



ABCD (Air Borne Contact Dermatitis) – A Hope By Panchakarma: A Case Study

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Abstract

ABCD, a horrid disease for the patient as well as for others who visit the patient, put the patient in mental stress also by repeated incidences. Anti allergic drugs and Steroids are also not very much helpful for the chronic patients. Such types of patients always search for an alternative treatment remedy to get rid of this unpleasant look. So an effort was made to implement *ayurvedic* principle by *Panchakarma* therapy on request of a puzzled patient and the result was encouraging.

Keywords: Allergen; Dermatitis; Airborne; Non-plant, *Basti*,

Introduction

Airborne contact dermatitis is a dermatoses affecting mainly exposed parts of the body and is caused by allergens/irritants present in the atmosphere. Allergens can be present in various forms like dust, sprays and pollens, which settle on the exposed parts of our body^[1]. Most commonly affected sites are face, neck, 'V' area of chest, eyelids, axillae and forearms. Sometimes non exposed sites like major body folds can also be involved^[2-4]. Allergens can be of plant as well as nonplant origin. Most common airborne dermatitis is due to *Parthenium hysterophorus*. However cases due to non-plant allergens and industrial origin are on increasing trend especially in developing countries^[2, 5]. The diagnosis of airborne dermatitis is usually made on the basis of history of the patient, the distribution and morphology of the lesions and patch test, prick test or Radio allergosorbent test^[6].

Nature of Airborne Contactants

The air borne allergens and irritant agents can enter the environment in many different ways like vapors etc. The most common allergens and irritants causing airborne dermatitis have been listed in Table 1^[6-30]. In India, *Parthenium hysterophorus* is the most common Compositae weed responsible for causing airborne dermatitis. This plant is also known as Congress grass or feverfew. *Parthenium* is originally a species of Mexico, brought to India along with wheat shipments from USA. The weed grows wildly on wastelands and along canals, railway tracks and roads. Sesquiterpene lactones (SQL) are the most important allergens in the plant. Among the SQL's, Parthenin is the major allergen^[31-33]. Other than parthenin, coronopilin, hymenin, tetraeurin A has been found in parthenium. Liverwort, tulip tree and sweet bay also contain SQL so they may show cross sensitivity with parthenium^[32].

Immunology of ABCD

In airborne allergic dermatitis, initially there is a refractory phase where there is a periodic or continuous contact with antigen but no response. This is followed by an induction phase where the hapten penetrates skin, conjugates with epidermal protein, comes in contact with antigen presenting cells, migrates to draining lymph nodes followed by stimulation of naïve T cells. This leads to proliferation of activated T cells to produce effector and memory cells which then enter the circulation. Re-exposure to the specific hapten leads to the release of mediators producing skin inflammation, A persistent inflammation is produced due to continued presence of effector cells. The inflammation may be resolve with cellular and enzymatic degradation of antigen, inhibition of antigen presenting cells and stimulation of suppressor T cells.

Clinical Manifestations

According to a classification by Dooms- Goossens, airborne contact dermatitis can be divided into different types^[8]:

1. Airborne allergic or irritant contact dermatitis

2. Airborne phototoxic reactions
3. Airborne photoallergic reactions
4. Airborne contact urticaria

Other rare airborne skin reactions include exfoliative dermatitis, lichenoid papules, hyper- and depigmentation and targetoid lesions. One particular product can cause more than one type of reaction for example, *P. hysterothorus* can produce allergic contact dermatitis, photocontact dermatitis and lichenoid eruption. Sometimes, one dermatitis may mask another one, for example, in case of rosacea and air-borne dermatitis in a farmer [34]. Classical air borne dermatitis presents as involvement of face, nasolabial folds ‘V’ of neck, extensors of upper limb and dorsum of hands. The skin symptoms can also occur on those parts of the body which are not exposed to the air [35]. Occasionally, though rarely there can be generalized involvement with the picture of an erythroderma, for example, erythroderma due to compositae dermatitis, mercury

