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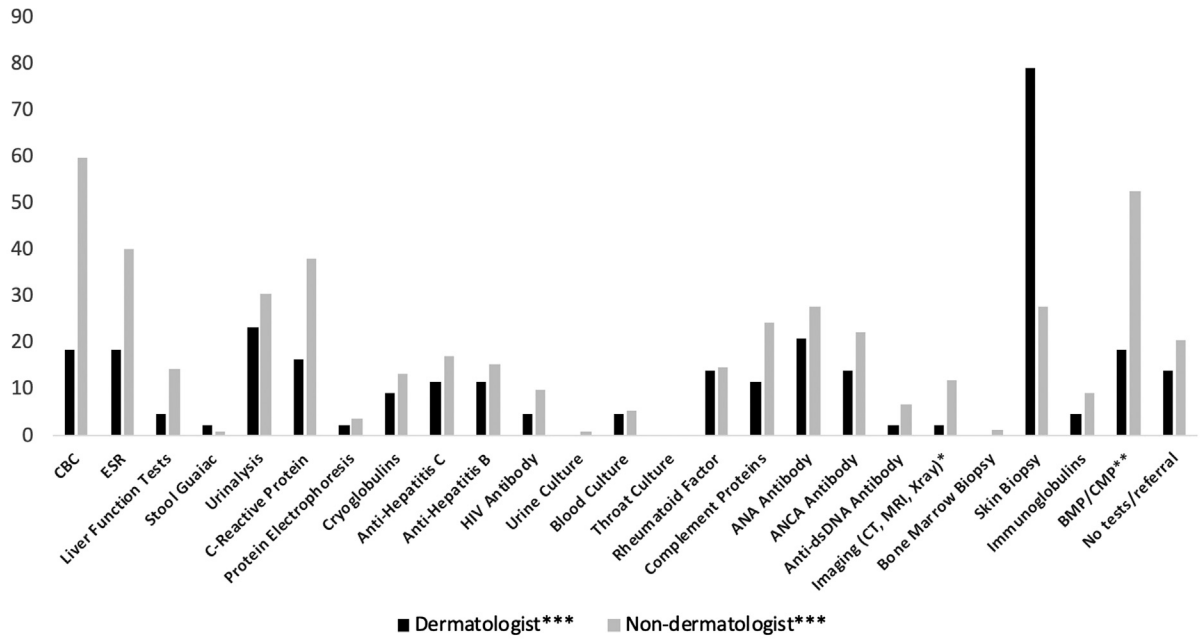
https://doi.org/10.1016/j.jaad.2019.12.016

Assessing practice gaps in the outpatient management of cutaneous small vessel vasculitis

To the Editor: Leukocytoclastic vasculitis (LCV) is a heterogenous group of inflammatory vascular disorders commonly encountered in clinical practice.[1,2] LCV is characterized by inflammation of small vessels of the body (ie, arterioles, venules, capillaries) and may have varying clinical manifestations.[3] In most cases, LCV is a self-limited skin eruption that does not recur. The etiology commonly falls into 4 categories: primary (idiopathic), medication related, infection induced, or autoimmune connective tissue disorders. Many patients with LCV receive an expensive laboratory evaluation to elucidate an underlying cause. However, in clinical practice, a patient history with review of systems, physical examination, and targeted workup consisting of skin biopsy and urinalysis is often sufficient to rule out underlying systemic involvement or disease triggers.[4]

Our study aimed to evaluate the cost of LCV workup directed by dermatologists versus nondermatologists. An outpatient cohort of patients with nonrecurrent LCV was identified in TriNetX using International Classification of Diseases L95.9 diagnostic codes from December 2015 through April 2019. Patient demographic information, laboratory tests, procedures ordered, and provider type were identified in the electronic medical records and compiled in REDCap (Vanderbilt University, Nashville, TN) as deidentified information. Because insurance plans vary, up-front costs of LVC workup were extrapolated from online cost analysis databases available to the general public. Total number of laboratory tests ordered and total cost were calculated and compared by specialty type, and an analysis of variance (ANOVA) was conducted between provider groups.



