.^{8,10,13}

As for the OCD type, there was a higher frequency of the allergic form, fact that differs from the findings of other studies but that can be explained by the fact that the sample which was analyzed had a large number of patients with long evolution dermatosis. Probably, some patients had, at first, irritative contact dermatitis and its chronicity favoured the sensitization to contactants. Comparing with the group of patients tested in the same period without occupational dermatitis it was observed a greater number of positive tests in those with occupational dermatitis

TABLE 3: Frequency of sensitization of the tested substances

Substance	69 Patients with occupational D.		561 patients with non-occupational D.		P
	Number	%	Number	%	
Potassium Bichromate 0,5%	28	41	24	4	P < 0,00000
Nickel sulfate 5%	16	23	107	19	P = 0,51
Carba-“mix” 3% ¹	16	23	20	3,5	P < 0,00000
Cobalt Chloride 1%	14	20	33	6	P < 0,00005
Tiuram-“mix” 1% ²	13	19	17	3	P < 0,00000
PPD-“mix” 0,4% ³	7	10	19	3	P < 0,016
Epoxy Resin 1%	5	7	2	0,3	P < 0,00005
Formaldehyde 1%	5	7	15	2,5	P = 0,09
Mercaptan-“mix” 2% ⁴	4	6	8	1,5	P < 0,03
Others			224		
Total	108		469		

* Each patient presented more than one positive substance

¹ Diphenylguanidine, Zinc Diethylcarbamate, Zinc Dimethylcarbamate, 1% each

² Tetramethyltiuram Dissulfite, Tetramethyltiuram Monosulfite 0,5% each

³ N-phenyl, N-isopropyl, p-phenylenediamine, N-N- diphenyl p-phenylenediamine, 0,2% each.

⁴ Mercaptobenzothiazole, Dibenzothiazole Dissulfite, Morpholinilmercaptobenzotiazole, N-ciclohexyl-2-benzotiazol sulfonamide, 0,5% each.

Data: Clínica de Dermatologia da Santa Casa de São Paulo, 2003-2006.

contributing to affirm that allergic contact dermatitis is common in carriers of OCD. Some studies show a higher frequency of ACD related to the profession.¹⁴ It is probable that improvements in the equipment for protection and guidance given to workers have contributed to decrease irritation related to occupation.

The main sensitizer found in the group of OCD studied was potassium bichromate, positive in 41% of the patients, followed by nickel sulfate in 23% and carba-mix in 23%. All the components from rubber totalized 58% of positiveness.

The comparative study among patients with and without occupational dermatitis showed that sensitisation to potassium bichromate, cobalt chloride, carba mix, tiuram-mix, mercaptan-mix, PPD-mix and epoxi resin was more common in the cases related to the profession. The sensitisation to nickel sulfate did not present any statistically significant difference between the groups. Sensitisation by nickel sulfate occurs many times in childhood, favouring the development of ACD when exposed to this metal while per-

forming professional activity.^{15,16}

ACD of civil construction workers is one of the most frequent occupational dermatosis found in the different populations studied.^{10,13,17} The most frequent allergens found in civil construction workers are potassium bichromate, present in cement, cobalt chloride, present in metal alloys or as other metal contaminants, and rubber components such as carbamates, mercaptobenzothiazoles, PPD groups and tiuram, used in equipments for individual protection. Data observed confirm data already presented in other published works.^{17,18}

CONCLUSION

OCD was diagnosed in 10,9% of the patients examined in a non specific allergy assistencial service of occupational disease and it was preferably found in the age group economically productive of the population. ACD was identified in 48 out of the 69 cases of OCD. Metals and rubber components were the main sensitizers. □

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