exanthema (generalization of the dermatitis caused by volatile substances such as mercury vapors). In addition to airborne factor, penetration through clothing and inhalation may play role in generalization. To assess the severity of Air borne contact dermatitis, there is a Clinical Severity Score (CSS) put forward by Verma et al. [36]. ABCD can also be subclassified as plant or non-plant origin [37]. Non plant allergens include potassium dichromate, epoxy resins, colophony, formaldehyde, perfumes/deodorants, volatile paints etc. Ghosh et al. studied 64 patients and found potassium dichromate as most common allergen followed by fragrance mix and epoxy resins [5]. In urban and semi urban areas, cement, perfumes, volatile paints and synthetic glues are the commonest allergens [38].

Diagnosis and Differential Diagnosis

Involvement of upper eyelid is a useful sign to differentiate these patients from pure photosensitivity. Also involvement of covered parts of the body such as major body folds, the genital region, lower legs, “Wilkinson’s triangle” and area under the chin suggest airborne contact dermatitis. The allergen in the environment can be found with the help

Allergic airborne contact dermatitis						
Plants, natural resins, vegetable and wood allergens	Plastic, rubber and glues	Metals	Industrial and pharmaceutical chemicals	Insecticides, pesticides, animal feed additives	Solvents	Miscellaneous
Ambrosia deltoidea Acacia melanoxyton Cedar pollen [9] Citrus fruits Compositae Cinnamon [10] Chrysanthemum Eucalyptus Pulverulenta [11] Essential oils Frullanta Garlic Helianthus annus Latex [12] Pinus roxburghii [13] Parthenium hysterothorus Soybean Tropical and domestic woods	Acrylates [14] Benzoyl peroxide Epoxy acrylates Epoxy resin Formaldehyde and formaldehyde resins Isocyanates [15] Rubber additives	Arsenic salts Chromate Cobalt [16] Gold Mercury Platinum [17] Nickel Silver	Azathioprine Azithromycin Albendazole Budesonide Cefazolin Famotidine Formaldehyde and releasers Glutraddehyde Isoflurane Lansoprazole Meropenam Methotrexate Methyl chloroform Methyl chloroisothiazolium [18,19] Pantoprazole Paraphenylenediamine Paracetamol PABA Potassium metabisulphite [20] Rhodium solutions [21]	Carbamates(fungicides) Cobalt (animal feed additive) Dyrene Ethoxuquin (antioxidant in animal feed) Oxytetracycline hydrochloride (animal feed antibiotic) Organophosphorus pesticides [22] Pig’s feed [23] Penicillin (animal feed antibiotic) Pyrethrum Spiramycin(animal feed antibiotic)	Acetone	Agricultural dusts [24] Cigarettes [25] Cladosporium Disperse dyes Penicillium

Non-allergic airborne contact dermatitis					
Irritant contact dermatitis	Photoallergic reactions	Contact urticaria	Contact urticaria syndrome	Protein contact dermatitis	Erythema multiforme like eruption
Phosphates ^[26] Synthetic fibers Chlorothalonil Mustard gas Metal dust Carbon fiber Ethylene oxide	Carprofen ^[27] Chlorpromazine Olaquinox Pesticides- manes, fenitrothion	Amoxicillin Epoxy resin Hyacinth Weeping fig Isothiazolinone	Anisakis simplex Compositae Fern Goat dander Protease Lupine flour	Flour Sapele wood[28]	Japanese liquor tree ^[29] Weeds ^[30]

Table 1: Various airborne contactants (modified from Santos et al. ^[6], Huygens et al. ^[7] and Handa et al. ^[8]).

of chemical analysis or direct microscopic studies of the air materials in the air ^[39]. Patch test is useful for air borne allergic cases ^[40]. Light tests and photopatch tests can help in excluding photosensitive disorders. Air borne dermatitis can also be confused with dermatitis caused by directly applied agents, dermatitis caused by occasional contacts with an allergen, connubial or consort dermatitis, an id reaction and photo induced reactions ^[8]. Irritant and allergic contact

dermatitis of the face can occur due to the transfer of allergenic particles by nail polish. This is the classic example of an “ectopic dermatitis” ^[41]. Another example of ectopic dermatitis in males is genital lesions caused by ‘hand transportation’ of the allergens. Finally, other eczematous skin diseases, for example, atopic dermatitis having predominant flexural and skin crease involvement are also an important differential diagnosis.

