Dermoscopic Findings in Cutaneous Metastases

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IMPORTANCE Cutaneous metastases rarely develop in patients with cancer but have important implications for prognosis and treatment. While dermoscopy is useful for many skin lesions, few data exist regarding dermoscopic findings in cutaneous metastases.

OBSERVATIONS We reviewed high-quality dermoscopic images of 20 outpatients with biopsy-proven cutaneous metastases and known diagnosis of underlying visceral malignancy and correlated these findings with clinical and histologic data. Most lesions were pink or flesh-colored, but 3 of 20 were pigmented. All 17 nonpigmented lesions demonstrated a vascular pattern on dermoscopy, with 15 of 17 (88%) having discrete vessels and 2 of 17 (12%) showing pink homogeneous structureless areas. Serpentine, or linear irregular, vessels were most common. In the 3 pigmented lesions (all metastatic breast carcinoma), various melanocytic patterns were observed.

CONCLUSIONS AND RELEVANCE Dermoscopically visible vascular structures within a cutaneous nodule in patients with a known cancer diagnosis should raise suspicion for cutaneous metastasis. Pigmentation in such lesions, in the absence of a history of melanoma, suggests a primary breast carcinoma. The high prevalence of vascular structures among cutaneous metastases may suggest a role for angiogenesis in their pathogenesis. These findings support the use of dermoscopy in the evaluation of suspected skin metastases or in the assessment of lesions of unknown origin in patients with cancer.


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C utaneous metastases rarely develop in patients having cancer with solid tumors. The reported incidence of cutaneous metastases from a known primary malignancy ranges from 0.6% to 9%, usually appearing 2 to 3 years after the initial diagnosis.1,2 Skin metastases may represent the first sign of extranodal disease in 7.6% of patients with a primary oncologic diagnosis.3 Cutaneous metastases may also be the first sign of recurrent disease after treatment, with 75% of patients also having visceral metastases.4 Infrequently, cutaneous metastases may be seen as the primary manifestation of an undiagnosed malignancy.5 Prompt recognition of such tumors can be of great significance, affecting prognosis and management.

The initial presentation of cutaneous metastases is frequently subtle and may be overlooked without proper index of suspicion, appearing as multiple or single nodules, plaques, and ulcers, in decreasing order of frequency. Commonly, a painless, mobile, erythematous papule is initially noted, which may enlarge to an inflammatory nodule over time.6 Such lesions may be misdiagnosed as cysts, lipomas, fibromas, or appendageal tumors. Clinical features of cutaneous metastases rarely provide information regarding the primary tumor, although the location of the tumor may be helpful because cutaneous metastases typically manifest in the same geographic region as the initial cancer. The most common primary tumors seen with cutaneous metastases are melanoma, breast, and squamous cell carcinoma of the head and neck.7 Cutaneous metastases are often firm, because of dermal or lymphatic involvement, or erythematous. These features may help rule out some nonvascular entities in the differential diagnosis (eg, cysts and fibromas). The presence of pigmentation most commonly correlates with cutaneous metastases from melanoma.

Given the limited body of knowledge regarding distinct clinical findings, we sought to better elucidate the dermoscopic patterns of cutaneous metastases, with the goal of using this diagnostic tool to help identify these lesions. We describe 20 outpatients with biopsy-proven cutaneous metastases secondary to various underlying primary malignancies. Their clinical presentation is reviewed, emphasizing the dermoscopic findings, as well as the histopathologic correlation.

Report of Cases

A waiver (WA0630-10) for retrospective review of data was approved by the institutional review board at Memorial Sloan-Kettering Cancer Center. Informed consent was obtained for photography with each biopsy. Twenty outpatients were se-
lected for whom clinical, dermoscopic, and histologic data were available (eTable 1 in the Supplement). The mean age of the patients included was 65 years (age range, 30-84 years). The ratio of women to men was 1.9:1. The primary cancers represented include breast (6 cases), colorectal (3 cases), thyroid (2 cases), and ovarian (2 cases); the remaining were endometrial, gastric, lung, bladder, peritoneal, melanoma, and leiomyosarcoma. In 15 of 20 patients, the skin lesion was thought to represent a cutaneous metastasis before biopsy. In 4 patients, the differential diagnosis included cutaneous metastasis, and in 1 patient there was no suspicion of cutaneous metastasis. Other suspected diagnoses included nonmelanoma skin cancer, melanoma, seborheic keratosis, “inflammatory or infectious processes,” and vascular neoplasms. In 4 of 20 cases (20%), patients had no known history of extranodal disease at presentation to the dermatologist for evaluation of skin lesions, which is higher than the reported incidence rate of approximately 8%.1

The most common presentation was a new nodule in the anatomical region of the primary cancer (12 of 20 cases), while the additional 8 cases manifested as papules or plaques. Most were erythematous, although 2 cases were predominantly pigmented (1 pink with focal brown pigmentation and 1 flesh-colored). Five of 20 patients had painful lesions, while 3 other patients reported pruritus. Three lesions were ulcerated at the time of presentation. Most patients were seen with cutaneous metastases near the site of the primary cancer, representing 16 of 20 patients (80%). Four patients (20%) were seen with distant cutaneous metastases.

