Background: Fibroepithelioma of Pinkus (FeP) is a rare variant of basal cell carcinoma that may clinically mimic a number of benign skin tumors. While the dermoscopic features of basal cell carcinoma have been studied extensively, little is known about the dermoscopic features of FeP.

Observations: Retrospective evaluation of clinical records and digital clinical dermoscopic images of 10 histopathologically proved FePs (6 nonpigmented and 4 pigmented) was performed. Clinically, no FeP was correctly identified and, in half of all patients, a clinical differential diagnosis of purely benign skin lesions was made. Dermoscopy enabled the correct diagnosis in 9 of 10 FePs, based on the presence of fine arborizing vessels, either alone or associated with dotted vessels, and white streaks (in 100%, 70%, and 90% of lesions, respectively). In the 4 pigmented FePs, a structureless gray-brown area of pigmentation and variable numbers of gray-blue dots were observed, in addition.

Conclusions: Dermoscopy is helpful in diagnosing FeP and in differentiating this variant of basal cell carcinoma from other benign skin tumors commonly included in the clinical differential diagnosis. This presumes, however, that dermoscopy is used as a first-line examination for all skin lesions, not only for those that are clinically suspect.

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FIBROEPITHELIOMA OF PINKUS (FeP), first described in 1953 by Hermann Pinkus, is a premalignant fibroepithelial tumor, is considered an uncommon variant of basal cell carcinoma (BCC). It manifests clinically as a solitary, and sometimes multiple, flesh-colored or slightly brown-gray, well-demarcated plaque. Infrequently, FeP may be pedunculated, polypoid, or ulcerated or may invade underlying tissues. It is typically found on the trunk of persons aged 40 to 60 years and is thought to have an equal sex distribution. Although it shows a certain predilection for the lumbosacral area, it is not limited to this region and may develop on other body sites, including the extremities, abdomen, head, and genitalia.

Among a number of differential diagnoses, dermal melanocytic nevus, pedunculated fibroma, acrochordon (skin tag), and seborrheic keratosis are most commonly listed. Histopathologically, FeP is characterized by numerous thin anastomosing cords of basaloid cells extending downward from the epidermis into the dermis in a honeycomb pattern, embedded within a fibrotic stroma. These peculiar features are thought to be caused by initial invasion of a BCC along the eccrine ducts, with subsequent obliteration of the ductal lumen.

As a variant of BCC, early detection and adequate treatment of FePs is warranted. Dermoscopy is a noninvasive diagnostic technique that enables the clinician to better differentiate a variety of pigmented skin lesions, including melanoma and pigmented BCC. While the dermoscopic patterns of BCC have been studied extensively, little is known about the dermoscopic patterns in FeP. We describe the dermoscopic features observed in a series of 10 patients with FeP.

METHODS

Dermoscopic images of 10 histopathologically proved FePs, collected at the Pigmented Lesion Clinics (Naples and Turin, Italy) between December 1, 2003, and December 31, 2005, were evaluated for the presence of various dermoscopic features. Clinical data obtained for each patient included the following: age and sex, location and clinical appearance of the lesion, clinical diagnosis, and dermoscopic diagnosis.

Clinical and dermoscopic images of each lesion were obtained using compact epiluminescent microscopy (DermLite Foto lens; 3Gen, LLC, Dana Point, Calif) coupled with a digital camera (Nikon Coolpix 4500; Nikon Corp, Tokyo, Japan) for the early detection of skin cancer. A clinical diagnosis, including an eventual additional differential diagnosis, was recorded before the dermoscopic diagnosis. Each
lesion was evaluated by 2 of us (I.Z. and G.A.) for the presence of the following dermoscopic features: vascular pattern, pigmented structural pattern, and additional dermoscopic features. All biopsy specimens were routinely stained with hematoxylin-eosin.

## RESULTS

### PATIENTS DEMOGRAPHIC DATA AND GENERAL RESULTS

Ten histopathologically proved FePs were collected, including 6 nonpigmented and 4 partially pigmented lesions. The tumors were obtained from 6 women and 4 men who ranged in age from 32 to 75 years (median age, 57.3 years). Eight lesions (80%) were located on the lumbosacral region of the trunk and 2 lesions (20%) were located on the abdomen and axilla, respectively (Table 1).