CBC= Complete Blood Count; ESR = Erythrocyte Sedimentation Rate; ANA = Anti-Nuclear Antibody; ANCA = Antineutrophil Cytoplasmic Antibody; BMP = Basic Metabolic Panel; CMP = Comprehensive Metabolic Panel
* Imaging studies include but are not limited to CT, MRI, and Xrays.
**Total costs calculated for BMP/CMP are the average of both laboratory tests.
***Percentages of dermatologists and non-dermatologists that order individual laboratory tests for LCV work-up are shown.

Fig 1. Comparison of laboratory tests ordered by dermatologists and nondermatologists.

Table I. Comparison of laboratory tests ordered and costs of LCV workup, differentiated by provider type

		Evaluation of patients with LCV in health care setting*				
Provider type	**Number of tests ordered, mean**	**Number of tests ordered, range**	**Most commonly ordered tests (%)†**	**Average cost of testing**	**Testing costs, range**	**Provider type for initial evaluation, %**
Dermatologist	1.41	1-6	Skin biopsy (79.1) Urinalysis (23.3) Anti-ANA antibody (20.9)	$169.94	$81-$487	14.6
Nondermatologist	5.53	1-16	CBC (59.9) BMP/CMP (52.4) ESR (40.1%)	$420.51	$35-$3012	85.4
Total combined‡	5.29	1-16	CBC (54.0) BMP/CMP (47.3) ESR (36.9)	$420.14	$35-3012	100

ANA, Antinuclear antibody; *BMP*, basic metabolic panel; *CBC*, complete blood count; *CMP*, comprehensive metabolic panel; *ESR*, erythrocyte sedimentation rate.

*Includes patients seen in both inpatient and outpatient settings.

†The top 3 most commonly ordered laboratory tests by dermatologists and nondermatologists listed in order of frequency. Aggregate data of the 2 cohorts are skewed toward nondermatologists.

‡The average number of laboratory tests ordered and cost of LCV workup for both dermatologists and nondermatologists with weight distributed toward nondermatologists, given the number of patients with LCV seen.

A total of 295 adult patients (20 to 94 years old; median, 56.8 years) with LCV were included in this study. Fig 1 shows a distribution of laboratory tests ordered for LCV workup compared by specialty type. Dermatologists most commonly ordered skin biopsy (79.1%) and urinalysis (23.3%); nondermatologists most frequently ordered complete blood count (59.9%), basic metabolic panel/comprehensive metabolic panel (52.4%), erythrocyte sedimentation rate (40.1%), and C-reactive protein (38.1%). Overall urinalysis was ordered in fewer than 40% of cases in both provider groups. Table I shows laboratory tests and costs of LCV workup and provider type evaluating patients with LCV. The majority of patients were initially evaluated by nondermatologists (85.4%) compared with an initial evaluation by a dermatologists (14.6%). Dermatologists tended to order fewer laboratory tests (mean 1.41, $P < .01$) than nondermatologists (mean 5.53), and the mean cost of tests ordered by dermatologist was lower than those ordered by nondermatologists ($169.94 vs $420.51, respectively; $P < .01$).

Overall, our study shows a practice gap between dermatologists and nondermatologists in the initial evaluation of patients with LCV. There was also a global practice gap because neither group consistently obtained a urinalysis. Urinalysis is a particularly important assessment because this indicates systemic involvement and changes outpatient management, yet only 40% of all providers obtained this test. Additionally, patients seen by nondermatologists accrue significantly higher laboratory and procedure-related costs. The range of expenditures also varied more with nondermatologists. Our cost expenditure analysis of LCV workup identifies modifiable factors with the goal of providing symptom-focused laboratory evaluation of nonrecurrent LCV. This study also showed a global practice gap, with a minority of providers ordering recommended testing. Recognizing LCV as a common skin condition encountered in clinical practice, our study highlights the cost of unnecessary tests and a practice gap among primary care providers and dermatologists in their laboratory workup for nonrecurrent LCV in the outpatient setting.

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Funding sources: None.

Conflicts of interest: None disclosed.

