Histopathologic Distinguishing Features Between Lupus and Lichenoid Keratosis on the Face

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Background: The occurrence of lichenoid keratosis (LK) on the face is not well characterized, and the histopathologic distinction between LK and lupus erythematosus (LE) occurring on the face is often indeterminate. The authors aimed to describe differences between LE and LK occurring on the face by hematoxylin and eosin alone.

Methods: Cases of LK and LE were obtained using computer-driven queries. Clinical correlation was obtained for each lupus case. Other diagnoses were excluded for the LK cases. Hematoxylin and eosin–stained sections were reviewed.

Results: Forty-five cases of LK and 30 cases of LE occurring on the face were identified. Shared features included follicular involvement, epidermal atrophy, pigment incontinence, paucity of eosinophils, and basket-weave orthokeratosis. Major differences between LK and LE, respectively, included perivascular inflammation (11%, 90%), high Civatte bodies (44%, 7%), solar elastosis (84%, 33%), a predominate pattern of cell-poor vacuolar interface dermatitis (7%, 73%), compact follicular plugging (11%, 50%), hemorrhage (22%, 70%), mucin (0%, 77%), hypergranulosis (44%, 17%), and edema (7%, 60%). A predominate pattern of band-like lichenoid interface was seen more commonly in LK as compared with LE (93% vs. 27%).

Conclusions: The authors established the occurrence of LK on the face and identified features to help distinguish LK from LE. Follicular involvement, basket-weave orthokeratosis, pigment incontinence, paucity of eosinophils, and epidermal atrophy were not reliable distinguishing features. Perivascular inflammation, cell-poor vacuolar interface, compact follicular plugging, mucin, hemorrhage, and edema favored LE. High Civatte bodies, band-like lichenoid interface, and solar elastosis favored LK.

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LEARNING OBJECTIVES

After participating in this activity, physicians should be able to:

1. Describe the histopathologic features of lichenoid keratosis occurring on the face.
2. Compare and contrast the histopathologic features of lupus erythematosus and lichenoid keratosis occurring on the face.

INTRODUCTION

Lichenoid tissue reactions may be a manifestation of systemic conditions, such as lupus erythematosus (LE), or the lichenoid dermatitis may represent an isolated cutaneous reactive process, as in lichenoid keratosis (LK). These 2 entities have distinct clinical presentations. Discoid or chronic cutaneous LE (CCLE) often presents as 1 or more erythematous to violaceous scaly patches or plaques, often with scarring and follicular plugging, on sun-exposed areas of the face, scalp, or ears. CCLE affects young women (usually aged 20–40 years) 2–3 times more often than men.[1] LK (also known as lichen planus-like keratoses or benign LK) has a similar female predominance, with an average age of 59.5 years (range, 36–87 years), and is typically located on sun-damaged skin of the trunk and upper extremities.[2] Only 7% of LKs were identified on the head and neck in a study of 1040 patients.[2] LKs are usually solitary, variably erythematous, violaceous, hyperpigmented flat lesions with a smooth or rough surface, ranging in size from 5 to 20 mm in diameter. The duration of LK is on average 5 1/2 months (range, 3 weeks–4 years).

Clinically, LKs are frequently diagnosed as basal cell carcinoma or actinic keratosis (AK).[2] LE is not usually entertained in the clinical differential diagnosis when LK arises on the trunk or extremities. However, given the lichenoid tissue reaction present in both LE and LK, there may be challenges in differentiating these histologically when LK is located on the face. Histopathologic features of 1040 LK have been characterized and subtyped.[2] However, facial lesions were not specifically identified in the 72 cases that were evaluated from the head and neck. Clinicopathologic features of facial

LK have been reported in 14 Korean patients[3] and in a subset of 50 patients in a report originating in China.[4] The aim of this study was to further characterize the histopathologic features of LK on the face in a US population and to compare these features with those of LE on the face to identify histopathologic features to help differentiate LE from LK. A review of previously reported facial LK is also provided.

MATERIALS AND METHODS

Computer-driven queries were performed at 2 separate institutions (Ackerman Academy of Dermatopathology, New York, NY, and University of Colorado, Denver, CO) to retrieve 45 cases of LK and 30 cases of LE occurring on the face between 2012 and 2013. Cases of LK were composed of 39 shave biopsies and 6 punch biopsies, whereas cases of LE included 15 shave and 15 punch biopsies. Hematoxylin and eosin (H&E)–stained sections were reviewed on all cases. Some cases had additional stains performed, such as periodic acid–Schiff or colloidal iron. Clinical information was obtained through an electronic database or by direct communication with the patient's physician for lupus cases and, when deemed necessary, for cases of LK. Histopathologically, LK was defined by incorporating previously reported criteria,[5] which corroborated the senior authors' collective years of experience in dermatopathologic diagnosis of this entity. The histopathologic criteria for LK included the presence of a variable degree of either vacuolar or lichenoid interface tissue reaction (with at least focal effacement of the basal layer of the epidermis), supported by the presence of adjacent solar lentigo, if present, and absence of features suggesting an alternative diagnosis such as prominent dermal mucin, a thickened basement membrane zone, or an associated melanocytic proliferation.

