

**Original Article****STUDY ON CORRELATION OF CLINICAL EVALUATION WITH PATCH TESTING IN PATIENTS WITH ALLERGIC CONTACT DERMATITIS**

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**ABSTRACT**

**Introduction:** Contact dermatitis is an inflammatory eczematous skin disease. It is caused by chemicals or metal ions that exert toxic effects without inducing a T-cell response (contact irritants) or by small reactive chemicals that modify proteins and induce innate and adaptive immune responses (contact allergens). **Aim and Objective of the study:** The aim and objectives of the study is to assess the clinical pattern and etiological profile in the subjects affected by contact dermatitis. **Materials and Methods:** Study participants were recruited as per the inclusion and exclusion criteria for a period of 2 years. Patch testing performed 2 weeks after the active lesions subside using Indian standard battery. Patch is removed after 48 hrs. First reading is taken after an hour of patch removal and second reading is taken at the end of 96 hrs results are interpreted as per the ICDRG (International contact dermatitis research group) grading Pre-and post-patch testing photographs are taken for comparison. **Results:** We included a total of 60 subjects presented with ACD based on inclusion and exclusion criteria. Out of which 60 total study subjects 26 (43.33%) were males and 34 (56.67%) were females. The mean age in years was 36.03±13.47 years. **Paraphenyline diamine** was found to be the most common allergen (**20.58%**), followed by Nickel, cobalt and fragrance. Nickel exclusively affects females. The other allergens frequently found positive among female were paraphenyline diamine (85.11%) and parthenium (66.67%). The most frequently encountered allergen among males was Dichromate (66.67%). **Discussion and conclusion:** Maximum cases belonged to 21-30 years age group. ACD most frequently affects housewives (30%) and labourers (16.67%). In 40.67% of the patients the allergen detected by patch test could be correlated with history and presentation of ACD. Potassium dichromate exclusively affected males. Nickel was the commonest allergen among females.

**Key-words: Allergic contact dermatitis, patch test, allergens, housewives and paraphenylene diamine**

## **INTRODUCTION**

Contact dermatitis is an inflammatory eczematous skin disease. It is caused by chemicals or metal ions that exert toxic effects without inducing a T-cell response (contact irritants) or by small reactive chemicals that modify proteins and induce innate and adaptive immune responses (contact allergens) [1-4].

Contact dermatitis is considered as one of the most common dermatologic diseases and the primary cause of occupational skin diseases. Recent studies found that ACD could be responsible for 50 to 60% of occupational contact dermatitis (OCD) and 20 to 30 % of all occupational diseases [5, 6].

Contact dermatitis is divided into irritant contact dermatitis and allergic contact dermatitis. Irritant contact dermatitis is a nonspecific response of the skin to direct chemical damage that releases mediators of inflammation predominantly from epidermal cells while allergic contact dermatitis is a delayed (type 4) hypersensitivity reaction to exogenous contact antigens. Immunological responses are due to the interaction of cytokines and T cells. In photo contact, allergic dermatitis lesions are confined to sun-exposed areas even though the allergen is in contact with covered areas.

The impact of ACD is often underestimated as it is not a life-threatening condition. It has been also considered as a trivial events related to job. However, many disabilities have been reported such as pain, itch, and psychosocial consequences [6]. All these factors can negatively affect the quality of life (QOL) of affected subjects.

The quality of life in ACD patients can be considered as a relatively new approach during consultation as it allows assessment and management of its impairment. Moreover, the physical and psychosocial effects of this disease can have an important impact on the patients' occupational activity leading to more frequent absenteeism and more prolonged sick leaves than healthy workers involving the need to change occupation.

However, relatively few studies have been published concerning the impact of the ACD on the quality of life and on the occupational activity of the affected subjects. Thus, we have conducted this study to assess the quality of life of patients with ACD and analyze the impact of this disease on the work productivity in the affected subjects.

## **AIM AND OBJECTIVES OF THE STUDY:**

The aim and objectives of the study is to assess the clinical pattern and etiological profile in the subjects affected by contact dermatitis.

## **MATERIALS AND METHODS**

A cross sectional is conducted in patients presenting with presenting with atopic dermatitis.

**Place of study:** The study was conducted at our tertiary care centre for the duration of two years in subjects aged >10 years and less than 40 years based on inclusion and exclusion criteria, we included a total of 80 adult subjects aged >10 years.

