

A CLINICAL EVALUATION OF THE PROPHYLACTIC TREATMENT OF POISON IVY DERMATITIS WITH AN ALUM-PRECIPITATED PYRIDINE EXTRACT OF RHUS TOXICODENDRON

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SUBCUTANEOUS injections of an alum-precipitated pyridine extract of *Rhus toxicodendron* for prophylaxis of poison ivy dermatitis was first described by Strauss and Spain in 1946.¹ Many subsequent reports²⁻⁶ have confirmed its clinical usefulness. The series of relatively few painless injections produces only small local reactions, and is nonsensitizing.⁶

A unique opportunity was afforded this investigator to make a clinical evaluation of the alum-precipitated pyridine *Rhus toxicodendron* extract for the prophylaxis of poison ivy dermatitis in a group of 20 men who were employed daily in jobs of tree trimming, tree removal, and the installation of maintenance of gas and electric service in areas heavily infested with poison ivy. These men were thus directly exposed to the poison ivy plant or roots 5 days a week in contrast to the occasional exposure experienced by persons otherwise employed. Although they had used general protective measures, such as showering with hot soapy water, frequent washing of their hands, rinsing with solvents, and wearing of gloves, each year these measures were found to be relatively ineffective and of limited value. In searching for another and more efficient method of protection, it was decided to use prophylactic treatments of the alum-precipitated pyridine extract of *Rhus toxicodendron*. The following clinical data represents two individual studies made in two consecutive years.

FIRST STUDY

A. *Method*.—The number of prior summers during which the men had contracted poison ivy dermatitis was recorded; the number of days in the 6 month period (April through September) in the year prior to the study was also recorded with the dermatitis classified as mild, moderate, or severe. A *mild* poison ivy dermatitis consisted of redness, in one or more patches, or in typical linear arrangement, possibly accompanied by transient whealing or edema, or slightly raised rough skin with occasional tiny vesicles. The total area involved, however, was no larger than the palm of the subject's hand. A *moderate* dermatitis was the same, but the area involved was larger than the palm

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of the subject's hand. A *severe* dermatitis consisted of vesiculation and oozing of any sized area, or redness of an area comparable to, or larger than, an entire extremity. These observations were used to compare the degree of dermatitis that occurred during the April through September period of the year when the men received no prophylactic treatment, and the degree of dermatitis that occurred during the corresponding 6 months of the year when the men received the alum-precipitated pyridine *Rhus toxicodendron* extract prophylactically.

Patch testing before and after therapy with the alum-precipitated pyridine extract of *Rhus toxicodendron* was performed to achieve an objective evaluation of any change in skin reactivity that may have occurred. To make the patches, two drops of 5-pentadecyleatechol in acetone, in dilutions of 1 to 100, 1 to 1,000, and 1 to 10,000, were placed on three separate blotting paper discs measuring $\frac{1}{4}$ of an inch in diameter. The discs, with their respective dilutions labeled below, were placed on a 3.2 by 7.7 cm. strip of adhesive plaster masked by parchment-like paper except for the area of the three discs and a 0.6 cm. margin. This outer border of adhesive was found sufficient to hold the test patch securely on the skin when firmly applied to the external surface of the mid-portion of the upper outer arm. A thin piece of non-adsorbent paper protected the face of the discs and adhesive until ready for use at which time it could be peeled off and discarded.

As the subjects all had a history of repeated attacks of ivy dermatitis, and some had had 3 plus reactions requiring weeks to heal from the usual 48 hour patch tests, the exposure was limited to a 24 hour period with the discs in contact with the skin, and observations were made one day and weekly thereafter to establish the time required for any reacting patch test site to return to normal. The patch tests were performed for the most part during April just before the series of poison ivy extract injections were begun and again at the end of the series in September or October when the opposite arm was used, although the interval was about 6 months. Interpretation of the patch test disc reactions was as follows: no skin change, 0 (negative); erythema, 1 plus (mildly positive); erythematous macular eruption, rough or raised, 2 plus (moderate reaction); vesiculation or oozing with tiny or large bullae, 3 plus (marked reaction).