The clinical criteria are outlined below. After H&E slides were reviewed and each case was classified according to preset criteria described below, a "z-test" was used to calculate a z-score for each histopathologic criterion. The z-score was then converted to a 2-tailed P value using an online calculator. A $P < 0.05$ was considered statistically significant.

Inclusion Criteria for Cases of LK

1. Confirmatory clinical information, age, gender, anatomic location, number of lesions, and clinical impression; in cases where an atypical pigmented lesion was included in the clinical diagnosis, clinical follow-up was obtained through direct communication with the patient's physician to confirm that there was not an associated pigmented lesion at the time of biopsy.
2. Confirmed histopathologic diagnosis of LK (J.M.J.H. or W.A.H.).
3. Adequate pathologic material available to allow examination of the entire epidermis and papillary dermis at minimum.
4. Anatomic location was specific to the face, including the ears. Of note, our computer search found no cases of LK on the scalp.

Exclusion Criteria for LK

1. A clinical history of LE.
2. A clinical history of multiple lesions.
3. A clinical history of lichen planus.
4. A history of or clinical suspicion for lichenoid drug or photoeruption.
5. Histopathologic features favoring seborrheic keratosis, such as horn cysts.
6. Prominent keratinocyte atypia suspicious for AK.
7. Anatomic location other than the face.

Inclusion Criteria for LE

1. Final histopathologic diagnosis was consistent with discoid lupus.
2. Physician's clinical impression was explicitly consistent with discoid lupus based on long-term follow-up of the patient.
3. Clinical impression consistent with lupus in the setting of a positive direct immunofluorescence.
4. Anatomic location of either the face (including ears) or scalp.

Exclusion Criteria for LE

1. Presence of eosinophils.
2. Clinical impression not explicitly consistent with lupus based on long-term follow-up of patient.
3. A clinical history of lichen planus.
4. A history of or clinical suspicion for lichenoid drug or photoeruption.
5. Anatomic location other than the face or scalp.

Histopathology Assessment Criteria

1. Cases were categorized according to the predominant inflammatory pattern observed:
   - Band-like (lichenoid) interface dermatitis: a dense lymphocyte infiltrate occurring in a band-like fashion and obscuring the dermal–epidermal junction in addition to vacuolar degeneration of the basal layer.[6,7]
   - Cell-poor vacuolar interface dermatitis: a cell-poor or sparse lymphocyte infiltrate associated with vacuolar degeneration of the basal layer.[7,8]
2. High Civatte bodies defined as having at least 1 Civatte body (dyskeratotic keratinocyte) found above the basal layer.
3. Eosinophils: defined by having at least 1 eosinophil present in 1 high-powered field.
4. Follicular plugging: defined as the presence of a dilated follicular infundibulum plugged with either compact orthokeratosis or noncompact orthokeratosis (lamellar or basket-weave).
5. The stratum corneum was classified according to the predominant pattern seen and was categorized into (1)

TABLE 1. Comparison of Clinical History Between LK and Lupus

	LK, N = 45	Lupus, N = 30
Anatomic location		
Cheek	16 (36%)	12 (40%)
Forehead, glabella	9 (20%)	1 (3%)
Scalp	—	5 (17%)
Ear	1 (2%)	2 (6%)
Eyebrow, suprabrow	2 (4%)	3 (10%)
Jawline	4 (9%)	2 (6%)
Zygoma	1 (2%)	—
Temple	6 (13%)	1 (3%)
Bridge of nose	1 (2%)	2 (6%)
Preauricular	2 (4%)	—
Periorbital	3 (7%)	—
Nasolabial fold	—	1 (3%)
Chin	—	1 (3%)
Average age, yrs	58	49.6
Range, yrs	31–95	20–83
Median age, yrs	70	45
Male	14 (31%)	10 (33%)
Female	31 (69%)	20 (67%)

a predominately basket-weave stratum corneum, (2) a predominately compact stratum corneum, or (3) a predominately parakeratotic stratum corneum. If present, the finding of focal parakeratosis was also noted in addition to one of the aforementioned patterns.