The most common dermoscopic finding overall was a vascular pattern, seen in all 17 nonpigmented lesions (eTable 2 in the Supplement). Discrete vessels were observed in 15 of 17 nonpigmented cases (88%). The most frequent subtype of vascular pattern was serpentine (or linear irregular vessels), seen in 13 of 17 cases (77%), followed by arborizing vessels in 9 of 17 cases (53%) (Figure 1A and B and eTable 1 in the Supplement). In 1 case, arborizing vessels were the only dermoscopic vascular structure seen, originating from the center of the lesion and radiating toward the periphery. Other vascular patterns observed include dotted vessels (4 of 17 cases [24%]) (Figure 2A
and B) and comma-shaped vessels (3 of 17 cases [18%]) (eTable 2 in the Supplement). Ten of 17 nonpigmented lesions (59%) having a vascular pattern had a mixed distribution, with more than 1 pattern of vessels seen on dermoscopy. Two other cases (12%) had a structureless or homogeneous pink appearance, without discrete vessels noted on dermoscopic evaluation.

In 3 cases, hyperpigmentation was noted clinically and correlated with melanocytic patterns on dermoscopic evaluation (eTable 3 in the Supplement). All 3 cases represented metastatic breast carcinoma. Brown streaks were observed within all 3 lesions (Figure 3), and blue-gray globules were found in 2 cases. An overlying bluish hue, mimicking a blue-white veil (typically found in melanocytic lesions), was seen in one of these cases. Vascular and melanocytic patterns were present in 1 lesion, with pigmented streaks and dotted vessels. Histopathologic evaluation confirmed the presence of melanocytes and melanophages within the tumor nodules (Figure 3C and D).

Discussion

Cutaneous metastases remain a diagnostic challenge. Because of the potential implications for prognosis and management, prompt diagnosis of such lesions is crucial. Despite the increase in the use of dermoscopy in recent years, dermoscopic findings in secondary cutaneous malignancy have been largely unreported, perhaps due to the uncommon nature of this entity, as well as a lack of experience with and data on using dermoscopy in this setting.

Few data exist on the dermoscopic features of cutaneous metastases. Solitary cutaneous metastasis from thyroid carcinoma, manifesting as an erythematous papule with an “atypical” polymorphous vascular dermoscopic pattern with linear irregular and dotted vessels, has been reported15 (eReferences 15-36 are listed in the Supplement). Others have found that the most common dermoscopic patterns in cutaneous melanoma metastases were saccular and vascular (especially polymorphic typical and winding vessels), as well as pigmented halo and peripheral gray spots.13 In a 2012 study,14 the dermoscopic findings in patients with amelanotic cutaneous melanoma metastases were predominantly a vascular pattern. The most common findings in this series were vessels and glomerular vessels, as well as irregular hairpin and corkscrew-like vessels.

This case series characterizes the dermoscopic features of cutaneous metastases from various primary malignant neoplasms. We noted a high prevalence of vasculature on dermoscopy, representing 88% (15 of 17) of nonpigmented lesions. The remaining 2 nonpigmented cases manifested a pink appearance clinically and dermoscopically, but without discrete vessels noted, possibly suggesting a vascular component consisting of vessels too small to be seen clinically. In both cases, cutaneous metastasis was included in the differential diagnosis because of the clinical setting but had no dermoscopic findings suspicious for metastasis. The most common individual vascular pattern noted was composed of serpentine (or linear irregular) vessels, followed by arborizing vessels. A mixed pattern of vascularity was frequently seen, falling into the “polymorphous atypical” category, seen in 59% (10 of 17) of the cases with observed vasculature. We also observed 1 lesion with only arborizing vessels present (Figure 1B), which clinically mimicked a basal cell carcinoma. However, there were subtle clues to its diagnosis. Typically, arborizing vessels originate from the periphery of the lesion in basal cell carcinoma.16 However, in our case, the vessels originated centrally and radiated toward the periphery.