Injections of the alum-precipitated pyridine *Rhus toxicodendron* extract were given at weekly intervals. The first doses were 0.4 c.c. and 0.7 c.c. of 1:50 dilution; the subsequent doses were 0.2 c.c., 0.4 c.c., 0.7 c.c., and 1.0 c.c. of 1:5 dilution. When the top dose of 1.0 c.c. of 1:5 dilution was reached, this dose was given monthly for 3 months.

In addition to recording the days of mild, moderate, or severe dermatitis, each man was asked to make a subjective evaluation at the end of the summer period as to whether his poison ivy dermatitis was the same or worse during the year of treatment than the previous year (a poor result), or substantially less in duration and severity (a good result). In order that the report would not be distorted by false statements made by the subjects unconsciously or consciously trying to please the doctor with a good report, a separate evalua-

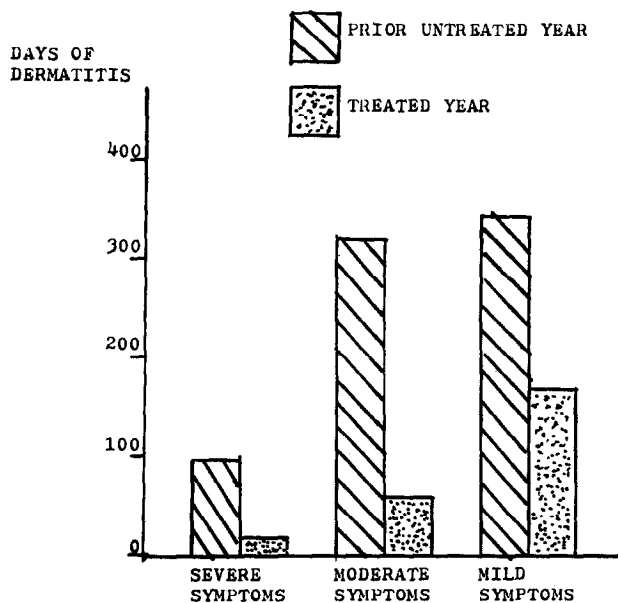


Fig. 1.—Symptoms of 20 workmen exposed daily to poison ivy.

tion was made by a plant safety engineer who checked the work records and talked informally to the workmen involved in the program. The diagnosis was confirmed by the experimenter during some stage of the eruption, to eliminate, as far as possible, confusion with unrelated rashes.

B. Results.—The 20 workmen chosen because of daily exposure to poison ivy in the course of their jobs were found to have had poison ivy dermatitis for 1 to 25 prior summers (an average of 12.9 summers). The 6 month (April-October) season of the year prior to prophylactic therapy showed much greater disability than the April-October period the next year during which alum-precipitated pyridine ivy extract was administered. Table I indicates in detail the results obtained: 15 good and 5 poor. The five "poor" results could not be explained on the basis of comparative exposure in the treatment year or prior year as all of the men stated they were exposed almost daily by the nature of their work.

Fig. 1 shows the reduced days of disability due to poison ivy dermatitis and the reduction of severity of the disease: 50 per cent reduction in the mild cases, 81 per cent in the moderate, and 85 per cent in the severe cases.

On patch testing at the end of the treatments, 10 of 11 men tested showed a decrease of skin sensitivity by not reacting to a dilution which previously had produced a positive test.

Clinical subjective reports by the workmen themselves were used to place them in two groups with either poor or good results. Four were classified as having poor* results; these reported that they had about the same number or

*One man reporting poor result (56 days of poison ivy dermatitis while taking the prophylactic injections compared with 7 days of poison ivy dermatitis the previous year without prophylactic injection therapy) was receiving treatment for dermatitis around the toes and not on any exposed areas. This cast doubt on the family physician's diagnosis. This case was eliminated from the series.

slightly more days of dermatitis. The rest of the men reported very little or no trouble. One man (R. C.) volunteered that the areas involved produced less oozing, vesiculation, and itching than in prior untreated summers, although for a similar number of days. Including this case (R. C.) with the 15 reporting good results makes a total of 16 out of 20 with good results.

