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Poison ivy: How effective are available treatments?

In this study, only one treatment approach significantly reduced pruritus. Three approaches were often associated with recurrences of rash or symptoms.

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ABSTRACT

Purpose ▶ To determine the characteristics and clinical course of *Rhus* dermatitis in patients who seek assistance from primary care clinicians, as well as treatment approaches used by patients and recommended by clinicians, and treatment approaches associated with better outcomes.

Methods ▶ This was a prospective cohort study with standardized baseline data collection on patients and their rashes, followed by examination of patient-completed diaries of signs, symptoms, and treatments.

Results ▶ Thirty-six clinicians identified 186 interested patients, of which 89 completed and returned diaries and consent forms. Of those 89 patients, 92% reported pruritus; 91%, erythema; 87%, papules; and 49%, vesicles or bullae at baseline. Their rashes involved the head/face/neck, 61%; trunk, 56%; legs, 54%; and arms, 22%. From the date of clinical consultation, the mean (standard deviation [SD]; range) duration of any symptom or sign was 14.4 days (8.0; 1-43). Patients most often had tried a topical antipruritic, astringent, or low-potency corticosteroid before seeking care. Clinicians prescribed oral or parenteral corticosteroids 81% of the time, sometimes in combination with a high-potency topical corticosteroid (25%) or oral antihistamine (31%). Only systemic corticosteroids plus high-potency topical corticosteroids were associated with a significantly shorter duration of itching (P=.005). No treatment was associated with reduced duration of erythema, papules, or vesicles.

Conclusions ▶ Patients who visit a primary care clinician for *Rhus* dermatitis can expect the rash to last another 2 weeks on average (total duration: one day to 6 weeks) regardless of what treatment is prescribed. Parenteral corticosteroids plus high-potency topical corticosteroids may reduce the duration of the itching.

Rhus dermatitis (poison ivy, oak, and sumac) is a common cause of contact dermatitis throughout the United States. The condition is usually mild and often not brought to the attention of primary care clinicians. Some patients, however, do see a health care provider for treatment, most often because of pruritus. This form of contact dermatitis results from a type IV hypersensitivity reaction to urushiol, a colorless oil in the leaves, stem, root, and fruit of poison ivy, poison oak, and poison sumac. The reaction, which occurs 24 to 72 hours following contact with the skin, can be prevented by washing the skin promptly with a detergent soap after exposure. By the age of 8, most people are sensitized to urushiol.[1]

According to most standard texts and clinical reviews, untreated *Rhus* dermatitis usually resolves in one to 3 weeks. What is not known is whether particular patient or rash

Patients seeking help for poison ivy can expect the rash to last an additional 2 weeks on average, regardless of the treatment prescribed.

characteristics might affect prognosis and thereby influence treatment recommendations—eg, age, gender, race, location of the rash, prior episodes, chronic illnesses such as diabetes, or chronic use of medications such as nonsteroidal anti-inflammatory drugs and corticosteroids.

Impetus for our study. An informal survey of 10 clinician members of the Oklahoma Physicians Resource/Research Network (OKPRN), a statewide practice-based research network, suggested that primary care clinicians treat between one and 10 patients with poison ivy each week during the spring, summer, and fall (median 2.5). Their reported armamentarium included more than 15 different over-the-counter topical agents, several oral antihistamines, and a variety of topical, oral, and parenteral corticosteroids.

Surprisingly, there is very little published evidence on which to base treatment decisions. Using PubMed and the search terms, *Rhus dermatitis*, *poison ivy*, and *poison oak*, we found only 3 placebo-controlled clinical trials of *Rhus* dermatitis treatments in the English language literature after 1966. Based on these studies, Zanfel, a mixture of alcohol-soluble and anionic surfactant, may be somewhat effective, but pimecrolimus and jewelweed extract were no more effective than placebo.[2-4] There is some evidence that topical corticosteroids are effective only before vesicles appear.[5] In one uncontrolled study, intramuscular injection of betamethasone and dexamethasone yielded about a 30% reduction in symptoms within 48 hours.[6] Assuming that systemic corticosteroids do produce benefit, however, the most effective dose and duration of treatment have not been determined.[7,8]

To address some of these gaps in our knowledge base, OKPRN members asked that we undertake a longitudinal cohort study of patients reporting to primary care practices.

