

Comparison of Allergic Contact Dermatitis Cases in the Private and Subsidised Clinics in the National Skin Centre, Singapore

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Abstract

Introduction: This is an epidemiologic study to compare allergic contact dermatitis patients in the private and subsidised clinics. **Patients and Methods:** All patients diagnosed to have allergic contact dermatitis in the National Skin Centre from January 1999 to June 1999 were studied retrospectively. **Results:** More private patients were evaluated for allergic contact dermatitis than subsidised patients in the study period (138 vs. 99). The female-to-male ratio in the paying clinics was greater than in the subsidised clinics (3:1 vs. 1:1). The mean age was the same for both groups i.e., 40 years. There was a greater proportion of unskilled workers attending the subsidised clinic (24.2% vs. 5.4%). The mean duration of rash before evaluation was longer for paying patients than for subsidised patients (31 vs. 22 months), but this was not statistically significant. A significant proportion of the patients had a history of atopic disease and endogenous dermatitis. The most frequent sites for allergic contact dermatitis were the face, hands and the exposed areas of the limbs. The most common allergens were nickel, cobalt and fragrance in the paying patients; and nickel, chromate and fragrance in the subsidised patients. **Conclusion:** More female patients with allergic contact dermatitis and more atopic patients were seen in the private clinics. The forearms, fingers, feet and ears were more commonly affected in the subsidised patients.

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Key words: Allergy, Epidemiologic, Fragrance, Nickel, Retrospective

Introduction

Allergic contact dermatitis is a common clinical problem seen in our dermatology outpatient clinics, comprising 0.5% of patients seen in 1999. In addition to our contact dermatitis clinic and occupational dermatosis clinic which caters to subsidised patients, many patients have also been worked up and patch tested in the private clinics.

Patients who are seen in the subsidised clinics are those referred from government doctors and are not given the privilege of choosing a specific dermatologist. They are not necessarily lower-income earners although many of the subsidised patients are retirees, national servicemen, foreign labourers or come from lower-income families.

Patients who are being worked up for allergic contact dermatitis in the subsidised clinics are evaluated in the specialised contact dermatitis or occupational dermatosis clinics where they are seen by dermatologists subspecialising in contact dermatitis and occupational skin diseases. Patients in the private clinics are seen only by their own dermatologists who may or may not have subspecialised in contact dermatitis and occupational skin

diseases. These patients generally belong to the higher educated and higher income group.

This is an epidemiologic study to compare the allergic contact dermatitis patients in the private and subsidised clinics. We compared the demographic and clinical data as well as the patch test results of the two groups of patients. The objective was to see if there was any epidemiologic difference between private and subsidised patients.

Patients and Methods

We have retrospectively studied all cases diagnosed to have allergic contact dermatitis in the National Skin Centre from January 1999 to June 1999. The biodata of all patients were recorded. The patients were patch tested to our standard series and additional allergens where relevant. Patch testing was done in a standard manner and reactions were recorded according to the International Contact Dermatitis Research Group scoring system.¹ The allergens were applied on aluminium Finn chambers and secured with Scanpor tape. The patches were removed after 48 hours of occlusion and the results read at 72 to 96 hours.

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Confirmation of allergic contact dermatitis was based on a relevant positive patch test. For contact urticaria, the diagnosis was based on a relevant positive prick test result. Contact urticaria cases were considered under allergic contact dermatitis. Patients who had irritant as well as allergic contact dermatitis were also classified under allergic contact dermatitis.

The normality of quantitative variables was checked using the Kolmogorov-Smirnov test. When the normality assumption was satisfied, a two-sample *t*-test was used; otherwise, the Mann-Whitney U test was carried out to determine any differences between the private and subsidised groups. Multiple regression was applied to adjust for relevant co-variables. The chi-square test was used to determine associations between the paying status of the subjects and their characteristics, with odds ratios presented where necessary. Adjustments for co-variables for these qualitative variables were performed using logistic regression. A *P* value less than 0.05 was considered significant.

