

Rubber Allergy at the Dermatology Clinic, Hospital Kuala Lumpur

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Summary

Out of 346 patients with contact dermatitis documented at the Dermatology Clinic Hospital Kuala Lumpur, 66 patients had contact rubber allergy. Majority had Type IV allergy (n=62). Five patients had both Type I and IV rubber allergy. One patient had only Type I rubber allergy. Females were more frequently affected (male:female ratio of 1:2.5). Contact dermatitis with rubber gloves was high in domestic, nursing, industrial and cleaning services. White collar personnel, students, labourers and gardeners had contact feet dermatitis to rubber footwear. Rare presentations include periorbital dermatitis, cheilitis and contact urticaria. The commonest identifiable rubber allergen was thiuram mix. Improvement of the dermatitis occurred in 51% of patients. In 29% of patients the dermatitis was recurrent. The patch test is a useful tool in determining contact dermatitis in the hands, feet, lips and periorbital areas. The simple and inexpensive non invasive "use" test is a quick and safe method in determining Type I allergy to latex protein.

Key Words: Contact rubber allergy, Rubber allergy

Introduction

Rubber products can be found everywhere and almost everyone is in contact with it everyday. Rubber allergy was unheard of till 1933 when chronic hand and feet dermatitis were noted to be caused by contact to rubber chemicals. Positive patch test to the rubber chemical in these patients imply Type IV allergy or delayed immunological reaction. In this situation the allergen is the chemical used in the rubber products and not to the latex protein itself. Since 1979 various clinical presentations of latex allergy were noted in sensitized individuals who were in contact with rubber gloves, balloons or condoms^{2,7}. The allergy were in the form of either urticaria or even angioedema at the site of contact. This may be associated with nasorhinitis, conjunctivitis or even bronchial asthma because of the aerosolised latex protein bound to surgical glove powder. A rare form of rubber allergy is anaphylaxis which is alarming if it occurs intraoperatively when it may not be suspected³. Since 1979 there has been 15 anaphylactic deaths associated with the use of rubber

catheters in barium enema and bladder catheterization^{4,5}. Urticaria, angioedema and anaphylaxis are caused by Type I allergy and this can be confirmed by a positive prick test to latex protein or "use" test⁶. How does this increase in exposure to rubber products in Malaysia affect us? We studied the pattern of rubber allergy in our vicinity by looking at the demography of patients with contact dermatitis documented in Dermatology Clinic, Hospital Kuala Lumpur between 1994 to 1996.

Methods and Materials

A retrospective analysis of all patients referred to Contact Allergy Clinic, Department of Dermatology, Hospital Kuala Lumpur with a diagnosis of contact allergy or contact urticaria secondary to rubber allergy during the period of September 1994 to 1996 was performed. Patient's age, sex, race, occupation, clinical presentation, identification of rubber chemical allergen from patch test and outcome of dermatitis after counselling were determined. Type IV and I allergy

to rubber was confirmed by positive patch test to rubber chemical and positive 'use' test (occurrence of contact urticaria to rubber finger cot within 20 minutes) respectively. The other invasive and expensive methods to detect Type I allergy to latex protein such as Prick test, Scratch test, Intradermal test, Enzyme Linked Immunosorbent Assay(ELISA), Natural rubber latex-specific radioallergosorbent test(RAST) and serum test for latex-specific Immunoglobulin E were not performed in this study.

Results

Within the two year period, there were a total of 346 patients with positive patch test in which 66 patients had rubber allergy. The prevalence of rubber allergy is about 1: 5 of positive patch test. Sixty-two had only Type IV allergy, five had both Type IV and I allergy and one had only Type I allergy. There were more females (49) compared to the males (17) with rubber allergy. Majority (37) were within 31 to 50 years of age. The youngest and oldest patients were 7 and 65 years respectively. There were six children below 14 years of age in which five had feet dermatitis. There was no common rubber allergen detected in these children. Rubber allergy was commonly found in patients who were constantly exposed to rubber products such as medical staff (12), domestic workers (10), students (9), factory workers (6) and cleaners (5). Rubber glove was the main source for the allergy in medical staff, housewives, factory workers and cleaners. The main source of rubber allergy in students was shoes. The presenting signs of rubber allergy in descending order were combination of hand and feet dermatitis followed by dermatitis in the hands, feet, periorbital areas and lips consecutively. Only four types of rubber chemicals were found in the European Standard (ES) series. The rest of the allergens were only found in the rubber series (RS). The common rubber allergens in descending order of frequency were thiuram mix (19), mercapto mix (8), PPD black rubber mix (7), 4,4 dihydroxybiphenyl (7), cyclohexylthiopentalimide (7), mercaptobenzothiazole (6), 1,3 phenylguanidine (5), monobenzole (4), 3 hexamethylaminotetramine (4), dibenzothiazyle disulphide (3), ethylenethiourea (2) and phenyl-naphthalamine (2). Improvements of the dermatitis after patch test counselling were noted in

34 patients. 19 patients still had recurrent dermatitis despite compliance to our advice. 13 defaulted follow up and were not contactable. Even in the patients with Type 1 rubber allergy (6), dermatitis improved after patch test counselling in four patients. Some patients who had dermatitis less than a year (7), less than 10 years (25) and more than 10 years (7) and even up to 41 years had improvement of their dermatitis after patch test counselling. Those who had multiple rubber chemical allergies, dermatitis improved in 8 patients and 4 had recurrent dermatitis. Conversely in patients who had multiple chemical allergies, improvement was seen in 8 patients and 12 had recurrent dermatitis. The sites in which recurrent dermatitis occurred were combination of hand and feet (9), hands only (4) and feet only (1). In those who improved, the common sites were a combination of hand and feet (14), feet only (7) and hand only (6). In patient who had combination of hand and feet dermatitis, 4 out of 14 patients found the hand had improved but the feet dermatitis persisted. The common allergen associated in improvement in the dermatitis were thiuram (11) and mercapto mix (5). Recurrent dermatitis was commonly associated with these allergen thiuram (5) and paraphenylenediamine black rubber mix (3). Only one patient with mercapto mix had recurrent dermatitis. Patient with atopy, 15 improved but 6 had recurrent dermatitis.