METHODS

We conducted this study between May 2010 and October 2014. The project was approved by the University of Oklahoma Health Sciences Center Institutional Review Board. Clinician members of OKPRN were invited to participate in the study via listserv, fax, or letter. We instructed clinicians and office staff to ask patients with *Rhus* dermatitis if they might be interested in participating in a study, which would require that they keep a symptom diary and would earn them a $20 gift card. Interested patients were given a packet of information, and a member of the research team later called the patients with additional information, including an explanation of informed consent and instructions on completing and returning the diary and written consent form.

Clinicians recorded information about the patient and the rash on a customized template, releasing it to the team after written consent was obtained from the patient. Categories for characterizing the rash were head/face, arms/hands, trunk, and legs/feet. A subset of 5 participating clinicians, selected to include a variety of practice types and patient populations, were also asked to produce, from their billing software, the number of patients and encounters in which poison ivy was addressed in each month of 2013.

On the diary, patients were instructed to record the presence or absence of pruritus, erythema, raised lesions, and vesicles/bullae at the end of each day until the rash resolved, or for 6 weeks following onset of the rash, whichever came first. Patients were asked to mail their diaries to the principal investigator once they were free of symptoms for one week or after 6 weeks from the onset of symptoms, whichever came first.

We asked both patients and clinicians to report medications used before and after the primary care encounter. A member of the research team assigned these medications to one of 12 categories: topical antihistamines, topical soaps (eg, Zanfel or Tecnu), topical astringents, other topical antipruritics, topical aloe vera, topical bleach, low-potency topical corticosteroids, moderate-potency topical corticosteroids, high-potency topical corticosteroids, oral antihistamines, oral corticosteroids, and parenteral corticosteroids.

We used independent T-tests to evaluate associations between baseline variables, patient-initiated treatments, and clinician-initiated treatments and the time to complete

resolution of individual signs and symptoms and complete resolution of all signs and symptoms following the clinical encounter. We created additional outcome variables for initial resolution followed by recurrence of itching, erythema, papules, and vesicles. The purpose of these variables was to determine if some treatments were initially effective but without lasting effect.

We used the chi square test to assess associations between clinician-initiated treatments and recurrence of signs or symptoms following initial resolution. To account for chance associations resulting from multiple analyses, we chose to set the level of statistical significance at P=.01. However, because of the lower-than-projected sample size, we chose to also report variables with P<.05 so that the reader could judge the likelihood that a larger sample might have disclosed other important associations.

We assumed that an average of 4 categories of treatment would be tried (eg, topical corticosteroids, systemic corticosteroids, topical antihistamines, and other topical agents), and that the mean number of days until resolution would be 21, with a standard deviation (SD) of 4 days. Setting power at 80% and alpha at .05, we calculated it would take 105 patients per group (N=420) to detect a difference of 2 days in time until resolution.

RESULTS

Over the 5-year study period, 36 clinicians identified 186 patients who expressed an interest in the study, and they transmitted the patient contact information to the research team. Patients were seen in a traditional primary care setting. All 186 patients were enrolled by phone. However, only 89 completed and returned their diaries and signed consent forms; of these, 60% were female, 92% were white, 4% were black, 4% were American Indians, 2% were Hispanic, and 7% had diabetes mellitus.

Five practices contributed data on numbers of poison ivy encounters per month and total encounters per month for the year 2013. They included an inner city academic practice in central Oklahoma and a rural community health center, a suburban private practice, and 2 private practices in a town of 30,000 in eastern Oklahoma. The largest average number of encounters occurred between April and August.

The distribution of enrolled-patient visits by month and season corresponded roughly to the proportions of all patient visits for poison ivy, with 1% occurring in the winter, 35% in the spring, 55% during the summer, and 9% in the fall. Virtually all study participants (92%) complained of pruritus and had erythema (91%) and papules (87%). Forty-nine percent had vesicles or bullae. The area of the body most often affected was the head/face/neck, 61%, followed by the trunk, 56%; legs, 54%; and arms, 22%.