No FeP was correctly identified at clinical examination, with the clinical differential diagnoses including dermal nevus (80%), BCC (50%), fibroma (30%), and seborrheic keratosis (20%). Although BCC was considered in 5 patients, in the other 5 patients the clinical differential diagnosis included purely benign skin lesions, which are not routinely excised (Table 1).

Fibroepithelioma of Pinkus was associated with a history of BCC in 1 patient (patient 1) and with concomitant multiple superficial BCCs on the trunk (patient 2) and an ulcerated nodular BCC on the nose (patient 10). Patient 1 had a history of multiple, previously treated BCCs, and when first seen had FeP in association with a melanocytic nevus. Although surgical excision of the colliding tumors was planned, the patient did not attend the scheduled intervention but returned 8 months after the initial visit. A baseline digital dermoscopic image was recorded; thus, we were able to observe the changes in this FeP with time. In particular, it was noted that there was a substantial increase in overall size compared with the baseline image, while the colliding nevus remained unchanged. At this later visit, the entire lesion was surgically removed, and histologic analysis confirmed the diagnosis of FeP in association with a junctional melanocytic nevus. Patient 2 had multiple superficial BCCs, and we initiated treatment of the superficial BCCs and FeP with 5% imiquimod cream, according to established protocols. Whereas all superficial BCCs resolved after a 6-week course of treatment, the FeP failed to respond, which led to its subsequent surgical excision.

### DERMOSCOPIC PATTERNS

The most striking result of our study is that dermoscopy enabled a correct diagnosis of FeP in 9 of 10 patients (Table 1). The only FeP not correctly identified was that described in our recently published original case report on the dermoscopy patterns of FeP (patient 7).

At dermoscopy, all lesions were red to light brown-yellow, associated with irregularly shaped and distributed linear, elongated telangiectasias that were sharply focused. We have named these fine arborizing vessels (FAVs), representing a variation on the theme of arborizing vessels (Table 2). However, in contrast to the arborizing telangiectasias typically observed in BCC, FAVs are generally smaller in caliber and have less evident ramifications (Figure 1). In addition to this particular vascular pattern, we also noted the presence of peculiar white septal lines (white streaks) in 90% of lesions (Figure 1).

In 4 FePs there was partial pigmentation characterized by an irregularly distributed, structureless grey-brown area of pigmentation associated with a few to numerous gray-blue dots (Figure 2 and Figure 3). This pigmentation was clinically visible in only 2 of 4 lesions.

Additional dermoscopic features of the lesions included dotted vessels (70%), milialike cysts (60%), and ulceration (50%) (Table 2). Dotted vessels were mainly located at the periphery and were always associated with FAVs, while milialike cysts were only seen as single units per lesion.

### COMMENT

The results of our study underscore the value of dermoscopy in clinical practice for the differentiation and accurate diagnosis of benign and malignant, pigmented and nonpigmented skin tumors. The most striking result of our study

<table>
<thead>
<tr>
<th>Patient/Sex/Age, y</th>
<th>Location</th>
<th>Clinical Diagnosis</th>
<th>Dermoscopic Diagnosis</th>
<th>History of BCC</th>
<th>Histopathologic Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/F/45</td>
<td>Sacral region</td>
<td>BCC</td>
<td>FeP</td>
<td>+</td>
<td>FeP and junctional nevus*</td>
</tr>
<tr>
<td>2/M/55</td>
<td>Sacral region</td>
<td>BCC, DN</td>
<td>FeP</td>
<td>+</td>
<td>FeP*</td>
</tr>
<tr>
<td>3/F/65</td>
<td>Abdomen</td>
<td>DN, F</td>
<td>FeP</td>
<td>−</td>
<td>FeP*</td>
</tr>
<tr>
<td>4/M/54</td>
<td>Sacral region</td>
<td>DN, F</td>
<td>FeP</td>
<td>−</td>
<td>FeP*</td>
</tr>
<tr>
<td>5/F/49</td>
<td>Sacral region</td>
<td>DN, F</td>
<td>FeP</td>
<td>−</td>
<td>FeP*</td>
</tr>
<tr>
<td>6/M/70</td>
<td>Sacral region</td>
<td>SK, DN</td>
<td>FeP</td>
<td>−</td>
<td>FeP*</td>
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<td>7/F/73</td>
<td>Sacral region</td>
<td>BCC, DN</td>
<td>BCC, DN, SK</td>
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<td>FeP*</td>
</tr>
<tr>
<td>8/F/56</td>
<td>Sacral region</td>
<td>SK, BCC</td>
<td>FeP</td>
<td>−</td>
<td>FeP*</td>
</tr>
<tr>
<td>9/M/32</td>
<td>Sacral region</td>
<td>BCC, DN</td>
<td>FeP</td>
<td>−</td>
<td>FeP*</td>
</tr>
<tr>
<td>10/F/74</td>
<td>Axilla</td>
<td>DN</td>
<td>FeP</td>
<td>+</td>
<td>FeP*</td>
</tr>
</tbody>
</table>

