

# Drug Combination for Treating Parthenium Dermatitis: A Case Study

Sanyukta Srivastava

**Abstract**—Parthenium Dermatitis is an immune inflammatory disease caused by Parthenium hysterophorus, airborne dry and friable plant particles including trichomes and sesquiterpene lactones. This paper deals with the disease in detail bringing out the best possible combination of drugs that can be administered to the patient. The paper comes out with the case study on a patient over a span of almost two years. It indicates the change in pattern of symptoms and the problems as the drugs and their dosage were changed. Related pathological test reports have been used to study the effect of particular drug in dealing with the problem. The paper aims at providing a comprehensive detail of the best possible drug combination for the Parthenium Dermatitis disease.

**Keywords**—Parthenium Dermatitis, drugs, case study, dosage.

## I. INTRODUCTION

**P**ARTHENIUM dermatitis is a major health problem caused by cosmopolitan weed Parthenium hysterophorus. It is a T cell mediated immune injury and disease manifests as itchy erythematous papules, papiluvasicular and plaque lesions on exposed area of the body<sup>1</sup>. Air-borne contact dermatitis (skin allergy) is a chronic health problem with very little mortality but the disease normally continues to persist with variable remission and relapse causing distress and morbidity. A cosmopolitan weed, Parthenium hysterophorus is the commonest cause of the Parthenium induced air-borne contact

Dermatitis. Parthenium dermatitis has been reported from various countries, including the US, Mexico, Central and South America, the West Indies, Africa, China, Vietnam and Australia, and is a major dermatological problem in India. Parthenium hysterophorus causes a spectrum of clinical patterns. Parthenium dermatitis, in its classical form known as airborne contact dermatitis, primarily affects the exposed areas and the flexures. Other clinical patterns are a seborrheic pattern, widespread dermatitis, and exfoliative dermatitis. The trend of the clinical pattern is changing. The classic airborne contact dermatitis may change to photo dermatitis resembling chronic actinic dermatitis or mixed pattern dermatitis. The allergens responsible for contact dermatitis are sesquiterpene lactones and are present in the oleoresin fraction of the leaf, the stem, and the flower and also in pollen. The allergens can be extracted in various solvents (such as acetone, alcohol, ether, and water) and then used for patch testing. Acetone

Sanyukta Srivastava is with the Gautam Buddha University, Greater Noida, Uttar Pradesh, India as a student of M.Tech in Biotechnology with specialization in Food Technology.

extract of Parthenium is better than aqueous extract in eliciting contact sensitivity. Treatment of Parthenium dermatitis is mostly symptomatic. Topical steroids, antihistamines, and avoidance of Parthenium are the mainstay of treatment for localized dermatitis. Systemic corticosteroids and azathioprine are frequently needed for severe or persistent dermatitis. The treatment is often regarded as a temporary relief process with the symptoms expected to reoccur with the passage of time. Thus it is required to find a possible combination of drugs that would not only keep the present symptoms under control but would also suppress any increase in the allergy.

The literature review shows that a lot of work has been done in the field of exploring the horizons of Parthenium dermatitis. Many researchers have worked in the field of exploring the role of particular drugs in curing of the disease<sup>3</sup>. Even a significant work has been done in exploring the chemistry of the disease, concerned with the presence of certain chemical compound in the patient<sup>4</sup>. Thus it was revealed that practically no work has been done to suggest possible combination of medicinal drugs that could be administered to the patient. This paper aims at doing this undone task with the help of a case study of the patient of Parthenium dermatitis.