Management

To control air borne dermatitis, degree of contact hypersensitivity and quantity of antigen should be decreased. In cases of parthenium dermatitis, causative plant should be removed from the immediate environment. Patient should cover as much of the skin as possible by clothing. Uncovered areas should be washed with soap and water so as to remove the antigen before it penetrates the skin. Barrier creams can also be used after every wash. Change of job and residence if possible can help in decreased exposure ^[8].

Treatment

Corticosteroids are the mainstay of therapy. Mild to moderate disease can be controlled with topical corticosteroids only. Corticosteroids decrease the number of inflammatory cytokines as well as decrease the antigen presenting cells. For severe involvement that is more than 25% body surface area, systemic steroids may be required. Systemic steroids are usually prescribed at a starting dose of 0.5-1 mg/kg/ day of prednisolone. Within 3 months, patient can achieve complete remission. To decrease the side effects, corticosteroid dose should be tapered as soon as remission occurs ^[32]. Amongst other immunosuppressants, azathioprine is most commonly used ^[42]. It takes 4-6 weeks to exert its action, so is more useful for the treatment of chronic cases. It should be used with corticosteroids in the management of acute stage. Weekly azathioprine therapy 300 mg / week can also be used instead of daily dose, this has benefit of increased compliance and lesser side effects ^[43,44]. Main side effects with azathioprine are gastrointestinal intolerance, hepatotoxicity and bone marrow suppression. Methotrexate and cyclosporine can also be used as effective steroid sparing agents ^[45]. Cyclosporine can be used in the acute phase because of quicker response. Side effects of cyclosporine include hypertension and nephrotoxicity. Oral hypo sensitization i.e. introduction of an antigen into the body by a route different from natural one to induce such a change in the immune system so that

when antigen is introduced into the body through normal route, the body does not develop clinical features. It is thought to act by causing depletion of memory T-cells. It is tolerated well by the patients except for mild abdominal pain, ‘heartburn,’ and cheilitis ^[46]. Immunotherapy with recombinant protein is emerging as a new treatment option for ABCD patients ^[47,48].

Case Study

A 57 years old government employee male having 55kg body weight and *Vata Pittaj Prikriti*, residing in an rural area suffering from intense itching all over body with inflammation of skin visited the outpatient department of *Panchakarma* in CBPACS, New Delhi on 20th april 2016 for *Panchakarma* therapy (OPD no.40272). The sleep was also disturbed due to severe itching. Sometimes itching was so unbearable that patient was unable to concentrate even after taking strong antiallergic and steroids (i.v.).

There was a history of this type of skin allergy since last 30 years which used to subside with medicines initially, but recurrence continued occasionally with feverish feeling. There was no history of any other illness like Diabetes Mellitus, Hypertension, Tuberculosis or any surgery. Patient was a chronic smoker but stopped smoking since last 3 years.

The patient was diagnosed as a case of Contact Dermatitis provisionally on the basis of clinical signs and symptoms. The diagnosis was confirmed by performing blood investigations CBC, TEC, Immunoglobulin E (Ig E). The Allergy Screening Test was also performed. The reports were as following:

Table 2

Test Name	Value
Hb	14.9 gm%
HCT	41.8%
PLT	1.8 Lak./c.mm
RBC	9.05 mill./c.mm
WBC	4.5/c.mm
DLC	N ₆₂ L ₂₁ E ₁₁ B ₀₀ M ₀₂
TEC	450/c.mm

Table 3

Allergy Screening Test

Test	Result	Test	Result
House dust	2.10***	Cauliflower	2.00**
Dog dander	1.0*	Spinach	1.90**
House Dust Mite	3.60***	Chicken	1.10**
Clove	1.20**	Parthenium	3.60***
Lemon	2.50***	Brufen	1.00*
Banana	2.00**	Sulpha	1.00*