Abbreviations: BCC, basal cell carcinoma; DN, dermal nevus; F, fibroma; FeP, fibroepithelioma of Pinkus; SK, seborrhoeic keratosis; +, yes; −, no.

*Diagnosis made at the Department of Dermatology, Second University of Naples, Naples, Italy.
is that dermoscopy enabled correct identification of 9 of 10 FePs, compared with the clinical examination, which included at least 1 benign skin tumor in 5 patients and exclusively benign skin tumors in the remaining 5 patients. This result can be explained by the presence of repetitive dermoscopic features including FAVs, which were seen in all FePs. Fine arborizing vessels were clearly distinct from the comma-shaped vessels found in dermal nevi and the regular hairpin-shaped vessels typically found in fibroma or seborrheic keratosis.15,19 Fine arborizing vessels represent a variation on the theme of arborizing vessels described in BCC16; however, in contrast to arborizing vessels described in BCC, FAVs are typically smaller in caliber and have less evident ramifications. Seven FePs also exhibited dotted vessels, which frequently are seen in melanocytic skin lesions or psoriasis, whereas 6 FePs exhibited milialike cysts, which are associated with seborrheic keratosis.15,19,21 In a previous study from our group that investigated vascular patterns in skin tumors, dotted vessels were highly predictive (90%) for melanocytic skin tumors, in particular for Spitz nevus and melanoma.19 Spitz nevus commonly exhibits regularly distributed dotted vessels as the only type of vascular pattern, while melanoma often reveals dotted vessels in combination with other types of vascular structures (called polymorphous pattern), such as linear-irregular vessels or milky red globules or areas. In the present study, we observed no single FeP with dotted vessels as the only vascular structure, but they were always combined with FAVs (ie, polymorphous pattern, by definition). Fine arborizing vessels in FeP can be differentiated from linear-irregular vessels in melanoma because the former are more elongated, less kinked, and sharply in focus. In our previous study, a polymorphous vascular pattern had a positive predictive value of 68.4% for malignant skin tumors.19 In the present study, a polymorphous pattern was seen in 70% of FePs, underscoring the importance of this pattern in the diagnosis of malignant skin lesions. However, the diagnosis of a given skin lesion must not be based on the presence of a single dermoscopic criterion; rather, the overall context of the lesion should be considered, including all clinical and dermoscopic criteria.15,21

Another feature observed in 90% of FePs was white streaks, which appeared as white septal lines throughout

### Table 2. Dermoscopic Features in Fibroepithelioma of Pinkus

<table>
<thead>
<tr>
<th>Patient</th>
<th>Fine Arborizing Vessels</th>
<th>Whitish Striae</th>
<th>Dotted Vessels</th>
<th>Milialike Cysts</th>
<th>Ulceration</th>
<th>Gray-Brown Coloration</th>
<th>Gray-Blue Dots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>−</td>
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<td>−</td>
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<td>−</td>
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<td>−</td>
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<td>−</td>
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<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
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<td>+</td>
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<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Lesions, No. (%): 10 (100) 9 (90) 7 (70) 6 (60) 5 (50) 4 (40) 4 (40)

Abbreviations: +, present; −, absent.