Results

During the 6-month study period, there were 237 patients diagnosed to have allergic contact dermatitis. One hundred and thirty-eight were seen in the private clinics while 99 were seen in the subsidised clinics. The demographic data are shown in Table I. Twenty-nine per cent of the patients had a history of asthma, atopic dermatitis and/or allergic rhinitis. After completion of evaluation, 39% of the patients were assessed to have an element of endogenous dermatitis in addition to allergic contact dermatitis.

TABLE I: DEMOGRAPHICS OF PRIVATE AND SUBSIDISED PATIENTS (JANUARY TO JUNE 1999)

		Private	Subsidised
Number		138	99
Sex*	Male	36 (26%)	51 (52%)
	Female	102 (74%)	48 (48%)
Mean age (y)		40 (range 7-72)	40 (range 15-84)
Mean duration (mo)		31 (range 1-360)	22 (range 1-180)
Atopy*		45 (33%)	23 (23%)
Race	Chinese	119 (86%)	76 (77%)
	Indian	10 (7%)	14 (14%)
	Malay	5 (4%)	5 (5%)
	Caucasian	3 (2%)	0
	Eurasian	1 (1%)	0
	Bangladeshi	0	4 (4%)
Endogenous element		50 (36%)	43 (43%)

* statistically significant using chi-square test

There were more professionals, office workers and skilled workers among the paying patients (55.6% vs. 40%). Among the subsidised patients, there were more unskilled workers (24.2% vs. 5.4%). The proportions of retirees, national servicemen, students and housewives were similar in both groups.

Using logistic regression on status, patients in technical occupations (e.g., construction, metalwork, factory, technician) were more likely to be subsidised patients [*P* < 0.001; odds ratio (OR), 4.20; 95% CI, 1.85-9.52]. This has been adjusted for sex, age, atopy, presence of endogenous element and affected body parts. Working patients not in technical or food-related occupations were more likely to be paying patients (*P* < 0.001; OR, 2.91; 95% CI, 1.67-5.08).

The most commonly affected body parts were the face, hands, forearms, legs and fingers. The differences in distribution of the rashes are shown in Table II. The two groups had similar distribution of rashes except that the subsidised patients had rashes more often on the arms and legs than on the hands.

Using the chi-square test, men were more likely to have involvement of the fingers (*P* = 0.015; OR, 2.56, 95% CI, 1.18-5.56), forearms (*P* < 0.01; OR, 3.77; 95% CI, 1.89-7.52), thighs (*P* = 0.001; OR, 4.0; 95% CI, 1.63-9.8), legs (*P* = 0.044; OR, 2.05; 95% CI, 1.01-4.17) and abdomen (*P* = 0.003; OR, 3.7; 95% CI, 1.49-9.09). Women were more likely to have involvement of the face (*P* = 0.003; OR, 2.69; 95% CI, 1.38-5.22) and periorbital skin (*P* = 0.008; OR, 1.08; 95% CI, 1.03-1.13). All patients with periorbital involvement were women.

The most common allergens are shown in Table III. Among the private patients, the most common allergens were nickel sulphate, cobalt chloride, fragrance mix, potassium dichromate and gold sodium thiosulfate. Among the subsidised patients, the most common allergens were

TABLE II: DISTRIBUTION OF RASHES IN PRIVATE AND SUBSIDISED PATIENTS

Body part	Total	Private	Subsidised
Face	65	38 (28%)	27 (27%)
Hands	46	27 (20%)	19 (19%)
Forearms*	43	18 (13%)	25 (25%)
Legs	37	17 (12%)	20 (20%)
Fingers*	30	12 (9%)	18 (18%)
Arms	26	13 (9%)	13 (13%)
Thighs	24	10 (7%)	14 (14%)
Abdomen	23	9 (7%)	14 (14%)
Neck	21	11 (8%)	10 (10%)
Feet*	20	8 (6%)	12 (12%)
Palms	20	8 (6%)	12 (12%)