## II. RESEARCH METHODOLOGY

### A. Object of the study

The object of the study is from India. Parthenium Dermatitis has shown a significant growth in India in the recent times. The patient is the female of around 43 years of age. She has a normal body built with a height of around 5'4". The patient has no medical problem history. She had no medical ailments such as Diabetes, Asthma, Blood pressure. She has a normal life routine and is a home maker by profession which facilitates that she has not much interaction with the outer rough environments in terms of climatic conditions of heat or cold. The patient is not involved in an rigorous physical activity. She complains of itching and dark patches appearing on her face as the start of the symptoms of the disease. Her vicinity is found to be having a growth of Parthenium hysterophorus (Congress grass). This is most likely reason of her getting infected with the disease. As the symptoms start to appear a year later after she moved to this place.

### B. Case Study

The literature of this paper has been prepared comprehensively by conducting a case study on the patient described above. The time period of study is around two years.

The patient has been on complete medication for this time period. Initially the dark patches were observed on the neck and hands progressing to the exposed sites of the face and slowly covering the full body resulting in blisters, itching and producing burning sensation. The paper investigates the sequential dosage of different drugs given to the patient and also highlights that how much has it effected the patient. This had been continued for the span of around two years. To observe the effect of the medicines personal interaction with the patient, doctor and the pathological reports have been used. The aim of the case study is to find out the best suitable combination of drugs that bring the maximum relief to the patient and also helps in keeping the symptoms as well as the allergy under control.

### III. RESULTS AND DISCUSSION

The patient's treatment begun when she complaint of having puritic papules and dark patches. Initially observed on the neck and hands they progressed to the exposed sites of the face and slowly covering the full body resulting in blisters,itching and producing burning sensation. In her visit to dermatologist she was diagnosed with parthenium dermatitis followed by several sets of medications over the span of two years. We have divided the medication period into months and will be referring to it as month1, month 2 etc.

Patient's treatment started in month1 with an immunosuppressant and an anti fungal drug along with sunscreen. Along with her medications, she was strongly recommended to cover the body as much as possible, avoid exposure to sunlight, use sunscreen and use of coconut oil to avoid itching. The medications (Table 1.a, Table 1.b, Table1.c) showed an improvement in the patient's health but only for a limited time period. After a month of medication, she again started to develop the same problem and was prescribed the increased dose of the same drugs used in (Set 1).

In the month 6,she had developed a serious problem in her health with the swollen face, dark patches, redness, itching, crusting and scaling of the skin and high burning sensation. Under such condition, she was treated with a different set of medications (Set 2) that involved, a Glucocorticoid (18mg) which is a steroid and a drug containing Cetirizine Hydrochloride which is an anti histamine along with moderately potent glucocorticoid steroid to apply on the skin. The change of medications showed an instant improvement in her condition within a day and in her next set of medication (Set 3) the steroid dose was reduced down to 8mg. The very next month, in September a slight misbalance in her condition was balanced by increased dose of steroid(18mg) a new addition of Clindamycin phosphate USP equivalent to clindamycin (a gel) and an anti histamine(Set 4). Following drugs showed a temporary effect over the disease. Same medication continued till Month 10 (Set 5, 6, 7) with the variation in the dose of steroids.

TABLE 1.A

	Set1 (Month 1)	Set2 (Month 5)
Drug 1	Immunosuppressant drug that belongs to the chemical class Purine Analougues (50mg)	Contain Methylprednisolone which is a Glucocorticoid(18mg)
Drug 2	contain Fluconazole (150mg)	Contains Cetirizine Hydrochloride(16mg)
Drug 3	Clotrimazole 1% + Beclomethasone Dipropionate 0.025%	Moderately potent Glucocorticoid steroid

TABLE 1.B

	Set 3 (Month 6)	Set 4 (Month 7)
Drug 1	contain Methylprednisolone which is a Glucocorticoid(12mg)	contain Methylprednisolone which is a Glucocorticoid(18mg)
Drug 2	Contains Cetirizine and Pseudophedrine	Contains Cetirizine and Pseudophedrine
Drug3	Moderately potent Glucocorticoid Steroid	Clindamycin Phosphate USP equivalent to Clindamycin.