6. Follicular inflammation was defined as lymphocytes disrupting the follicular epithelium, associated with vacuolar change and/or dyskeratosis. Additionally, these features had to involve the infundibular portion of the hair follicle.
7. Presence of mucin was defined as diffuse or focal (but prominent) interstitial mucin deposition within the dermis visualized on H&E alone. For cases that had previous staining with colloidal iron, these slides were not reviewed or incorporated into the assessment for the presence of mucin.
8. Hemorrhage was defined as the presence of focal (prominent) or diffuse extravascular red blood cells within the papillary or reticular dermis. Hemorrhage present at the biopsy margins, suggesting biopsy trauma, was not satisfactory for this condition.
9. Pigment incontinence (melanin within dermal macrophages or melanophages) was noted as present or absent.

RESULTS

A total of 45 cases of LK and 30 cases of lupus were retrieved and analyzed. The average patient age for LK was 58 years (±15 years) (range, 31–95 years; median, 70 years) (Table 1). The average patient age for lupus was 49.6 years (±17 years) (range, 20–83 years; median, 45 years). The LK cases were composed of 14 males (31%) and 31 females (69%), whereas the lupus group was composed of 10 males (33%) and 20 females (67%). The most common location for LK was the cheek (36%), followed by the forehead (20%), temple (13%), jawline (9%), periorbital region (7%), brow region (4%), preauricular region (4%), zygoma (2%), bridge of nose (2%), and ear (2%) (Fig. 1). The most common location for lupus was also the cheek (40%), followed by the scalp (17%), brow region (10%), jawline (6%), ear (6%), bridge of nose (6%), forehead (3%), temple (3%), nasolabial fold (3%), and chin (3%). Clinical history for LK was variable. "Rule out BCC" was the most common clinical diagnosis given on the histopathology requisition form, seen in 20% of cases. Clinical descriptive information was provided for only 20% of LK cases and included a variety of vague descriptions such as "blue-gray changing lesion," "scaling lesion," "irregular brown patch," and "hyperpigmentation." Other common clinical diagnoses included "rule out (irritated) seborrheic keratosis" (13%), "rule out squamous cell carcinoma or AK"

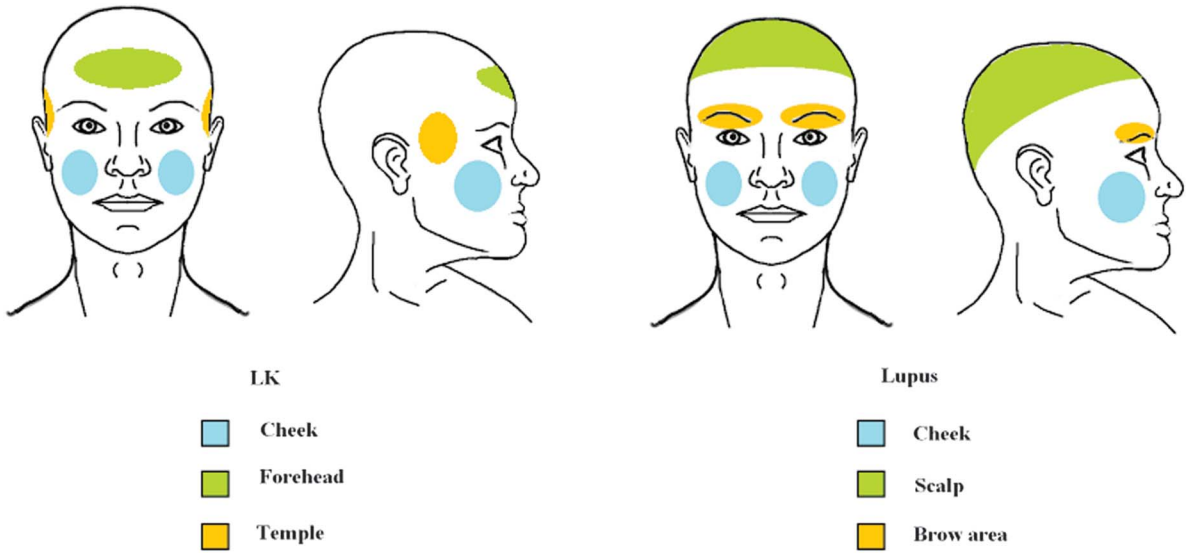

FIGURE 1. Most common locations for LE and LK occurring on the face.