From the date of initial clinical consultation, the mean/median (SD; range) duration of symptoms and signs were: pruritus, 10.9/9 days (7.1; 0-43); erythema, 13.7/13 days (7.7; 0-42); papules, 10.1/9.5 days (6.5; 0-37); and vesicles, 5.3/5 days (4.1; 0-15). The mean/median (SD; range) duration of any symptom or sign was 14.4/13.5 days (8; 1-43). Rashes with vesicles tended to last longer (16.1 vs 12.9 days), but this difference did not reach statistical significance.

Treatments used by patients before and after their primary care visit are shown in **TABLE 1**. Seventy-three percent of patients had tried something from one treatment category before consulting a clinician, and 31% had tried something from more than one category. They were most likely to have used a topical antipruritic, astringent, or low-potency corticosteroid, or a combination of these. Clinicians always recommended some treatment and, in 76% of cases, treatments from more than one category. They most often prescribed oral or parenteral corticosteroids (81% of the time), sometimes in combination with a high-potency topical corticosteroid (25% of the time) or oral antihistamine (31%). Oral corticosteroids were used for an average of 11 days; parenteral corticosteroids were given once. Oral antihistamines were recommended for 30% of patients, with an average course duration of 13 days. Clinicians did not prescribe systemic corticosteroids or any other treatment type more often based on location of the rash or presence of vesicles.

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Systemic corticosteroids plus high-potency topical corticosteroids reduced the duration of itching.

TABLE 1

Medications and other treatment choices before and after primary care visits

Medication/treatment	Before primary care visit N=89* (%)	After primary care visit N=89* (%)
Topical antihistamines	10 (11%)	2 (2%)
Topical Zanfel or Tecnu	5 (6%)	2 (2%)
Topical astringents (eg, calamine lotion)	21 (24%)	6 (7%)
Other topical antipruritics (eg, menthol, camphor, benzocaine, pramoxine)	34 (38%)	8 (9%)
Topical aloe vera	0 (0%)	0 (0%)
Topical bleach	1 (1%)	0 (0%)
Low-potency topical corticosteroids	17 (19%)	8 (9%)
Moderate-potency topical corticosteroids	1 (1%)	8 (9%)
High-potency topical corticosteroids	1 (1%)†	29 (33%)
Oral antihistamines	1 (1%)	27 (30%)
Oral corticosteroids	3 (3%)†	49 (55%)
Parenteral corticosteroids	2 (2%)†	43 (48%)
Other (home remedies)‡	14 (16%)	0 (0%)
No treatment‡	7 (8%)	2 (2%)§

*Many of the 89 patients had tried (pre-visit) or were prescribed (post-visit) multiple treatments.

†These patients had received prescription medications from other clinicians before seeing the physicians who participated in this study.

‡Not included in the study's 12 therapeutic categories.

§Two patients declined recommended treatment.

No statistically significant associations were found between the baseline nontreatment variables and duration of symptoms and signs. Patient-initiated treatments were also not associated with duration of symptoms and signs following the initial clinician visit.

Of the treatments prescribed by clinicians or independently chosen by patients following their initial office visit, only systemic corticosteroids plus high-potency topical corticosteroids were associated with a significantly shorter duration of itching (P=.005). No treatment was associated with reduced duration of erythema, papules, or vesicles. Use of topical soaps was associated with a longer duration of papules (P<.0001) and of total duration of signs or symptoms (P=.0004) compared with other treatments.

Location and characteristics of the rash were not associated with likelihood of recurrence following treatment. Post-visit use of a topical soap was associated with recurrence of itching (P=.001) and erythema (P=.01). Recurrence of erythema was also more frequent in patients prescribed topical astringents (beta coefficient=0.28; P=.008), and recurrence of papules was more common in patients treated with low-potency topical corticosteroids (P<.0001). These results and several others that almost reached statistical significance are shown in **TABLE 2**.