*These cases of fibroepithelioma of Pinkus showed slight pigmentation.
the tumor. To our knowledge, white streaks have not been described in other skin tumors. This feature corresponds histopathologically to the marked fibrosis typical of FeP (Figure 4) and should be differentiated from regression structures in melanocytic skin lesions. Four FePs in our series were slightly pigmented and exhibited, in addition to FAVs or white streaks, an irregularly distributed, gray-brown structureless pigmentation and a variable number of small gray-blue dots. Again, the latter seem to represent variations on the theme of the multiple gray-blue globules previously described in BCC, which may reflect the etiologic similarity of FeP and BCC. Yet, FeP failed to respond to topical therapy with 5% imiquimod cream, which is considered an effective treatment for BCC. However, we are hesitant to draw any conclusions about the efficacy of such topical treatments for FeP based on a single observation.

Our study also raised some intriguing points that require further consideration. That 5 FePs were clinically considered benign highlights the importance of using dermoscopy as a first-level procedure for all lesions, not only for clinically preselected suspect lesions. Given that in our patients the clinical diagnosis included benign lesions such as dermal nevus, fibroma, and seborrheic keratosis, it could be assumed that these FePs would have been missed clinically. This leads to the issue of the reported frequency of FeP. Although exact epidemiologic data are lacking, FeP is generally considered a rare skin tumor. At the Department of Dermatology, Second University of Naples, 7 FePs were diagnosed within 1 year, which is an unexpectedly high number of such lesions, considering the general opinion about their frequency. To date, most of the epidemiologic data have been drawn from single case reports and histopathologic studies of varying sample sizes. However, inasmuch as FeP frequently mimics benign skin lesions that neither raise clinical suspicion nor are routinely excised, it might be speculated that the reported low incidence might be due, in part, to underdiagnosis. On the other hand, UV-exposure is considered an important factor in the pathogenesis of BCC, and, consequently, it could be speculated that the sunny climate of southern Italy might favor the development of FeP, as a peculiar variant of BCC, in that geographic region.

Certainly, our preliminary study of only 10 lesions is far too small to draw any definitive conclusions about the frequency of FeP in a given population. In addition, that 9 of 10 FePs were correctly diagnosed at dermoscopy might have been influenced by our personal experience based on our original case report on the dermoscopic patterns of FeP. Moreover, the sensitivity and specificity of our proposed dermoscopic criteria for FeP and the lack of response of 1 FeP to treatment with topical 5% imiquimod cream require further investigation.

In conclusion, our study demonstrates that FeP seems to exhibit repetitive dermoscopic features, including FAVs, either alone or in combination with dotted vessels, and white streaks, which may enable the clinical diagnosis. However, this presumes that dermoscopy is used in diagnosis of all skin lesions, whether benign or suspected of being malignant.

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Correspondence: Iris Zalaudek, MD, Department of Dermatology, Medical University of Graz, Auenbruggerplatz 8, 8036 Graz, Austria (iris.zalaudek@meduni-graz.at).

Author Contributions: Dr Argenziano had full access to all data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Zalaudek. Acquisition of data: Zalaudek, Ferrara, Broganelli, Moscarella, Mordente, Giacomel, and Argenziano. Analysis and interpretation of data: Zalaudek. Drafting of the manuscript: Zalaudek, Ferrara, Moscarella, Mordente, and Giacomel. Critical revision of the manuscript for important intellectual content: Broganelli and Argenziano. Administrative, technical, and material support: Zalaudek, Ferrara, Broganelli, and Giacomel. Study supervision: Argenziano.

Financial Disclosure: None reported.
REFERENCES


ARCHIVES Web Quiz Winner

Congratulations to the winner of our July quiz, Jose A. Tschen, MS-IV, Universidad Autonoma de Guadalajara–School of Medicine, Guadalajara, Mexico. The correct answer to our July challenge was angiosarcoma. For a complete discussion of this case, see the Off-Center Fold section in the July issue of the ARCHIVES (Lockshin B, Billings S, Tan S, Swofford M, El-Gamal H. Fungating forehead plaque. Arch Dermatol. 2006;142:1059-1064).

Be sure to visit the Archives of Dermatology Web site (http://www.archdermatol.com) to try your hand at the interactive quiz. We invite visitors to make a diagnosis based on selected information from a case report or other feature scheduled to be published in the following month’s print edition of the ARCHIVES. The first visitor to e-mail our Web editors with the correct answer will be recognized in the print journal and on our Web site and will also receive a free copy of The Art of JAMA II.