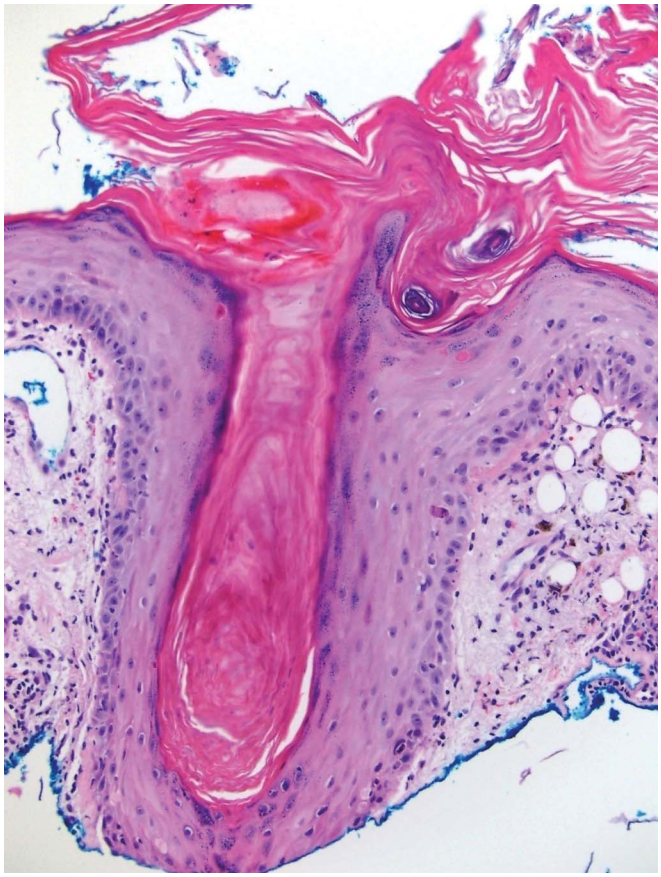

FIGURE 2. Biopsy of LE demonstrating follicular plugging and cell-poor vacuolar interface changes of the adjacent epidermis. Compact follicular plugging was a key feature in distinguishing LE from LK on the face (H&E, ×40).

(13%), "rule out lentigo maligna or atypical lentigo" (11%), "rule out dysplastic nevus" (4%), or a combination of these diagnosis (16%). In all cases in which the clinical diagnosis included lentigo maligna or an atypical pigmented lesion, clinical follow-up was obtained through direct communication with the patient's physician.

There were several different and overlapping features noted between LK and LE (Figs. 2–6). Notable shared features between LE and LK occurring on the face included follicular inflammation, epidermal atrophy, paucity of eosinophils, and a predominately basket-weave stratum corneum (Table 2). In addition, pigment incontinence was also a shared feature and was at least focally observed in every case of both LK and LE. Several significant differences were observed. Major differences between LK and LE, respectively, included perivascular inflammation, high Civatte bodies (Fig. 4), solar elastosis, cell-poor vacuolar interface dermatitis (more common in LE), band-like interface dermatitis (more common in LK), compact follicular plugging (Fig. 2), hemorrhage, mucin, perieccrine inflammation, hypergranulosis, and papillary dermal edema. Of note, although nearly half of the lupus cases were shave biopsies, eccrine involvement was still a dominant feature seen in lupus. There was a trend toward mixed epidermal atrophy and acanthosis in many of the lupus cases, but this did not

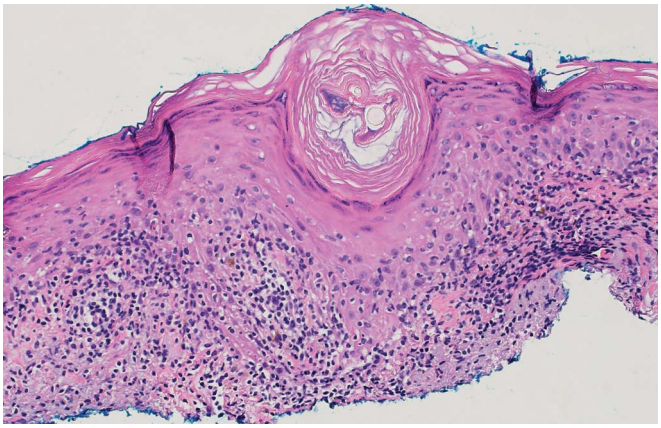

FIGURE 3. Biopsy of LK demonstrating a dense band-like lymphocytic infiltrate. There is also lamellar and basket-weave follicular plugging, as opposed to compact follicular plugging, which was seen more commonly in lupus. Prominent solar elastosis, which was also more common in LK, is evident beneath the infiltrate (H&E, ×20).

reach significance, in comparison with LK. Similarly, there was a trend toward prominent parakeratosis in the lupus cases versus LK. Of the lupus cases that had previous periodic acid–Schiff staining (n = 12), 5 failed to demonstrate basement membrane zone thickening on review of stained sections. An adjacent solar lentigo was seen in 20% of LKs.