In the multivariable models, the only variable associated with duration of pruritus was the combination of systemic and high-potency topical corticosteroids (8 vs 12 days.) Use of only parenteral or only high-potency topical corticosteroids did not predict shorter duration of pruritus. Use of topical soaps was associated with longer duration of papules (33 vs 9.6 days) and longer duration of any symptoms (33 vs 13.9 days). It was also associated with a higher likelihood of recurrence of pruritus (chi square test [χ^2], 10.67) and recurrence of erythema (χ^2, 5.92) after initial resolution. Topical astringent use was predic-

TABLE 2

Associations between clinician treatments and outcomes including all variables with $P<.05$

Outcome	Associated variables	Mean duration (days) treatment vs other treatments	*P* value
Duration of pruritus	Systemic + HP topical CS	8 vs 12	.005
Duration of erythema	None	N/A	N/A
Duration of papules	Topical soap	33 vs 9.6	<.0001
Duration of vesicles	Systemic CS	7.5 vs 5.3	.04
Duration of any sign/symptom	Topical soap	33 vs 13.9	.0004
		Chi square	
Recurrence of pruritus	Topical soap	10.67	.001*
Recurrence of erythema	Topical soap	5.92	.01
	Topical astringent	7.01	.008
	LP topical CS	5.57	.02
Recurrence of papules	Topical soap	4.08	.04
	Topical astringent	4.50	.03
	Topical LP CS	20.96	<.0001
Recurrence of vesicles	None	N/A	N/A

CS, corticosteroid; HP, high-potency; LP, low-potency; N/A, not applicable.

*Only 2 patients were included in this analysis.

tive of recurrence of erythema (χ^2, 7.01) and use of low-potency corticosteroids was associated with recurrence of papules (χ^2, 20.96).

DISCUSSION

While network clinicians felt that studying poison ivy was of interest and importance, and we had preliminary survey information to suggest it was a common problem treated in primary care, our data suggest that clinical encounters for poison ivy are actually quite uncommon (less than 0.4% of all encounters) even during peak months. Our problems with recruitment were therefore unexpected, and we ended up with far fewer enrolled patients than we had projected, and needed, based on our power analysis. Also based on our preliminary survey, we anticipated considerably more variation in treatment approach than we found. Most clinicians recommended either an oral, parenteral, or high-potency topical corticosteroid, and some also recommended an oral antihistamine, usually diphenhydramine.

The literature and common sense suggest that most patients who seek medical treatment for poison ivy are primarily concerned about itching. Even with the smaller-than-anticipated number of participants in this study, we were able to show that the combination of a systemic (oral or parenteral) corticosteroid and a high-potency topical corticosteroid was associated with a statistically significant shorter duration of pruritus with no recurrence following treatment. We found no evidence that systemic corticosteroids alone, parenteral corticosteroids alone, or high-potency topical corticosteroids alone had any effect on duration of signs or symptoms, even at an alpha of .05. We also found no evidence that oral antihistamines were associated with a shorter duration of pruritus (P=.06); with a larger sample size, we might have found a difference.

Since only 2 patients used topical soaps following their initial clinician visit, the associations between use of these products and longer duration of signs and symptoms and with recurrence of signs and symptoms,

although statistically significant, should be viewed with skepticism and with an eye toward possible confounders (eg, people who used these agents may have been more likely to notice and record minor symptoms). Furthermore, these agents have been effective only when used before or at the onset of the rash.

Study limitations. The study has a number of limitations. It had a high drop-out rate. Some patients might not have had poison ivy, but it is generally considered easy to diagnose with accuracy. We cannot be sure that all of the enrolled patients had *Rhus* dermatitis. Enrollment was based on the clinical impression of the patients' primary care clinicians. The sample size reduced the power of the study to detect small differences in treatment effects and prevented more complex analyses (eg, combinations of medications, interactions).

The possibility of self-selection bias, weaknesses of the cohort design, and patient-reported outcome measures were additional limitations. The study was also carried out in a single southwestern state, which may not be representative of some other locations. However, it is one of only a few studies published on *Rhus* dermatitis and possibly the only one conducted in primary care settings. JFP

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