* statistically significant using chi-square test

TABLE III: COMMON ALLERGENS

Allergen	Total	Private	Subsidised
Nickel sulphate	100	67 (48.6%)	33 (33.3%)
Potassium dichromate	39	15 (10.9%)	24 (24.2%)
Fragrance mix	38	19 (13.8%)	19 (19.2%)
Cobalt chloride	35	25 (18.1%)	10 (10.1%)
Gold sodium thiosulfate	23	14 (10.1%)	9 (9.1%)
Dermatophagoides mix*	21	3 (2.2%)	18 (18.2%)
Colophony	18	11 (8.0%)	7 (7.1%)
Balsam of Peru	17	11 (8.0%)	6 (6.1%)
Neomycin	15	13 (9.4%)	2 (2.0%)
Paraphenylenediamine	15	10 (7.2%)	5 (5.1%)

* statistically significant using chi-square test

nickel sulphate, potassium dichromate, fragrance mix, dermatophagoides mix and cobalt chloride.

Using the chi-square test, women were more likely to have positive patch test results to neomycin ($P = 0.001$; RR, 1.11; 95% CI, 1.05-1.17), nickel ($P = 0.001$; OR, 2.7; 95% CI, 1.53-4.76) and gold ($P = 0.013$; OR, 4.31; 95% CI, 1.24-14.95). All patients with positive patch tests to neomycin were women. Men were more likely to be patch tested positive to chromate ($P < 0.001$; OR, 6.99; 95% CI, 3.2-15.38) and dermatophagoides ($P = 0.042$; OR, 2.51; 95% CI, 1.01-6.21). Of the 29 men patch tested positive to chromate, 18 were working in the construction industry while 3 were in the metalworking industry.

There was also a significant number of patients with positive patch tests to medicaments (including traditional medicaments) and cosmetics (and toiletries). Ten private (7.2%) and 12 subsidised (12.1%) patients patch tested positive to cosmetics while 13 private (9.4%) and 11 subsidised (11.1%) patients patch tested positive to medicaments.

There were 5 contact urticaria cases among the subsidised patients. Skin prick tests were positive to rubber gloves (2), prawns (2) and methyl methacrylate (1). Only 1 private patient was diagnosed to have contact urticaria. Skin prick test was positive to prawn, cuttlefish and cockles in this patient.

Discussion

Among the private patients, there were significantly more women evaluated for allergic contact dermatitis during the study period, with a female-to-male ratio of approximately 3:1. This is in contrast to the subsidised clinic, where the female-to-male ratio was approximately 1:1. Women were more likely to be private patients as compared to men ($P < 0.001$; OR, 3.01; 95% CI, 1.74-5.21). This may be that more women than men sought treatment for dermatological problems from general practitioners and hence, more of them were seen in our centre as private

patients. The mean age of patients was the same for both groups i.e., 40 years. There were no significant differences in racial composition between the 2 groups.

The mean duration of rash was longer for the private patients (31 vs. 22 months). This difference may be because the private patients may have been undergoing treatment by their general practitioners for some time and referred only when the rash was not responding to treatment, whereas those seeing government doctors in the polyclinics were referred to a tertiary centre more readily. However, this difference was not statistically significant ($P = 0.501$).

More private patients reported a history of atopic disease than subsidised patients (33% vs. 23%, $P = 0.046$; OR, 2.39; 95% CI, 1.02-5.63). However, after detailed evaluation of the history, clinical findings and patch test results, more subsidised patients were assessed to have an element of endogenous dermatitis than private patients (43% vs. 36%) (not statistically significant, $P = 0.263$). This is unexplained.

The most common allergens were nickel, chromate and fragrance. In 3 previous studies on the epidemiology of allergic contact dermatitis in Singapore,²⁻⁴ the 2 most common allergens have consistently been nickel and fragrance. The third commonest has changed over time: chromate (1984-1985), neomycin (1986-1990), thimerosal (1992-1996).