DISCUSSION

LK on the face is a potentially challenging diagnosis to make because of the occurrence of other causes of lichenoid dermatitis that more frequently have been reported on the face, such as CCLE, photolichenoid allergic reactions, lichen planus actinicus, and lichenoid host reactions to lentigo

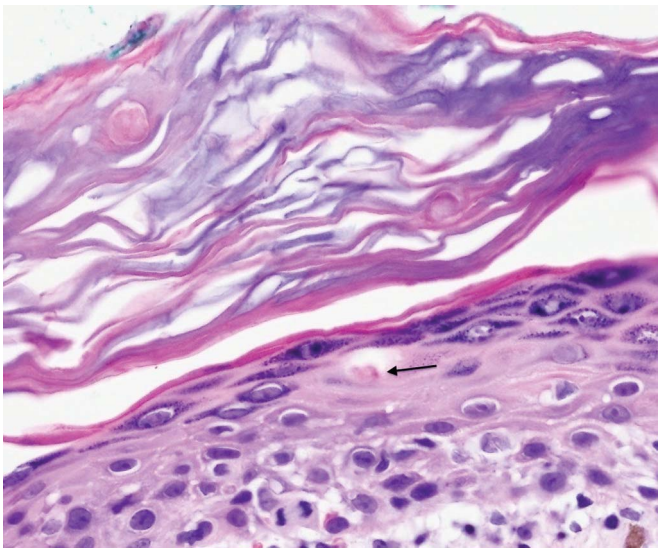

FIGURE 4. Biopsy of LK demonstrating high Civatte bodies, which were more commonly seen in LK and were helpful in distinguishing it from LE (H&E, ×40).

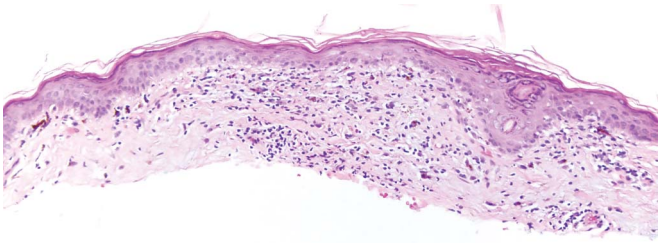

FIGURE 5. Case of LE with histologic features overlapping with LK. The focal area of band-like lymphocytic infiltrate overlaps with LK. The edge of the biopsy shows cell-poor vacuolar interface, more typical of LE (H&E, ×4).

maligna. The clinical presentation, such as numerous or extensive lesions, or a contiguous pigmented patch will usually help eliminate many inflammatory causes of lichenoid dermatitis and lentigo maligna, respectively, but this information is not always available to the pathologist at the time of diagnosis. Additionally, CCLE may present initially with a solitary scaly erythematous lesion on sun-exposed skin, similar to LK. The frequency with which CCLE involves face, in contrast to the limited reports of LK on the face, might result in a tendency for a diagnosis of LE to supersede that of LK for biopsies obtained from the face. This study established the occurrence of LK on the face.

The 45 cases of LK on the face in this study demonstrated histologic features similar to those characterized in a series of 1040 LK.[2] These authors subtyped LK based on histology that may be related to the evolutionary stage of the lesions. In "classic" lesions, there is epidermal acanthosis with a lichenoid infiltrate, whereas partially regressed lesions may be atrophic with melanoderma and scattered lymphocytes. Early lesions have a normal thickness of the epidermis with interface lymphocytes. In a bullous presentation, the intensity of the lichenoid infiltrate and necrosis may be associated with intraepidermal or subepidermal vesiculation.[2] Many of the LK

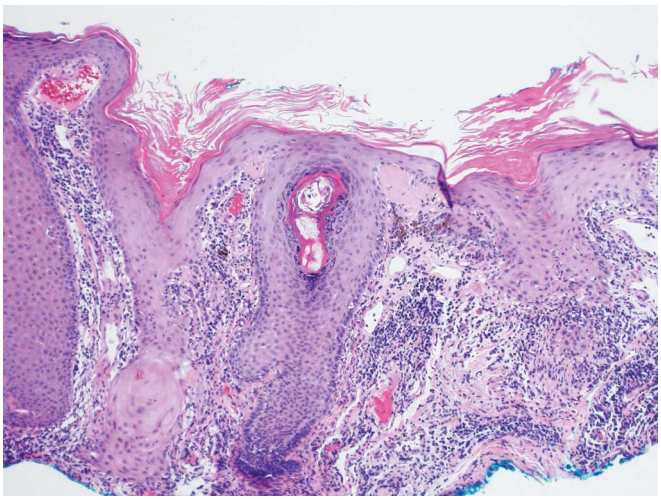

FIGURE 6. This case of LE may be confused with LK given the perifollicular inflammation and presence of Civatte bodies; however, the presence of compact follicular plugging, as demonstrated here, can help differentiate LE from LK (H&E, ×20).

in this study showed mixed epidermal and inflammatory features and did not fit cleanly into this schema. No bullous LKs were identified in the facial LK. Facial lesions were not specifically identified in the 72 cases that were evaluated from the head and neck by Morgan et al.