The safety engineer, checking the company records of days out of work and interviewing each man individually, stated that he believed the results were very encouraging since only 2 workmen said that they had not been helped whereas all the others said they had been helped considerably, 5 of the total claiming complete immunity. The safety engineer's estimate of good results, therefore, was 19 out of 21.

SECOND STUDY

A. *Method.*—The following year a study with patch test controls was undertaken with a similar group of 21 men. In this group 6 to 11 injections of 1.0 c.c. doses of the 1:5 dilution of the pyridine *Rhus toxicodendron* complex were administered subcutaneously during the spring and summer months, and pre- and post-treatment patch tests were performed as previously described. The initial 4 or 5 injections about April were weekly; subsequent injections varied from 2 to 4 weeks apart, ending about October.

B. *Results.*—Three 2 plus reactions at the beginning of the season became negative at the end of the season, and four 1 plus reactions also became negative. Therefore, a reduction of skin sensitivity, or increase in tolerance, was

TABLE I. IVY DERMATITIS

SUBJECT	NO. OF PRIOR YEARS	DAYS IN PRIOR YEAR (NO PROPHYLAXIS)			DAYS IN TREATED YEAR (WITH PROPHYLAXIS)			RESULT
		MILD	MOD.	SEVERE	MILD	MOD.	SEVERE	
M. B.	1			45	16			Good
M. T.	3			30†				Good
M. J.	6	10			5			Good
S. B.	1	20						Good
P. A.	2		20†		6			Good
B. A.	25		14			20	5	Poor
R. C.	20	21			21			Poor
W. C.	25	90			1			Good
C. C.	24	5			10			Poor
R. F.	20	5		2	38			Poor
H. H.	25		120		16			Good
G. J.	20		90	10		42‡	10	Poor
J. L.	15	28			7			Good
J. Lo.	15		21		7			Good
A. G.	25	35			10			Good
W. O.	5	4						Good
R. S.	4	90			33			Good
R. St.	1	28						Good
F. O.	16		55					Good
G. R.	6			12				Good
Totals	259*	336	320	99	170	62	15	15 5

*Or an average of 13 (12.95) preceding summers of ivy dermatitis.

†Required hospitalization part of this time. None during year with prophylactic treatment.

‡Although days of moderate dermatitis reduced from 90 to 42, patient reported he was "same as previous year" so a "poor" result was tabulated.

measured in 7 out of 21 men. In 3 others, although the same strength disc produced a similar reaction both before and after treatment, it was noted that the duration of the reaction at the tested site lasted half as long after prophylactic treatments as before the treatments were given. Thus, 10 out of 21 objectively may be said to have shown lessened sensitivity, or increased tolerance. Much more basic research would be needed to venture an explanation of "tolerance," but it apparently can occur without any antigen-antibody type reaction being involved.

This group tolerated the material well with only occasional tenderness or a noticeable swelling at the site of the injection. By subjective standards, these men reported good results in 18 of 21 cases, or 86 per cent. Albuminuria was not found as a result of treatment in any of the men studied.

CONCLUSIONS

1. An occupationally exposed group of 20 men who had had poison ivy dermatitis from one to 25 prior summers showed a reduction in days of dermatitis of 50 to 85 per cent after a graduated course of alum-precipitated pyridine *Rhus toxicodendron* subcutaneous injections, ultimately reaching 1.0 c.c. of 1:5 dilution.

2. Clinically good prophylactic results were obtained in at least 76 per cent; from the work records and conversations with the 20 subjects involved in the study, the safety engineer reported 95 per cent good results.

3. Twenty-one men, occupationally exposed to a similar degree, were given six to eleven injections, each consisting of 1.0 c.c. of 1:5 dilution of an alum-precipitated pyridine *Rhus toxicodendron* extract, with 86 per cent good results.

4. Reduction of skin sensitivity or increased tolerance to 5-pentadecylcatechol was demonstrated by means of patch testing in 53 per cent of the cases.

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