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https://doi.org/10.1016/j.jaad.2020.01.024

Patch testing and contact allergen avoidance in patients with lichen planopilaris and/or frontal fibrosing alopecia: A cohort study

The incidence of frontal fibrosing alopecia (FFA) has increased since 1994, suggesting environmental causes in disease etiology.[1,2] The development of FFA has been linked to a xenobiotic-processing enzyme genetic defect, but the exact etiopathogenesis is still unknown.[2] Patch testing in British and Brazilian patients with FFA identified 5 potentially relevant allergens.[1,3] This study sought to identify relevant allergens in patients with FFA and/or lichen planopilaris (LPP) and assess whether avoidance of relevant allergens affected patients' alopecia symptoms and disease activity.

From January 2018 through June 2019, 42 patients with LPP/FFA were referred for patch testing from a specialty alopecia clinic. Patch testing included the North American Baseline Series, Cosmetic and Hairdresser Series, and 8 other potential allergens, identified by 3 experienced contact dermatitis experts (JY, PS, DS), which included *N*-isopropyl-*N*′-phenyl-*p*-phenylenediamine, methylchloroisothiazolinone/methylisothiazolinone (MCI/MI), benzophenone-4, avobenzone, benzalkonium chloride, carvone, polysilicon 15, and aminoazobenzene. Readings were performed at 48 and 96 hours. At least 3 months after patch testing, patients with relevant allergens participated in a brief survey to assess the impact of allergen avoidance. All surveyed patients were following stable LPP/FFA treatment regimens for at least 6 months before patch testing and remained on those treatments during the 3 months before survey administration. Allergens were deemed relevant if they were present in patients' personal care products and had at least a +1 patch test reaction. Because gallates may be present in oils in personal care products in concentrations small enough to be omitted from ingredient lists but still capable of eliciting allergic contact dermatitis, all +1 or higher reactions for these were considered relevant.[4] Local institutional review board approval was granted for this study.

There were 41 women and 1 man, with a mean age of 61 years (range, 25-81 years) who underwent patch testing. Most were white (97.6%) with biopsy-proven LPP (61.9%), FFA (26.2%), or LPP/FFA overlap (11.9%), and 76.2% had clinically relevant allergens found in cosmetic and personal care products applied on the scalp and face. As shown in Table I, the most common relevant allergens included gallates (26.2%), linalool (19.0%), and fragrance mixes (19.0%). Linalool is a ubiquitous fragrance chemical found in many personal care products, including cleansers, cosmetics, creams, lotions, and hair care products (shampoo, conditioner, leave-in products such as hairspray and gel, etc). Gallates are preservatives added to products to prevent the growth of yeast, fungi, and bacteria, and they can be found in cleansers, cosmetics, liquids, and creams.

The distribution of the number or type of relevant allergens in patients with LPP, FFA, or LPP/FAA did not differ widely (Table II). Twenty patients were eligible at the time of survey administration to participate. Of these, 58.3% and 72.7% of surveyed patients who had scalp pruritus or erythema on initial presentation indicated that their scalp pruritus or erythema decreased, respectively, after at least 3 months of allergen avoidance.

Study patients continued clinic visit evaluations by the treating physician (MMS), who was blinded to patient survey responses. Perifollicular scalp erythema was graded from 0 (none) to 3 (confluent) for each scalp section (top, right, left, back). Review of medical records showed that after at least 3 months of allergen avoidance, 70% of patients had decreased scalp erythema on examination. No patient had signs or symptoms of worsening LPP/FFA.

Although no recent studies have investigated the prevalence of allergens in the general population in the United States, European studies report the prevalence for Fragrance mix (FM) I (FM I) and FM II to be 1.8% and 1.9%, respectively.[5] Although the prevalence in the North American Contact Dermatitis Group (NACDG) results approach those of our cohort, the NACDG includes +/- or questionable/equivocal reactions in their data, and we did not include these equivocal results in our patient data set. Removing the +/- results from the 2015-2016 NACDG numbers brings the prevalence of FM I, FM II, and MCI/MI allergy to approximately 10%, 4.8%, and 6.8%, respectively.[4] The higher prevalence of allergens in our patient cohort (14.3%, 9.5%, and 11.9% for FMI, FM II, and MCI/MI, respectively) suggests that our results may be important in the treatment and evaluation of patients with LPP and FFA. Although an age- and sex-matched control group for the current study is lacking, the NACDG patients were predominantly female (72%) and