In the series of facial LK in Korean patients,[3] histologic features in all cases included a lichenoid inflammatory infiltrate obscuring the dermal–epidermal junction and vacuolar degeneration of the basal cell layer (Table 3). Differences between it and this study include more common parakeratosis, less common solar elastosis, less common pigment incontinence, and more common eosinophils.

In a series of 50 patients with histopathologic features of LK in China,[4] 70% were located on the face (Table 3). Major differences between it and this study include more common parakeratosis, adjacent solar lentigo and red blood cell extravasation, and less common epidermal atrophy, solar elastosis, pigment incontinence, and follicular involvement.

The facial LK in this study showed overlapping features with LE and some differentiating features. Typical histopathologic features of LE include basal cell vacuolization, epidermal and dermal colloid bodies, periappendageal infiltrate, pilosebaceous atrophy, parakeratosis, hyperkeratosis, mucin, and subepidermal edema.[1,8,9] Erythrocyte extravasation may also be seen.[8] In chronic lesions of LE, follicular plugging, basement membrane thickening, and a dense superficial and deep perivascular and periappendageal lymphocytic infiltrate are more typical.[8]

In contrast to LK lesions of the face, eosinophils are not a feature of LE, although these may rarely be seen. In an evaluation of eosinophils in several cases of interface dermatitis, it was concluded that the presence of even a single eosinophil within 9 or 10 fields at ×20 objective argues against a diagnosis of LE.[10] Eosinophils were rarely seen in the cases of LK in this study (7%), so they cannot be reliably used to differentiate LE from LK.

In LE, liquefactive basal cell degeneration is often paucicellular, in contrast to obliteration of the dermal–epidermal junction by a lichenoid lymphocytic infiltrate, as was noted in the facial LK in the series by Kim et al. In this study, an inflammatory infiltrate predominately in a band-like pattern favored LK, although a predominate pattern of paucicellular basal cell vacuolization was seen more often in biopsies of LE than LK (Table 2).

Other histopathologic features that were found to be present in both LK and LE biopsies in this study include follicular involvement by the infiltrate, areas of epidermal atrophy, the presence of a basket-weave stratum corneum, and pigment incontinence (Table 2).

A previous study by Zedek et al[11] compared shave biopsies of cutaneous LE with squamous neoplasia. Although many of the same histopathologic criteria were assessed in this previous study, notable differences between it and this study include lack of inclusion of lesions specific to the face, classification of follicular plugging, and the assessment of hemorrhage, Civatte bodies, solar elastosis, and papillary dermal edema. Zedek et al concluded that the presence of features such as vacuolar interface, eccrine involvement, compact stratum corneum, perifollicular inflammation, and

TABLE 2. Comparison of Histopathologic Features Between LK and LE on Face

	LK	Lupus	z value (95% Confidence Level)	2-tailed *P*
Features common to both LE and LK				
Perifollicular inflammation	21/45 (47%)	16/30 (53%)	−0.57	0.57
Epidermal atrophy	21/45 (47%)	17/30 (57%)	−0.85	0.40
Predominantly basket-weave stratum corneum	32/45 (71%)	18/30 (60%)	1	0.32
Basket-weave or lamellar follicular plugging	10/45 (22%)	8/30 (27%)	−0.44	0.66
Melanophages	100%	100%	—	—
Eosinophils*	3/45 (7%)	0/30 (0%)	1.44	0.15
Differences				
Perivascular inflammation	5/45 (11%)	27/30 (90%)	−6.77	<0.0001
High Civatte bodies	20/45 (44%)	2/30 (7%)	3.52	0.0004
Solar elastosis	38/45 (84%)	10/30 (33%)	4.52	<0.0001
Vacuolar interface†	3/45 (7%)	22/30 (73%)	−6	<0.0001
Band-like inflammation†	42/45 (93%)	8/30 (27%)	6	<0.0001
Compact follicular plugging	5/45 (11%)	15/30 (50%)	−3.73	0.0002
Hemorrhage	10/45 (22%)	21/30 (70%)	−4.12	<0.0001
Mucin	0/45 (0%)	23/30 (77%)	−7.05	<0.0001
Papillary dermal edema	3/45 (7%)	18/30 (60%)	−5.04	<0.0001
Perieccrine inflammation	0/45 (0%)	13/30 (43%)	−4.86	<0.0001
Hypergranulosis	20/45 (44%)	5/30 (17%)	2.5	0.01
Mixed acanthosis and atrophy	6/45 (13%)	9/30 (30%)	−1.77	0.08
Prominent parakeratosis	2/45 (4%)	5/30 (17%)	−1.78	0.08