As expected, the most frequent sites for allergic contact dermatitis in both private and subsidised patients were the face, hands and the exposed areas of the limbs. Using logistic regression on status, the forearms ($P = 0.019$; OR, 3.59; 95% CI, 1.24-10.40), fingers ($P = 0.0062$; OR, 4.79; 95% CI, 1.56-14.71), feet ($P = 0.025$; OR, 4.35; 95% CI, 1.21-15.67) and ears ($P = 0.024$; OR, 6.98; 95% CI, 1.30-37.59) were more often affected in subsidised patients than in private patients. This has been adjusted for sex, age, atopy and presence of endogenous element.

The most common positive patch test results among patients with face dermatitis were nickel (31/65), fragrance (11/65) and cobalt (10/65). In a study of eczema of the face, neck and scalp in 1989,⁵ the most common allergens were nickel (112/538) and paraphenylenediamine (52/538). Among the private patients, the most common positive patch test results were to nickel, cobalt and paraphenylenediamine; whereas in subsidised patients, the commonest positive patch test results were to nickel, dermatophagoides and chromate.

In patients with facial eczema with positive patch tests to nickel, these results were usually attributed to jewellery and spectacle frames. Most of those with positive patch tests to cobalt were also positive to nickel. The positive patch tests to paraphenylenediamine were mostly attributed to hair dye. Of those patch tested positive to dermato-

phagoides and chromate, most were also positive to other more relevant allergens.

In our study, the most common causes of allergic contact dermatitis of the hands were nickel (12/46), chromate (12/46) and fragrance (8/46). In a previous study comparing hand eczema and non-hand eczema in 1988,⁶ the most common causes of hand eczema were nickel sulphate (8%), cobalt chloride (3%), potassium dichromate (3%) and fragrance mix (4%). For hand dermatitis, the most common positive patch test results in private patients were to nickel, colophony and chromates; while subsidised patients were most commonly patch tested positive to chromates, nickel and fragrance.

In patients with hand eczema with positive patch tests to nickel, these results were usually of past relevance and were most commonly attributed to costume jewellery. In those with positive patch tests to chromate, most were related to occupational exposure to cement, while 2 were related to leather attire. Most of those with positive patch tests to fragrance were of present relevance from cosmetics and toiletries and these patients were also positive to multiple allergens in the fragrance series. Of those patch tested positive to colophony, most were also positive to other more relevant allergens with only 1 attributed to plaster.

Of 35 patients with positive patch test reaction to cobalt, 27 were also patch tested positive to nickel, chromate or both. This is most likely due to co-sensitisation between cobalt and nickel or chromate.⁷

During the study period, dermatophagoides (house dust mite) was being evaluated as a diagnostic method for mite-induced eczematous dermatitis and hence, was included temporarily in our standard series. Among the patients in our study, 21 had positive patch tests to dermatophagoides. 13.7% of patients with a history of atopy had a positive dermatophagoides patch test compared to 7.5% of those without a history of atopy.

In a previous study of contact sensitivity to topical medicaments in Singapore in 1989,⁸ the most common medicaments causing allergic contact dermatitis were neomycin (7.8%), proflavine (7.1%) and clioquinol (4.3%). This has not changed—the topical medicaments causing

the most frequent positive patch test results in our study were neomycin (15), flavine (8) and quinoline mix (7).

Conclusion

More private patients were evaluated for allergic contact dermatitis than subsidised patients in the study period (138 vs. 99). The female-to-male ratio in the paying clinics was greater than in the subsidised clinics (3:1 vs. 1:1). The mean age was the same for both groups i.e. 40 years. The mean duration of rash before evaluation was longer for paying patients than for subsidised patients (31 vs. 22 months), but this was not statistically significant.

A significant proportion of the patients had a history of atopic disease and endogenous dermatitis. The most frequent sites for allergic contact dermatitis were the face, hands and the exposed areas of the limbs. The most common allergens were nickel, cobalt and fragrance in the paying patients; and nickel, chromate and fragrance in the subsidised patients.

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