

PATCH TESTING IN HOSPITAL EMPLOYEES : A PILOT STUDY

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ABSTRACT

Introduction- Contact dermatitis is particularly prevalent in hospital employees doing wet work, such as surgeons, nurses, laboratory, staff, cleaners and kitchen staff. Two types of allergy are recognized: type I or immediate hypersensitivity, leading to anaphylaxis, and type IV hypersensitivity, leading to contact dermatitis.

Aim & Objectives- a) — To assess the relationship between of history positive and patch test positive. b) To evaluate the relationship between duration of occupation and patch test positivity.

Material & Method - 54 employees were enrolled from AVBRH during period of August 2011 to August 2012 after considering inclusion and exclusion criteria. It is an Interventional study. We used Indian battery for patch testing – Systopic Laboratories Pvt. Ltd with 20 standardized test substances comprising of the most common allergens or allergen mixes selected in accordance with the recommendations of International Contact Dermatitis Research Group (ICDRG) was used for patch test.

Results- Patch test was positive in 24.07% subjects. Patch test and history positive in 53.84% patients out of 13. Negative history but patch test was positive in 46.15%. Positive history but patch test was negative in 30.76%. There is no relationship between duration of occupation and positivity of patch test ($p=0.4590$ (NS, $p<0.05$), sensitivity=21.95%, specificity=66.67%, PPV = 69.23%, NPV=20% & Accuracy= 31.48%; Fisher's Exact test was used for statistical analysis. There was significant relationship between history positive and positive patch test $p=0.002$ (S, $p<0.05$), Sensitivity = 63.64%, specificity= 86.05%, PPV=53.85%, NPV= 90.24% & Accuracy= 81.48% Fisher's Exact test used for analysis.

Conclusion: There is no relationship between duration of occupation and positivity of patch test. If patient is sensitive to any antigen irrespective to duration of exposure, patch test is positive.

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INTRODUCTION

The skin is our primary interface with the external environment and, in general performs quite efficiently as a barrier against noxious chemicals or living organisms. The range of human activities is extremely diversified, and numerous occupations can lead to breakdown of the epidermal barrier, with subsequent development of work-related dermatoses.¹ Among skin diseases contact dermatitis forms the largest proportion and commonly reported occupational disorders in most developed and developing countries.

Occupational dermatoses are defined as skin diseases for which work-related exposure is a major, direct contributory factor. These account for 20-80% of all occupational diseases in various countries and can lead to loss of productivity, lost workdays and significant disability.

Hand dermatitis and especially contact dermatitis are the main problems in occupational dermatology. Contact dermatitis is an inflammation of the skin that results from direct contact with various allergens. The resulting red, itchy rash isn't contagious or life-threatening, but it can be very uncomfortable. The incidence of contact dermatitis in nurses varies from 7% to 46%.²

Frequent hand washing and drying, especially with paper towels, is common cause of Irritant contact dermatitis.² Health care workers are at great risk of skin damage due to contact with detergents, disinfectants etc. Contact dermatitis is particularly prevalent in hospital employees doing wet work, such as surgeons, nurses, laboratory, staff, cleaners and kitchen staff.⁴

Two types of allergy are recognized: type I or immediate hypersensitivity, leading to anaphylaxis, and type IV hypersensitivity, leading to contact dermatitis.

Adarsh/Patch testing in Hospital Employees : A Pilot study

As less studies done on health care workers in past in this region we decided to this study.

AIMS AND OBJECTIVES

- To assess the relationship between of history positive and patch test positive.
- To evaluate the relationship between duration of occupation and patch test positivity.

MATERIALS AND METHODS

The present study was carried out in Department of Dermatology, Venereology and Leprosy, in Acharya Vinobha Bhave Rural Hospital, Sawangi, Wardha. The ethical clearance was taken from Institutional Ethics Committee for present work.

Sample size:

54 employees were enrolled from AVBRH during period of August 2011 to August 2012 after considering inclusion and exclusion criteria. A written consent was taken.

Type of study:

It is an Interventional study.

The subjects were classified in different categories (nurses, laboratory workers, technicians, ward boys) and randomly selected.

We used Indian battery for patch testing – Systopic Laboratories Pvt. Ltd with 20 standardized test substances comprising of the most common allergens or allergen mixes selected in accordance with the recommendations of International Contact Dermatitis Research Group (ICDRG) was used for patch test.