*1 case of lupus was excluded because of the presence of eosinophils.
†As predominate inflammatory pattern.

follicular plugging favored a diagnosis of LE. Whereas the former 2 features described were in concordance with this study (vacuolar interface and eccrine involvement), the latter 3 features were not found to be useful in differentiating LE from LK on the face. Both LE and LK shared the features of a predominately basket-weave stratum corneum and perifollicular inflammation. Follicular plugging was present in both LK and LE, although it was less common in LK (30/45 cases lacked this feature); the follicular plug was distinctly compact in LE, and this characteristic was most helpful in differentiating LE from LK when follicular plugging was present.

The results from this study challenge some classic histopathologic beliefs. In particular, follicular inflammation is generally regarded to be a feature of lupus, but on superficial shave biopsies of lupus on the face, it was not found to be a reliable distinguishing feature (Table 2). In many cases of LK from the face, lichenoid involvement of the follicles was noted, irrespective of the presence of a band-like lymphocytic infiltrate involving the epidermis. The shared feature of follicular inflammation seen in both lupus and LK may be a result of their facial distribution and follicular density of this site.

TABLE 3. Comparison of Previously Reported Clinical and Histopathologic Features of LK Occurring on the Face

Study	Sites	Most Common Facial Location	Clinical Diagnosis	Demographics	Parakeratosis, %	Atrophy, %	Solar Elastosis, %
Current study, n = 45	Face	Cheek (35%)	BCC	58 years; 69% female	4	47	84
Kim[3] et al, n = 14	Face	Cheek (71%)	SK or BCC	46.5 years; 93% female	79	36	50
Zhang[4] et al, n = 50	All sites 35/50 (70%) face	Cheek (28%)	SK	61.2 years; 68% male	100	24	32

Study	Melanophages, %	Band-like Infiltrate, %	RBC, %	Eos, %	Follicular Involvement, %	Solar Lentigo, %
Current study, n = 45	100	93	22	7	47	20
Kim[3] et al, n = 14	79	100	NA	29	NA	7
Zhang[4] et al, n = 50	40	100	50	42	8	68

BCC, basal cell carcinoma; EOS, eosinophils; RBC, extravasated red blood cells; SK, seborrheic keratosis.

Another "traditional" lupus-associated feature[9] that was found to be common to both LK and LE was epidermal atrophy, demonstrated in 47% and 57% of cases, respectively. Interestingly, previous (although smaller) studies involving LK on the face identified acanthosis, rather than atrophy, as the predominant epidermal pattern.[3] However, in accordance with the results of the study here, the presence of epidermal atrophy may not be specific for either diagnosis and may be site related. Another notable shared feature between LE and LK was the predominance of a basket-weave stratum corneum. The presence of parakeratosis was not found to be a differentiating feature between LE and LK, as has previously been reported.[9] Interestingly, although eosinophils are generally associated with LK,[3,12] our findings suggest that unlike LKs in other locations,[5] eosinophils are not commonly present in LK from the face. Other significant differences were identified between LE and LK of the face (Table 2). Features that were more prominent in LK included the presence of high Civatte bodies, solar elastosis, band-like lichenoid interface dermatitis, and hypergranulosis (Figs. 3 and 4).

In contrast, features more prominent in LE than LK included perivascular inflammation, eccrine gland involvement, cell-poor vacuolar interface, compact follicular plugging, mucin, hemorrhage, and papillary dermal edema.

Rendering a diagnosis of LK on the face will remain challenging. Provided the lesion does not represent a sample from a larger patch or a clinically pigmented lesion that may represent lentigo maligna, the authors believe that a diagnosis of LK on the face can usually be made with confidence. The clinical history of a small solitary erythematous lesion, especially if there is history of a stable solar lentigo, supports LK over lichenoid regression of lentigo maligna but will not exclude LE. Although LKs are believed to represent a lichenoid reaction to a solar lentigo, histologically, a contiguous solar lentigo could only be documented in 20% of cases. This was due, in part, to transection of the inflammatory process at the biopsy edge. It is also conceivable that the entire lentigo had undergone the inflammatory process, thus, leaving no remaining uninvolved lentigo in the specimen. This feature was not helpful to differentiate LK from LE. Additionally, this study suggests that typical features of LE, such as follicular inflammation and epidermal atrophy, may not allow differentiation from LK. Based on our findings, the authors propose that the following features may be helpful in distinguishing lupus from LK on the face: perivascular inflammation, predominately cell-poor vacuolar interface pattern, without a band-like lymphocytic infiltrate disrupting the basal cells, compact follicular plugging, mucin, hemorrhage, and/or papillary dermal edema, all of which were significantly found to occur more often in LE than LK of the face. In contrast to LE, the presence of high Civatte bodies, band-like lichenoid interface, and/or solar elastosis should prompt one to consider a diagnosis of LK.