We also present a new case of amelanotic cutaneous metastasis of metastatic melanoma. Its dermoscopic findings of serpentine vessels, along with dotted and comma-shaped vessels, are in keeping with prior studies13,14 on the dermoscopic features of melanoma metastases. One series reported that 53% of cutaneous melanoma metastases demonstrate a vascular pattern on dermoscopy.13 The specific vascular pattern noted varied, with linear irregular vessels observed most commonly. Dotted vessels or glomeruloid vessels (which are considered a variation of dotted vessels) and polymorphous vessels may be seen as well and have been noted by several authors.17-20 A pattern of dotted vessels is not the most common vascular pattern seen in cutaneous melanoma metastases; however, when present, a 90% positive predictive value that the lesion is of melanocytic origin has been reported.17

Our cases of breast cancer metastases represent a notable subset of cases because 60% (3 of 5) manifested...
clinical hyperpigmentation that corresponded to a melanocytic dermoscopic pattern. All 3 cases had pigmented streaks or globules, and 1 case had a superimposed vascular pattern as well. Hyperpigmented cutaneous metastases from breast cancer have been recognized since 1977, when cases of breast carcinoma were noted to have pigmentation on histologic examination, referred to as “melanocyte colonization.” The melanocyte colonization was postulated to occur when tumor cells contacted the basal layer of the epidermis and the residing melanocytes. Epidermotropic metastases are thought to facilitate movement of these melanocytes into the tumor. Other investigators reported a case of breast cancer metastases over the chest, mimicking melanoma. They speculated that melanocytes require several factors to integrate into a cutaneous metastasis, including an epidermotropic tumor, interaction with the cutaneous basement membrane, and perhaps specific growth factors, which combined result in a pigmented cutaneous metastasis. Melanin release from the damaged epidermis is also phagocytosed by melanophages, resulting in further pigmentation. While breast carcinoma is the most commonly reported tumor manifesting with pigmented cutaneous metastasis, other pigmented tumors reported include prostate adenocarcinoma, anorectal adenocarcinoma, head and neck carcinoma, vulval extramammary Paget disease, squamous cell carcinoma, basal cell carcinoma, Bowen disease, porocarcinoma, and medullary thyroid carcinoma. These tumors may share a propensity to interact with the basal layer of the epidermis and potentially induce growth factors that stimulate pigmentation.

The presence of a vascular pattern in most of our cases of cutaneous metastases raises important questions regarding their pathogenesis. Indeed, much investigation has already been performed studying the role for angiogenesis and its mediators in tumor metastasis. It is well known that the ability of a tumor to metastasize involves the production and recruitment of new capillaries. The tumor must trigger an “angiogenic switch” by tipping the balance of local chemokines in favor of proangiogenic factors (eg, vascular endothelial growth factor and fibroblast growth factor 2). Support for these findings includes the demonstration that the polymorphous and glomeruloid vessels seen on dermoscopic evalua-
tion of a case of cutaneous melanoma metastasis corresponded to proliferation of spindled endothelial cells.20 Another study14 examined 68 benign and metastatic nodules under high-resolution and color Doppler sonography to determine the degree of vascularity in such lesions; all metastatic nodules, regardless of primary malignancy type, showed hypervascularity, whereas none of the benign lesions demonstrated this property.

Although our study supports the notion of dermoscopy as a useful tool in the diagnosis of cutaneous metastases, as well as a role for angiogenesis in the pathogenesis of cutaneous metastases, it has some limitations. Because of the rarity of cutaneous metastases and the recent expansion in the use of dermoscopy to nonpigmented lesions, our number of cases is limited. In addition, while we routinely obtain prebiopsy dermoscopic images of pigmented lesions, such imaging may not be routinely performed before biopsy in nonpigmented lesions. Consequently, although the presence of a vascular pattern in 88% (15 of 17) of our cases is striking, it would be relevant to examine a larger sample of similar lesions to better characterize the vascular pattern seen on dermoscopy. In addition, our evaluators (K.A.C., A.A.M., and P.L.M.) were not masked to the diagnosis; hence, the diagnostic accuracy, sensitivity, and specificity for the aforementioned dermoscopic structures cannot be evaluated. Finally, while our results support a role for neovascularization in the pathogenesis of cutaneous metastases, molecular studies were outside the scope of this article.

Our finding of a vascular dermoscopic pattern in 88% (15 of 17) of cutaneous metastases cases supports a role for routine dermoscopic evaluation of lesions of unknown origin in patients with a history of cancer. In addition, the presence of pigmented metastases, in the absence of a history of melanoma, may suggest a primary breast carcinoma. One should remember that the presence of a vascular pattern is not specific to cutaneous metastases and may be seen in vascular neoplasms, basal cell carcinomas, squamous cell carcinomas, and other tumors. However, the almost universal presence of a dermoscopic vascular pattern in cutaneous metastases is notable. Increased awareness of this distinctive dermoscopic pattern should improve the diagnostic accuracy and recognition of cutaneous metastases.

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