TABLE 1.C

	Set 5 (Month 8)	Set 6 (Month 10)
Drug 1	an immunosuppressant drug(50mg) of chemical class Purine Analogues/ changed to Methylprednisolone which is a glucocorticoid(8mg) after two days	an Immunosuppressant drug(50mg) that belongs to the chemical class Purine Analogues
Drug 2	contain Methylprednisolone which is a glucocorticoid(4mg)	contain Methylprednisolone which is a glucocorticoid(8mg)
Drug 3	Clindamycin phosphate USP equivalent to Clindamycin.	

The eleven months of medication that was provided to the patient bought her relief up to a certain extent. But this relief was for a limited time period. In the summers, the patient shows exacerbation of the disease. The severity of the situation was brought down with the help of steroids that were given on a regular basis throughout the year with variation in its dosage. During her serious state of disease, the antifungal drugs were replaced by the Antihistamines (Table 1.a) to prevent itching that proved to be of temporary relief. Introduction of steroids and antihistamines throughout provided an immediate relief but no significant improvement was observed. Moreover, sunscreen and gels (Clindamycin phosphate USP equivalent to Cindamycin) made no relief impact to the skin. By the end of the year, patient developed a small white patch on her left wrist and over the eyelids.

The next phase of case study marks studying that what could be the best possible drug that could be given to the patient to take care of the complications that has arise out in the previous observations.

The patient was treated with the similar set of medications as earlier with an addition of Tacrolimus to be applied on the affected areas (Table 2). In the starting of this period, with the rise in temperature, patient again developed a severe condition of swollen face, itchy rash all over the body, oozes, bleeds,

leucoderma on left hand and upper eyelids, cuts and cracks on the fingers. She was injected with drug Triamcinolone (40mg) and medicated with similar immunosuppressant along with drug (50mg) that contains Cefixime and an Antihistamine (Set 8)). In mid summers her disease was medicated again with an increase dose of the steroid, an immunosuppressant, and an antibiotic (Set 9). The set 8 & Set 9 of table 2 correspond to the same month of observation, because just in the span of fifteen days the medicines were modified keeping in view the effect of the previous ones and their response to the problem in the summer months.

TABLE II

	Set 7 Month 11	Set 8 Month 15	Set 9 Month 15
Drug 1	Immunosuppressant drug (50mg) of chemical class Purine analogues	Triamcinolone- (40 mg)	Methylprednisolone which is a Glucocorticoid (16 mg)
Drug 2	contain Methylprednisolone which is a glucocorticoid (4mg)	Immunosuppressant drug (50mg)	Immunosuppressant drug (50mg)
Drug 3	Tacrolimus- 0.03%.	Cefixime	Cetirizine Hydrochloride

Patient was treated for another 5 months with medications similar to those mentioned in Table 2. During winters the condition improved a bit and thus it was taken care of with the reduced dosage of steroids, ranging around 4 mg (Table 2, Set 7). As the summers approached her condition again became critical and the dosage of steroids was increased four times, i.e. 16 mg along with an injected drug Triamcinolone (table 2, Set 9) to control the allergy and drug comprising of cefixime to control itching, redness of skin (Table 2, Set 8). But the problems started to get intense again and thus the medication was added on with a new drug Histamine (Table 2, Set 9).

These modified medication were of not much help to the patient. After initial relief the problems started to resurface. Patient started to develop the papules, cracks on fingers, Itching, redness. This called for some changes in the drugs

TABLE III

	Set 10 Month 16
Drug 1	Contains Levocetirizine
Drug 2	Triamcinolone- 40 mg
Drug 3	An antihistamine

The drugs mentioned in Table 3, showed not much effect. Thus it was realized that the combination of drugs that has been given to the patient are working well enough in the winters but they somewhere or the other fail to deliver desired results in the summer months when the situation becomes more intense. This called for a series of pathological test and a modification in the dosage to suit this peak season of summers exclusively.