The absence of deeper dermis to evaluate for eccrine involvement was the biggest limitation to our evaluation of these biopsies. Ideally, analysis would have been limited to more analogous biopsy types for both lesions (all shave biopsies), but the only histopathologic feature that could not be appropriately assessed due to this limitation was eccrine involvement. Specimens that did not allow examination of all other histopathologic features (except for eccrine involvement) were excluded from the study. Additionally, specific adjustments to the assessment criteria were made to account for this limitation, including evaluation of the infundibular portion of the follicle only for assessing perifollicular inflammation. Although the small sample size is an additional limitation of our study, the results from this study could be useful in distinguishing LE and LK on the face, especially in the settings of shave biopsy, limited clinical information, and/or limited ability to perform immunofluorescence.

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CME EXAMINATION
December 2015

Please mark your answers on the ANSWER SHEET.

After participating in this activity, physicians should be able to describe the histopathologic features of lichenoid keratosis occurring on the face and compare and contrast the histopathologic features of lupus erythematosus and lichenoid keratosis occurring on the face.

1. Which of the following is true regarding lichenoid keratosis?

   A. They are commonly found on the face
   B. They usually present as multiple lesions
   C. They typically occur in younger patients, between the second and fourth decades
   D. They show a female predominance

2. Which of the following histopathologic features would help to distinguish lupus from lichenoid keratosis on the face?

   A. Epidermal atrophy
   B. Inflammation involving the hair follicle
   C. Follicular plugging
   D. Solar elastosis

3. Which of the following is the most common location for lichenoid keratosis occurring on the face?

   A. Temple
   B. Brow
   C. Cheek
   D. Glabella

4. Which of the following clinical histories would suggest a diagnosis other than lichenoid keratosis?

   A. History of a solitary lesion
   B. History of a contiguous pigmented patch

C. Lesion duration of 6 months
D. Lesion size <1 cm diameter

5. Which of the following clinical entities is lichenoid keratosis most commonly confused with?

A. Pigmented lesion
B. Basal cell carcinoma
C. Squamous cell carcinoma
D. Lupus erythematosus

ANSWER SHEET FOR THE AMERICAN JOURNAL OF DERMATOPATHOLOGY
CME PROGRAM EXAM
December 2015

Please answer the questions on page 882 by filling in the appropriate circles on the answer sheet below. Please mark the one best answer and fill in the circle until the letter is no longer visible. To process your exam, you must also provide the following information:

Name (please print): _____
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1. (A) (B) (C) (D) (E)
2. (A) (B) (C) (D) (E)
3. (A) (B) (C) (D) (E)
4. (A) (B) (C) (D) (E)
5. (A) (B) (C) (D) (E)

Your evaluation of this CME activity will help guide future planning. Please respond to the following questions below.

Please rate these activities (1 — minimally, 5 — completely)	1 2 3 4 5
These activities were effective in meeting the educational objectives	O O O O O
These activities were appropriately evidence-based	O O O O O
These activities were relevant to my practice	O O O O O

Please rate your ability to achieve the following objectives, both before and after this activity: 1 (minimally) to 5 (completely)	Pre 1 2 3 4 5	Post 1 2 3 4 5
1. Describe the histopathologic features of lichenoid keratosis occurring on the face	O O O O O	O O O O O
2. Compare and contrast the histopathologic features of lupus erythematosus and lichenoid keratosis occurring on the face	O O O O O	O O O O O

How many of your patients are likely to be impacted by what you learned from this activity?
O <20% O 20-40% O 40-60% O 60-80% O >80%

Do you expect that these activities will help you improve your skill or judgment within the next 6 months? (1 — definitely will not change, 5 — definitely will change)	1 2 3 4 5
	O O O O O

How will you apply what you learned from these activities (mark all that apply):

In diagnosing patients O	In making treatment decisions O
In monitoring patients O	As a foundation to learn more O
In educating students and colleagues O	In educating patients and their caregivers O
As part of a quality or performance improvement project O	To confirm current practice O
For maintenance of board certification O	For maintenance of licensure O

Please list at least one strategy you learned from this activity that you will apply in practice:

How committed are you to applying these activities to your practice in the ways you indicated above? (1 — minimally, 5 — completely)	1 2 3 4 5
	O O O O O

Did you perceive any bias for or against any commercial products or devices? If yes, please explain:	Yes	No
	O	O

How long did it take you to complete these activities? _____ hours _____ minutes
What are your biggest clinical challenges related to dermatopathology?

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