**Design of the Study:** cross-sectional study

### **Study Population:**

Inclusion criteria: we included all the subjects in the age group of 10 to 40 years suffering from atopic dermatitis. The Diagnosis of ACD was clinically made and confirmed by relevant patch test.

**Study Period:** The study was carried out for a period of two years from April 2020 to April 2022.

### **Methods of Data Collection and Study Procedure:**

Study participants were recruited as per the inclusion and exclusion criteria for a period of 2 years. Patch testing performed 2 weeks after the active lesions subside using Indian standard battery. Patch is removed after 48 hrs. First reading is taken after an hour of patch removal and second reading is taken at the end of 96 hrs results are interpreted as per the ICDRG (International contact dermatitis research group) grading Pre-and post-patch testing photographs are taken for comparison.

**Data analysis and interpretation:** The collected data were analyzed for their appropriateness and suitability. The interpretation was made for the collected data. Chi-square test is used for comparison.

## **RESULTS:**

We included a total of 60 subjects presented with ACD based on inclusion and exclusion criteria.

Out of which 60 total study subjects 26 (43.33%) were males and 34 (56.67%) were females. The mean age in years was  $36.03 \pm 13.47$  years.

**Table 1: Shows distribution of subjects based on occupation**

Total study subjects	Percentage
House wife	30
Student	16.67
Retired	3.33
Factory worker	1.67
Driver	1.67
Shop vendor	3.33
Banker	3.33
Farmer	5
Lab technician	5
Engineer	5
Teacher	8.33
Labourer	16.67

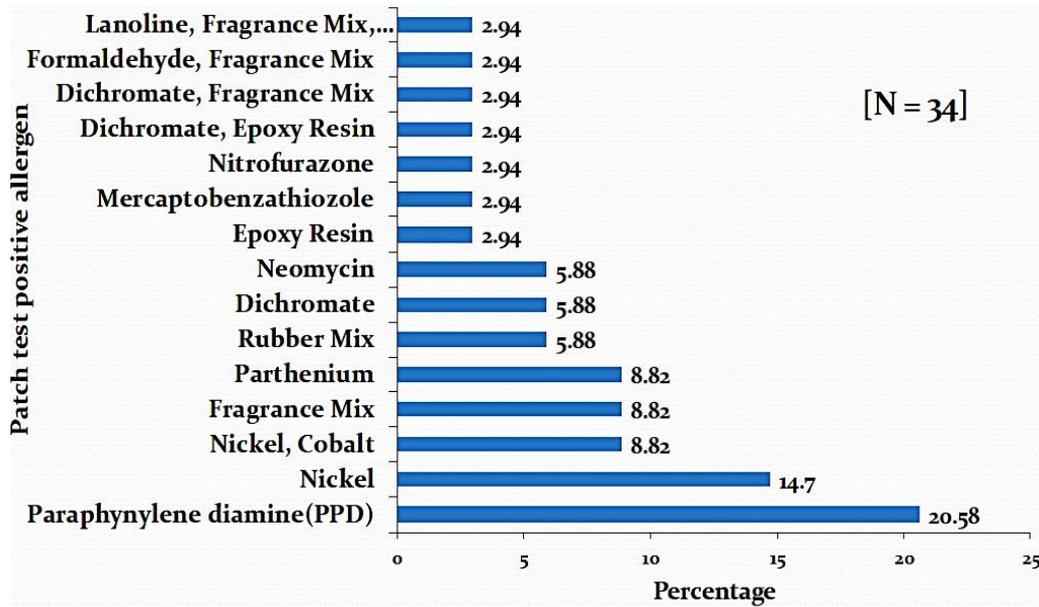
Out of 60 study participants 16.67% participants were labourer. Out of 34 females 18 were housewives (30%), which represent more than fifty percent female patients [N = 60]

**Table 2: Shows gender-wise distribution of correlation with patch test**

Correlation with patch test	Gender		Total n = 59
	Females (n = 33)	Male (n = 26)	
Yes	13 (39.39%)	11 (42.31%)	24 (40.67%)
No	20 (60.61%)	15 (57.69%)	35 (59.33%)

In **40.67%** of the patients the allergen detected by patch test could be correlated with history and presentation of ACD. Male showed more correlation with positive patch test but this difference was statistically not significant. ( $P > 0.05$ )

Figure 1: Shows patch test positive allergen



Paraphenylenediamine was found to be the most common allergen (20.58%), followed by Nickel, cobalt and fragrance.