Discussion

Rubber allergen was noted to be the second commonest allergen after nickel detected by patch testing. Prevalence of rubber allergy was higher in this study compared to the Spanish findings observed by Conde-Salazar *et al* in 1993⁸. The latter noted out of 4680 tested 686 (14.7%) had one or more positive patch test to rubber chemicals.

There can be contact with rubber products as early as at birth. The source of rubber is the rubber mat, sponge and mattress. Toddlers come in to contact with rubber toys, balloons and footwear. Despite being in contact with rubber products since a very early age, dermatitis only occurs after the child attends primary school. Six children with rubber allergy were studied. Their ages varied from 7 to 13. Five had feet dermatitis. The incriminating rubber allergen was not

the same in these children. The feet as predicted was the site of dermatitis because of the constant exposure to rubber shoes. This is consistent with the study done by Levy *et al* where shoe sensitivity is common in children⁹. In their study rubber dermatitis was the most common contact allergen in children. Out of 653 children tested with the standard battery, 98 children had positive reactions of which 41 children were sensitive to thiuram or mercaptobenzothiazole.

North American Contact Dermatitis Group found statistically significant differences in rubber allergy between men and women¹⁰. Dermatitis of the hands and feet were commoner in men than women although face and neck dermatitis were more frequent in women. In this study contrasting findings were noted. The number of women with rubber allergy is more than twice that of males. Hand dermatitis from rubber glove allergy was commoner in female nurses, domestic workers and cleaners. Allergy to rubber gloves was suspected when pruritus occurred after using the gloves. Most people continued using them despite the pruritus and only stopped after developing severe hand dermatitis. By then the hands were too painful for the patient to work efficiently. These patients continued to work because they were afraid of losing their jobs.

White collar workers develop contact allergy to rubber footwear and sponge used at home. Besides hand and feet dermatitis, the other sites affected are the, waistline and groin that correspond to the elastic lining of the undergarments. Some develop pruritic erythematous rash on the back after lying on the rubber mat. In periorbital and lip(chelitis) dermatitis the source of rubber allergen could have come from eyeshadow sponge applicators or balloon and rubber erasers that has been bitten.

There are numerous rubber chemicals in the market. Inclusion of rubber series in patch testing had increased the pick up rate of rubber allergy. The European series have only four common rubber allergens namely thiuram mix, mercapto mix, mercaptobenzothiazole and N-Isopropyl-N Phenyl Paraphenylenediamine (PPD black rubber mix) routinely. Some of the patients were sensitive to the less common rubber allergens. The top five incriminating rubber allergens in this series were

thiuram mix (ES), mercapto mix (ES), PPD black rubber mix (ES), 4,4 dihydroxybiphenyl (RS) and cyclohexylthiopenthamide (RS). The top five allergens noted in the 10 year Spanish study in 1993 were thiuram mix, carba mix, black rubber mix, mercapto mix and naphthyl mix⁸.

Patients with contact rubber dermatitis are encouraged to keep the skin dry because sweating enhances absorption of the leached rubber chemical into the skin. Topical steroids on its own may not clear the dermatitis if the patient is constantly in contact with the rubber products. Therefore it is essential that the patient either avoids the product or uses non rubber products such as non-rubber gloves or garments. Patients with contact urticaria should try to completely avoid latex products especially if they have a history of anaphylaxis previously, angioedema or severe contact urticaria. They should always carry an allergy card or tag for early recognition should an emergency occurs. The patient's family should be alerted and be prepared to attend to immediate resuscitation.

Being aware of the existence of rubber allergy can be beneficial because appropriate substitutions have cured some, improved symptoms as well as reduce morbidity in the majority of patients¹¹. In this study, 48% of the 66 patients were either cured from the eczema or have their symptoms relieved partially. Diagnosis and intervention at a late stage may have little effect on the course of dermatitis¹² as shown in our patient who had dermatitis for as long as 40 years. Even with Type I rubber allergy improvement in dermatitis may occur as in four out of the six patients. Patients with contact allergy to multiple rubber chemicals, the dermatitis improved in 7 but was recurrent in 4 patients. In those who had contact allergy to multiple different chemical allergen, the dermatitis tends to be recurrent (10 out of 17 patients). Allergy to mercapto mix (5 out of 6 patients) and thiuram (11 out of 16 patients) were associated with a better outcome. Turjanmaa noted those hospital personnel who are atopic and have hand dermatitis are at an elevated risk for development of contact urticaria to rubber¹³. This was also observed in our study in which all the six patients with Type I allergy had hand dermatitis. Three of them had atopy.

Allergic contact dermatitis to rubber chemical may

have a good prognosis if accurately diagnosed and appropriate substitutions are made by the patient¹¹. Patch test to rubber series in addition to the standard series should be done in patient with suspected rubber allergy. 'Use' test to rubber finger cot is easily

performed to exclude concomitant immediate type latex protein allergy. Counseling should be emphasized because deliberate exposure of the skin to an irritant or allergen known to the patient is a potential cause of persistence of dermatitis.

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