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RESEARCH ARTICLE

STUDY OF PATCH TEST IN PATIENTS WITH HAND DERMATITIS.

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Abstract

Objective:-Hand dermatitis is a chronic disease with considerable negative impact on quality of life. Numerous studies have investigated the prevalence and risk factors of hand dermatitis. Patch testing for hand dermatitis helps in identifying correct antigen thus helping in management.

Aim:-To perform patch testing and to identify frequently implicated allergens in patients with hand dermatitis**.**

Materials and Methods: This prospective study included 50 consecutive patients (28 women and 22 men) with hand dermatitis from January 2014 to December 2015 who attended department of dermatology. We patch tested with antigens of Indian standard series and suspected personal allergens.

Results:-Thirty four patients (68%) of 50, showed positive patch reaction to one or more allergens with men (44%) and women (56%), the majority (80%) of the patients belonged to the 21 to 50 years age group . The most frequent implicated allergens were nickel (36%), potassium dichromate (28%) cobalt (26%).

Conclusion:-Hand dermatitis is common in females and patch test is helpful in identification of probable allergens.

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Introduction:-

Hand dermatitis is usually multifactorial. About two-third of all cases of contact dermatitis involve the hands [(1)]. Hand dermatitis is a very common and is a frequently encountered problem, affecting individuals of various occupations. It affects occupational as well as private aspects of life, and the severity varies from mild and transient to severe and chronic disease. Being a disease that affects mainly young people, and often interfering with their professional career, the disease is a burden not only to the patient but also to the society. The incidence of hand dermatitis varied from 10.9 to 58% in different studies [(2, 3.4)]. It appears to be the most common occupational skin disease, comprising 9-35% of all occupational diseases and up to 80% or more of all occupational contact dermatitis[(5)]. So, it becomes important to find the exact etiology and to use the appropriate preventive and treatment measures [(6)].

Materials And Methods:-

Fifty consecutive patients having dermatitis confined to hands were included in the study. The patients suspected to be having cumulative insult dermatitis, psoriasis, lichen planus and dermatophytic infection were excluded from the study. Patients with active dermatitis also were excluded from patch testing until the dermatitis was subsided. A detailed history regarding duration, site of onset, progression, relation to occupation, season,

aggravating factors, exact nature of work, hobbies, spare time activities and atopy were recorded. Patch testing was performed in all cases with allergens of the Indian Standard Series as per the recommendations of CODFI (Contact and Occupational Dermatoses Forum of India). All the patients were also tested with various substances with which contact allergy was suspected. Housewives and domestic servants were in addition tested with fresh juices of vegetables and fruits. Medical and paramedical personnel were tested with all antibacterial and antifungal ointments and other substances which were indicated. Patch test was carried out in standard method with the indigenous patch test unit resembling fin chamber. It consisted of 12.0X 5 cm strip of Johnson sticking plaster with two parallel rows of five aluminum discs of 7mm diameter placed at a distance of 2cm from the center of each other. The concentrations of antigens for patch testing were as recommended by the International Contact Dermatitis Research Group (ICDRG) and Fisher. Patch test readings were carried out 48 and 72 hours after application.

Results:-

Age of the patients in the study group ranged from 25 to 62 years with the mean age of 39.78 years. There were 22 males and 28 females with male: female ratio of 1: 1.27. This group comprised of 18 housewives, 10 farmers, 8 factory workers, 5 medical and paramedical personnel, 4 office workers, 3 construction workers and 2 teachers. The majority of patients were in the 31–50 years age group (62%). Among males, the majority (20%) belonged to the 41–50 years age group while among females the majority (38%) belonged to the 21–40 years age group. Most common symptom in both males and females was itching which was present in 21 (42%) males and 20 (40%) females. Other common symptoms were burning sensation which were present in 21 (42%) and 15 (30%) of the patients, respectively. Atopy or asthma was present in18 (36%) patients, which include 10 males and 8 females.Out of 50 patch tested patients 34 (68%), showed positive patch test reading for one or more antigens. Common antigens giving positive reactions were nickel, potassium dichromate and cobalt. Nickel sensitivity was found in 22% females and 14% males, cobalt sensitivity was found in 10% females and 16% males, potassium dichromate in 10% females and 18% males. The sensitivity to various antigens in different occupations is shown in table I.

Table I: Allergens – positivity

ALLERGEN	POSITIVE (%)
Nickel sulfate	52
Potassium Dichromate	48
Cobalt Chloride	40
Black rubber mix	10
Thiuram mix	6
Mercapto benzothiazole (MBT)	6
Paraphenylene diamine (PPD)	12
Neomycin Sulfate	20
Nitrofurazone	30
Fragrance mix	10
Colophonium	6
Formaldehyde	2

The commonest sensitizing medicament was Nitrofurazone (30%) followed by neomycin sulfate (20%). Among rubber chemicals black rubber mix (10%), Mercapto benzothiazole (MBT) and Thiuram mix (6%) each and paraphenylene diamine (PPD) (12%), fragrance mix (10%) and Colophonium (6%). Eighteen housewives were tested for vegetable and fruit sensitivity and 8 were positive. Garlic and onion in 2 (4%) each, green chilli, potato, brinjal and tomato 1(2%) each.