Figure 2: Gender-wise distribution of patch test positive allergen

Patch test positive allergen	Female	Male	Total
Paraphenylenediamine (PPD)	6	1	7
Nickel	5	0	5
Fragrance Mix	0	3	3
Parthenium	2	1	3
Nickel, Cobalt	1	2	3
Rubber Mix	2	0	2
Dichromate	0	2	2
Neomycin	1	1	2
Epoxy Resin	0	1	1
Mercaptobenzathiozole	0	1	1
Nitrofurazone	1	0	1
Dichromate, Epoxy Resin	0	1	1
Dichromate, Fragrance Mix	0	1	1
Formaldehyde, Fragrance Mix	1	0	1
Lanoline, Fragrance Mix, Rubber	0	1	1

Nickel exclusively affects females. The other allergens frequently found positive among female were paraphenyline diamine (85.11%) and parthenium (66.67%). The most

frequently encountered allergen among males was Dichromate (66.67%).



**DISCUSSION:** ACD is a common condition with an important socioeconomic cost because of its related personal and professional impairments. The pathophysiology of allergic contact dermatitis starts with the contact of the allergen to the skin. This allergen penetrates that stratum corneum of the skin and is taken up by Langerhans cells. The antigens subsequently undergo processing by these cells and get displayed on their surface. Langerhans cells then migrate towards regional lymph nodes. The antigens taken up by these cells come in contact with the adjacent T-lymphocytes. Due to the process of clonal expansion as well as cytokine-induced proliferation, antigen-specific T lymphocytes get created. These lymphocytes may then travel through the blood and into the epidermis. This process collectively is known as the sensitization phase of allergic contact dermatitis. The

elicitation phase is what occurs after reexposure to the antigen takes place. The Langerhans cells containing the antigen interacts with the antigen-specific T-lymphocytes for that antigen, which triggers a cytokine-induced proliferation process. This proliferation, in turn, creates a localized inflammatory response. A good clinical evaluation of allergic contact dermatitis involves a detailed history and physical. The morphology and location of the dermatitis is often the best indicator of the offending agent. Patch testing is the gold standard to confirm the diagnosis and should be performed when ACD is suspected in patients with persistent symptoms. Patch testing can help determine the allergen to avoid future exposure. While patch testing is easy to perform, the test may be over-utilized, leading to higher costs for the patient. If the diagnosis is still not certain, a skin biopsy usually demonstrates spongiosis. The only definitive treatment of ACD is the identification and removal of the offending agent, and all patients with suspected or confirmed ACD should be advised of this. First-line medical therapy includes topical steroids when ACD is confined to less than 20% of the body, and oral corticosteroids when greater than 20% of the body is involved. If ACD involves a delicate area such as skin folds or eyelids, topical calcineurin inhibitors or PDE4 inhibitors may also be effective. Upon identification of the allergen, strict avoidance is necessary to prevent a recurrence. Symptomatic management includes oral antihistamines, topical hydrocortisone, and cool water soaks. Vesicles should not be ruptured as there is a risk of infection. The use of moisturizers is a recommended adjunct. For severe cases, topical immunomodulators like tacrolimus may be beneficial. Some patients may benefit from phototherapy using UV A plus psoralen. Rarely in severe cases, one may require immunosuppressive agents like mycophenolate. In cases of chronic or recalcitrant ACD, use patch testing to identify the causative agent. Successful patch testing requires several components: choice of appropriate chemicals for testing, a positive patch test to relevant allergens, and patient counseling of patch test results. Additionally, the American Contact Dermatitis Society's Contact Allergen Management Program (CAMP) can be utilized to generate a "safe list" of products that do not contain the patient's allergens. In the case where allergens are unavoidable, systemic therapy may be necessary [6-11].

## **CONCLUSION:**

- Maximum cases belonged to 21-30 years age group.

- ACD most frequently affects housewives (30%) and labourers (16.67%).
- In 40.67% of the patients the allergen detected by patch test could be correlated with history and presentation of ACD.
- Potassium dichromate exclusively affected males. Nickel was the commonest allergen among females.

### RECOMMENDATIONS:

Patch testing is useful investigative procedure for ACD due to unpredictable association between clinical pattern and type of allergen. Whenever possible, a change of occupation can be advised.

### CONFLICT OF INTEREST: None

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