The materials to be patch tested are placed on 8 mm Finn chambers on Scanpore tape, and then fixed on the upper back, taking care to make a note of the location of the tested allergens. The patches are left on for two days. They are then removed, marked, and read with another reading at four days: these are the optimal timings. ⁶

The results were read according to ICDRG Scale (as follows):

Reading the test results:

?	Doubtful reaction; faint macular erythema only
+	Weak(nonvesicular) positive reaction; erythema, infiltration, possibly papules
++	Strong(vesicular) positive reaction; erythema, infiltration, possibly papules
+++	Extreme positive reaction; bullous reaction
-	Negative reaction
IR	Irritant reaction of different types
NT	Not tested

The possible side effects are explained: irritation on the back from the presence of the patches, the production of an excessive reaction, the worsening of the dermatitis in a number of cases, and the potential that they may rarely be actually sensitised by the process of testing. In view of the latter, it is important that only relevant substances are tested. This will be decided by taking a history. All patients are given written information about what to expect from the procedure and given a contact number to telephone if anything untoward happens. ⁶

The main reason for refusal was that nurses were having a shower daily after a hard day working and they had to postpone having a bath for three days if they had a patch test on their back. ⁵

Inclusion criteria:

1. All employees of AVBRH hospital.
2. Patient told not be take any medication (steroids, antihistamines etc) that would affect the result of patch test 2 weeks prior to patch testing.

Exclusion:

1. Patients not working in AVBRH.
2. Patient having any acute dermatitis at time of patch test.
3. Patient already on medication that will affect the result of patch test.

INSTRUCTIONS TO THE PATIENT:

1. The patients were advised to leave the patch tests in place for 48 hours.
2. He / She was asked not to take bath or wash or wet the back during this period.
3. To avoid tight underclothes.
4. To avoid exercise or any other activity causing sweating.
5. To avoid friction or rubbing and lying on the back- test patches could become loose.
6. The patient was advised to report immediately if there is severe itching or irritation.
7. To avoid exposure to sunlight / UV light.
8. To come after 48 hours and 72/96 hours for patch test reading.

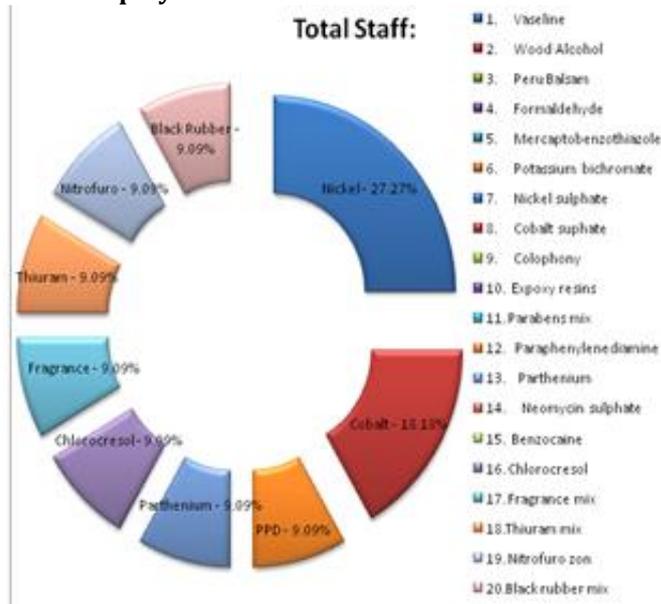
Allergens Kit:

We used Antigens from Indian Standard Battery – Systopic Laboratories Pvt. Ltd.

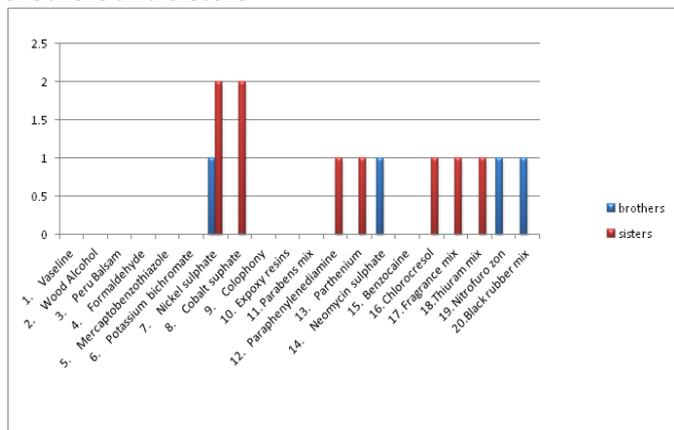
1. Vaseline
2. Wood Alcohol
3. Peru Balsam
4. Formaldehyde
5. Mercaptobenzothiazole
6. Potassium bichromate
7. Nickel sulphate
8. Cobalt sulphate
9. Colophony
10. Epoxy resins
11. Parabens mix
12. Paraphenylenediamine
13. Parthenium
14. Neomycin sulphate
15. Benzocaine
16. Chlorocresol
17. Fragrance mix
18. Thiuram mix
19. Nitrofurazon
20. Black rubber mix

Observation and Results

Graph 1 shows various antigens involved in occupational dermatosis, and number of positive patch test in employees.