As the patient didn't get any relief with *Shaman Chikitsa* (ayurvedic or modern medicinal treatment), it was decided to go for *Shodhan Chikitsa*. It was last of April month with high temperature in delhi and Patient's *Shareerik & Manasik bala* was *avara*. So permorming *Vaman* or *Virechan* was not recommended. Patient was admitted in IPD (IPD no.2533) on 27th April 2016 for *Basti Karma* (enema) as per indication mentioned in the classics of *Ayurveda* (Ch.Chik.7/ 46)^[49]. The patient underwent *Basti Karma* from 27th April 2016 to 12th may 2016 (*Kala Basti Kram*). Care was taken not to consume the known allergic food (as per allergy report) and other allerlic things reported in the test.

After completion of *Basti Karma*, the patient felt 60% relief in itching. There was no requirement for anti allergic drug. The patient was getting sound sleep only with ayurvedic medicines. After knowing the findings, all known allergy causing foods, drugs & inharatants were restricted in routine usage as far as possible. The patient was feeling much relief gradually. After 2 months of *basti karma* & on adopting the usual routine food except foods and drugs known for allergy, the patient felt significant relief in the signs and symptoms of contact dermatitis. The patient was followed up by every week for 6 months and then every month for further 4 months to observe the recurrence of the symptoms. After follow up of 10 months, the patient was found free from all sign and symptoms. The quality of life was improved significantly and the patient was enjoying a normal healthy life with no exacerbation.

In the study, the assessment was done on the basis of PDSS (Parthenium Dermatitis Severity Score) according to Indian Journal of Dermatology^[50] as following:

Table 4

Component	Severity score
A. Itching	
Nil	0
Mild	1
Moderate	2
Severe	3
B. Types of lesions	
Papules	1
Plaques	2
Lichenified papules	3
Lichenified plaques	4
Exudative lesions	5
C. Erythema	
Nil	0
Mild	1
Moderate	2
Severe	3
D. Areas of Involvement	
Face	
Forehead	0.2
Checks R and L	0.2 each
Nose, chin	0.1 each
Periorbital areas R and L	0.05 each
Ears and retroauricular areas R and L	0.1 each
Neck, anterior and posterior	0.2 each
Scalp	0.7
Upper limbs	
Dorsa of hands R and L	0.2 each
Flexors of forearms R and L	0.4 each
Extensors of forearms R and L	0.4 each
Flexors of arms R and L	0.4 each
Extensors of arms R and L	0.4 each
Shoulders R and L	0.2 each
Chest	2
Abdomen	2
Back, upper and lower	2 each
Lower limbs	
Dorsa of feet R and L	0.2 each
Anterior aspect of legs R and L	0.8 each
Posterior aspect of legs R and L	0.8 each
Popliteal fossa R and L	1 each
Anterior aspect of thighs R and L	1 each
Posterior aspect of thighs R and L	1 each
Total score = (A+B+C+D)x3	Maximum PDSS = 99

*R and L: Right and Left

Table 5
Assessment of the Patient

Group	Score before Basti (1 st day)	Score after Basti (16 th day)	Score after 2 months
A	3	2	0
B	4	2	1
C	2	1	0
D	23.1	17.2	7.2
Total	32.1x3=96.3	22.2x3=66.6	8.2x3=24.6

With the ayurvedic treatment including basti karma Ig E level was reduced from **3268.5** IU/ml to normal limits after 2 months. It indicates that after the basti karma and restriction of the foods, known for allergy, improvement in immunity was observed and relief was noted.

Conclusion

ABCD patients tend to have active symptoms even many years after diagnosis. Avoidance of further antigen exposure should be emphasized. Biological measures like exotic arthropods and opportunistic pathogens, use of various antagonistic plants and bioherbicides and chemical herbicides can help in decreasing parthenium hysterophorus. It was observed that ayurvedic treatment after Basti Karma was very effective in this case of ABCD. This is a single case study based on evidence. Further, we require clinical trials to evaluate the efficacy of the basti karma on this.



During Basti Karma



After 1 month

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