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Prevalence of Various Allergens in Footwear Dermatitis

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Introduction –

Agra city of Taj is also having fame in field of shoe industries. From the pre independence era the shoe industry has come a long way to Make Agra the leading shoe manufacturing city of the country. All types of shoes are manufactured here. Most populations living around the city bear shoes due to easy availability and low cost. Hot and humid atmosphere enhance the chances to develop dermatitis of feet, shoe allergen may be a major factor in developing feet dermatitis. Contact dermatitis is inflammatory response of the skin as a result of the exposure to an exogenous agent. It is divided in to two main types Allergic Contact Dermatitis & Contact Irritant Dermatitis. Allergic contact dermatitis is Type IV delayed hypersensitivity reaction and due to presence of allergens in shoe material. The foot dermatitis leads to substantial morbidity & many other problems. Hence present study is dedicated to reveal out what are the constituent present in shoes which gives rise to dermatitis.

Material & Methods –

Present study was carried out in the Department of Dermatology Venerology & Leperology, S.N. Medical College, Agra between 1ST August 2004 to 31st August 2005.Total 368 patients of foot dermatitis were registered. Out of which 71 patients were selected for present study based on exclusion & inclusion criterion.

Criterion for Selection of Patients:

Inclusion Criterion :

1. Patient with recurrent, sub acute, chronic eczematous condition suggestive of contact dermatitis on feet.
2. Patients willing to undergo patch testing two or three times.
3. Patient should be living in or around Agra.
4. Patients should stop all the medicine preceding 14 days prior to patch test.

Exclusion Criterion :

1. Patients with acute eczematous lesions.
2. Patients in whom the foot dermatitis was suspect due to systematically administered agent.
3. Patients receiving systematic corticosteroids and/or another immunosuppressive drug.

History & Examination -

A detailed history of each patient was recorded in the Performa specially designed for the study including the particulars of patient. A complete clinical examination was done in all patients & the details about the sites of involvement, morphology of the clinical lesion were carefully noted down & their relevance to the complete history was assessed & evaluated for the probable contacts in the individual patients. KOH scrapping done to rule out dermatophytes Infection in suspicious cases.

These patients were later subjected to patch testing as per the protocol established by the ICDRG (International Contact Dermatitis Research Group).

Antigen Used (Footwear Series)

The antigen used for the procedure included the standard screening tray of (marketed by Systopic Pharmaceuticals Ltd, India) footwear series & some crude materials used in manufacturing shoe were Potassium dichromate (0.5% in petrolatum), Nickel Sulphate (5% in petrolatum) , Mercaptobenzothiazole (1% in petrolatum), Formaldehyde (1% in aqueous), Epoxy resin (1% in petrolatum), Di ethyl thiourea (1% in petrolatum), Leather Rubber & Foam.

Results & Discussion –

A total 71 patients with eczematous lesions clinically suggestive of foot dermatitis were included in this study. Out of which 69% were male & 31% were female. 59% of subjects were in between age group of 20 to 39 yr of age.

Table I :Age Sex Distribution of Foot Dermatitis

Age Group (yrs.)	Male n(%)	Female n(%)	Total n(%)
10 - 19	7(14.29)	2(9.09)	9(12.67)
20-29	13(25.63)	5(22.73)	18(25.35)
30-39	15(30.61)	9(40.9)	24(33.8)
40-49	8(16.33)	3(13.63)	11(15.49)
50-59	4(8.16)	3(13.63)	7(9.86)
60-69	2(4.08)	0(0)	2(2.08)
Total	49(69.02)	22(30.98)	71(100)

Table 2 Patch Test Results

Sex of Subject	Male n(%)	Female n(%)	Total n(%)
Patient with Positive Patch Test Result	32(69.6)	14(30.4)	46(100)
Patient with Negative Patch Test Result	17(68)	8(32)	25(100)
P value	0.892		

Out of total 71 subjects 64.79 % subjects were found positive on Patch Test. Out of which 69.4% were male & 30.6% were female. There was no association was found between sex and patch test result.

Table 3:Etiological Profile of Various Allergens Established with Positive Patch Test

S. No.	Allergens	Male N (%)	Female N (%)	Total N(%)
1	Potassium dichromate	15(21.13)	7(9.86)	22(30.09)
2	Nickel Sulphate	11(15.49)	9(12.68)	20(28.17)
3	**Mercaptobenzothiazole** 4(5.63) 1(1.41)			5(7.04)
4	Formaldehyde	2(2.82)	1(1.41)	3(4.23)
5	Epoxy resin	1(1.41)	0(0)	1(1.41)
6	Di ethyl thiourea	3(4.23)	2(2.82)	5(7.05)
7	Leather	19(26.76)	11(15.49)	30(42.25)

8	Rubber	13(18.31)	3(4.23)	16(22.54)
9	Foam	6(8.45)	2(2.82)	8(11.27)

As the Table 3 showing highest sensitization rate from leather (42.25%), Potassium dichromate(30%) , Nickel Sulphate(28.2%), Rubber (22.5%), Foam (11.27%), Di ethyl thiourea (7%), Foam (7%), Formaldehyde (4.23%) & Epoxy resin (1.41%).

Bajaj et al. found that out of one hundred and five patients with foot dermatitis showed a positive reaction in 47 (44.76%) cases . On patch test testing most of them were chrome positive. Other sensitizers were plastic, rubber & rubber chemicals[1].

Saha et al. showed potassium dichromate and colophony were commonest sensitizers present in shoes [2]. Handa et al. found that, rubber, dyes & leather were main offender(3).

Lynch & Rudolph found that Contact dermatitis of foot wear was generally related to rubber compounds, linings, adhesives, dyes, or leather[4].

Eapen & Sndra found that potassium dichromate, nickel sulphate & mercaptobenzthiazole were main offender. Trattner showed that most common allergens were potassium dichromate (27.2%), nickel sulfate (11.9%), Kathon CG (10.9%), and 4-tert-butylphenol formaldehyde resin (8.7%)[6].

Conclusion & Recommendation –

Footwear dermatitis is very common condition caused by leather, plastic & rubbers. They should be appropriately diagnosed by patch testing. Patch testing should be routine test to diagnose lower extremity dermatitis.

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