Graph 2: Comparison of patch test sensitivity to brothers and sisters

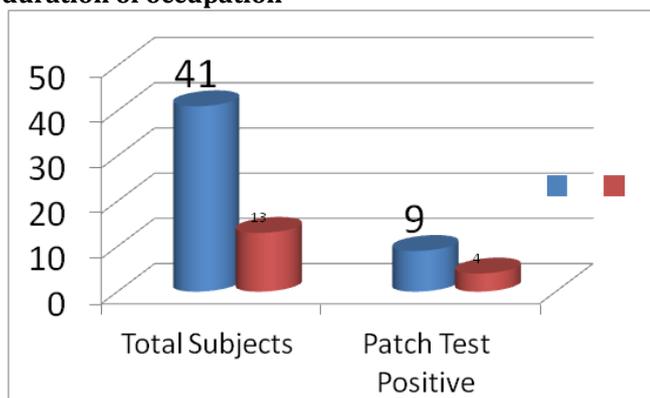


Graph 2 shows the number of brothers and sisters showing positive patch tests to various antigens.

Table 3: Relationship between patch test positive and duration of Occupation

Duration of Occupation	Total Subjects	Patch Test Positive
0-5yrs	41	9
6-10yrs	13	4

Graph 3: Relationship between patch test positive, and duration of occupation

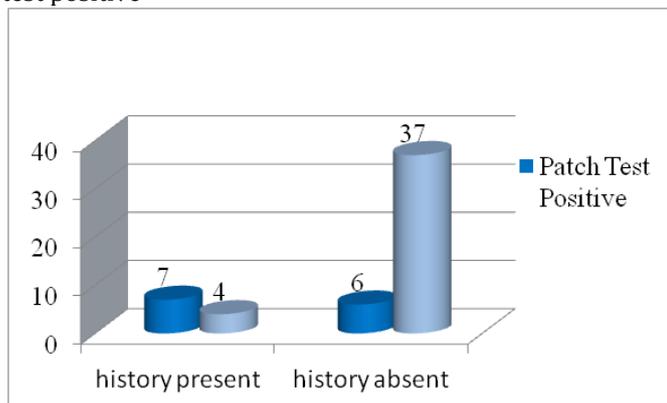


$p=0.4590$ (NS , $p<0.05$) ,sensitivity=21.95% ,specificity =66.67% , PPV = 69.23% , NPV=20% & Accuracy= 31.48% ;

Table 4: Relationship between patch test positive and history present

S.No	history present	history absent
Patch Test Positive	7	6
Patch Test Negative	4	37

Graph 4: Relationship between history positive and patch test positive



$p=0.002$ (S, $p<0.05$) , Sensitivity = 63.64%, specificity= 86.05% , PPV=53.85%,NPV= 90.24% & Accuracy= 81.48%

DISCUSSION

According to our study, total number of patients enrolled were 54. Patch test was positive in 24.07% subjects. Patch test and history positive in 53.84% patients out of 13. Negative history but patch test was positive in 46.15%. Positive history but patch test was negative in 30.76%.

The positive reaction rates for nickel sulphate in our study in 27.27% in comparison to 29.5% obtained in a study done by H. Dickel et al.¹⁰ Further the reaction to fragrance mix as obtained in our was 9.09%. Study by Erin M. Warshaw et al¹¹ showed 11.3% and by Arpita Jain et al³, Delhi, showed 15%. Reaction to thurium mix was 9.09% in our study as compared to study by Erin M. Warshaw¹⁷ et al showing 10.2% and Arpita Jain et al³ showing 7.5%. In our study sensitivity to neomycin was 9.09% in comparison to study having 10.2% and 7.7% Warshaw et al¹¹ and Arpita Jain et al³ respectively. Similar comparison was seen in cobalt chloride 9.09% in our study in contrast to 6.5% by Warshaw et al¹¹ and 15% by Arpita Jain et al³.

According to table & graph 3 there is no relationship between duration of occupation and positivity of patch test ($p=0.4590$ (NS , $p<0.05$) ,sensitivity=21.95% ,specificity =66.67% , PPV = 69.23% , NPV=20% & Accuracy= 31.48% ; Fisher’s Exact test was used for statistical analysis. If patient is sensitive to any antigen irrespective to duration of exposure, patch test is positive.

There was significant relationship between history positive and positive patch test $p=0.002$ (S, $p<0.05$) , Sensitivity = 63.64%, specificity= 86.05% , PPV=53.85%,NPV= 90.24% & Accuracy= 81.48% Fisher’s Exact test used for analysis. It says that we should go for patch testing only when history is positive.¹²

CONCLUSION

There is no relationship between duration of occupation and positivity of patch test. If patient is sensitive to any antigen irrespective to duration of exposure, patch test is positive.

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Adarsh/Patch testing in Hospital Employees : A Pilot study

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