In the fresh prescription mentioned in Table 4, the patient was recommended the drugs comprising Betamethasone which

is a synthetic steroid, followed by an immunosuppressant and an antibiotic. In the later stages the dosage of antibiotics was stopped and the other two were continued. Moreover the patient was asked to stop the usage of any sort of oil or gel to prevent itching, redness or the cracks appearing on the skin

TABLE IV

	Set 11 Month 17	Set 12 Month 18
Drug 1	Betamethasone, known as a corticosteroid. (1mg)	Betamethasone, known as a corticosteroid. (1mg)
Drug 2	an immunosuppressant drug (50mg) that belongs to the chemical class purine analogues	an immunosuppressant drug (50mg) that belongs to the chemical class purine analogues
Drug 3	Ciprofloxacin	

Change in the steroid with minimal dose along with the immunosuppressant showed a tremendous change in the patient's condition. No use of oil or any sort of gel proved to play a vital role in controlling the itching and redness of the skin. After a month of first set of prescription, an improvement in her health condition with occasional itching lead to continuity of the same set of medication for another two months excluding the antibiotic.

Finally, the patient the medications resulted in improvement of her health condition. Even with rise in temperature she was observed not to develop any such critical condition. The itching, red patches and the cracks on the skin all reduced tremendously to a level much below than ever since the start of the medication. This combination of drug was continued for a considerable large interval of time and it proved to be standing up to the expectations, delivering the results similar to that in its initial phase of prescription. The patient was in a much better position and was able to resume the normal life.

#### IV. CONCLUSION

Parthenium dermatitis is an uncommon and not easily curable disease, caused by the spores of the plant coming in contact with the skin causing itching, papules, redness, swelling, and oozing on the entire body. The study clearly indicates that excessive dose of steroids are quite instrumental in controlling the symptoms but their effect lasts for a very short period of time. Minimal dose of steroid in combination with immunosuppressant proves out to be the best combination that lead to the improvement in patient's state of health. Moreover the use of oil turned out to be the major cause of dirt sticking to the skin and causing the allergy to become more severe. The study clearly discourages the use of oil on the body. Going through various medical drug combinations that were given to the patient over a period of time, the one towards the end of study, i. e. minimum dosage of steroids and along with an immunosuppressant comes up as the best possible drug alternative for providing relief to the patient as well as to keep the symptoms of allergy well under control.

#### REFERENCES

- [1] Nasim Akhtar, Abhigyan Satyam, Vivek Anand, K.K. Verma, Rakesh Khatri, Alpana Sharma; "Dysregulation of TH type cytokines in the patients of Parthenium induced contact dermatitis" ;Clinica Chimica Acta Septemr 2010
- [2] <http://www.ncbi.nlm.nih.gov/pubmed/18021597>
- [3] Kaushal K Verma, Y Manchanda, J.S.Pasricha; "Azathioprine for treatment of Parthenium Dermatitis" Journal of European Academy of Dermatology and Vernology, Vol 11, Supplement 2, Page S174, September 1988
- [4] Nasim Akhtar, Abhigyan Satyam, Vivek Anand, K.K. Verma, Rakesh Khatri, Alpana Sharma; "Dysregulation of TH type cytokines in the patients of Parthenium induced contact dermatitis" ;Clinica Chimica Acta Septemr 2010



**Sanyukta Srivastava** is a 9<sup>th</sup> Semester student of Integrated Dual Degree (B.Tech +M.tech) in Biotechnology with specialization in Food Technology from Gautam Buddha University, Greater Noida, U.P India. She has keen desire to pursue research in her respective field. She has a thorough knowledge of the laboratory skills of her subject. She is currently working on a project on "Quality Control Systems in a food processing Unit". Email i.d : [miss\\_sanyukta@rediffmail.com](mailto:miss_sanyukta@rediffmail.com), Contact No: +91-9910189702, University : [www.gbu.ac.in](http://www.gbu.ac.in)