Discussion:-

Hand dermatitis is a common condition seen in the primary care setting and has a multifactorial etiology. The incidence of hand dermatitis was found to be 10.9-58% in various studies [7, 8]. Patch testing is the diagnostic tool for allergic dermatitis. Josef Jadassohn found this technique in 1895[9]. Hand dermatitis is more common in females as compared to males [10]. In our study of 50 patients, 22(44%) were males and 28 (56%) were females. The male: female ratio was 1: 1.27 and females outnumbered males, this could be because of increased exposure of

women to wet work and household chemicals. Age of the patients in the study group ranged from 25 to 62 years with mean age of 39.78 years.
Allergic contact dermatitis of hands can be caused by a variety of substances depending upon person's occupation, hobbies, surroundings and certain occupations are particularly likely to provoke hand eczema like hairdressers, farmers, construction workers, dental and medical personnel, metal workers, food handlers, etc. In our study most of the patients were housewives 18 (36%), then farmers 10(20%), factory workers 8(16%), medical and paramedical 5(10%), construction workers 3(6%) and teachers 2(4%). 34(68%) showed positive patch test reading for one or more antigens. Kishore et al reported high patch test positivity (82%) from India [(11)].

In our study most frequently identified allergens were nickel 36% (female22%, male14%), potassium dichromate 28% (Male18%, female10%) and cobalt chloride 26% (male16%, female10%). Nickel being a frequent offender in females and chromates in males, exposure to nickel can occur with handles of doors, bags and umbrellas, ornaments especially ear-rings, paper pins and clips, scissors, coins, pens, hair pins, brassiere hooks, spectacle frames, zippers, watches, watch chains and bracelets. Nickel can be leached out of stainless steel utensils by action of sweat, soaps and detergents [(12)]. The industrial exposure to nickel occurs in electroplating as mordant in dyeing and printing fabrics, electrical wiring ceramics, duplicating fluids and fluxes, pigment for paint and wall paper, paint for glass, enamels, alkaline batteries, hydrogenation of fats, nickel alloys, insecticides, magnets cores, fuel additives, permanent wave solutions and dyes[(13)]. Agrup[(2)] found 12% (56 of 462) women and none of 250 men with hand eczema sensitive to nickel in Sweden . Nickel sensitivity in England and Europe was found in 21% and 11% women respectively with hand eczema[(14)]. In the present study 22% of women and 14% men were sensitive to nickel. The frequent sensitization in men was due to the fact that most of factory workers were employed in the metal factories. It is essential to test all cases of contact dermatitis of hands with nickel sulfate as sensitivity cannot be clinically suspected[(15)].

Potassium dichromate was positive in 28% of cases. Chromate sensitivity has been documented to be around 6% according to various series from different countries[(16)]. Chromium is used in steel alloys, electroplating, tanning, dyeing, pigments and printing industries, as an anticorrosive, in making chromates. Chromates are also found in bleaching agents, matches, hide glues, detergents, brushless shaving creams, paints and polishes, foundry sand, fabrics and cements. Allergy to cobalt often accompanies chromate sensitivity in men and nickel sensitivity in women. In current study Cobalt sensitivity was seen in 26%. Cobalt is frequently combined with nickel as a contaminant and the two metals always occur together. Cobalt is a contaminant in cement. It may also occur in producers of pottery, ceramics, metal alloys, glass, carbide and pigments.

Vegetables are known to cause contact dermatitis of hands in housewives and cooks. It occurs as scaling and fissuring of palmer surface of index , middle fingers and thumb. The most common sensitizers are Allium sativum, Allium cepa, Lycopersicon esculentum, Daucus carota, Hibiscus esculentus and Zinziber officinale [(17)]. The sensitizing substances in garlic have been identified by human and guinea pig studies as diallyl disulphide, allylpropyl disulphide and allicin[(18)]. Vegetable sensitivity was found in 16% housewives tested in this study. Bajaj[(19)], Pasricha and Kanwar[(20)] reported vegetable sensitivity in 75.8 and 62.7% of housewives eczema respectively. Allium sativum and allium cepa being the most frequent sensitizers. The natural rubber is not a sensitizer but additives like accelerators, antioxidants added during processing are common sensitizers. Thiuram mix, mercaptobenzothiazoles (MBT) and paraphenylene diamine, dihydroxyphenol, monobenzyl ether of hydroquinone, quinoline are common sensitizers. Exposure to rubber at home occurs with rubber gloves, underclothes, shoes, finger stalls, socks, stockings, rollers, apron, pillows, contraceptives, bathing caps, hearing aid, hot water bottle, flexes and electrical plugs, water hose pipes ,balloons, toys and squash balls. These patients react with Thiuram and MBT. Men are sensitized by exposure to rubber in tyres and transport industries, dairy farming, face masks, conveyor belts, agriculture equipment and occasionally by domestic exposure. Hence rubber chemicals form part of standard trays for patch testing recommended by international contact Dermatitis Research Groups. Similar to current study Tiwari et al [(21)] reported contact dermatitis to rubber foot-wear in 7.2% of 470 soldiers tested. However, rubber sensitivity was found in 6.8-10%patients and occurs with equal frequency in both sexes.

Sensitivity to antibacterial agents has been reported by several workers[(22)] Bajaj and Gupta[(23)] reported sensitivity to Nitrofurazone (36.2%), Neomycin sulphate (35.9%), Oxytetracycline (22.1%), Cetrimide (18.6%) and Framycetin (16.7%) in patients suspected to be having allergic contact dermatitis to local

antibacterials. However, in patients with contact dermatitis of hands, Oxytetracycline, Neomycin and Sulfadiazine were most frequent sensitizers. Sensitivity to medicaments was found in medical personnel, office workers, factory workers, housewives and domestic workers in the present study. Nitrofurazone and neomycin were most frequent sensitizers in both medical and non-medical personnel.

Conclusion:-

Hand dermatitis is a continuing challenge for the dermatologist. It is more common among female patients. Patch test is a useful tool in identification of probable allergens in hand dermatitis and thus plays an important role in prevention by avoiding particular allergens.

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