BRIEF ARTICLE

Case Report and Review of Eccrine Porocarcinoma in Skin of Color

Sadhana Sruveera Sathi, MS[1], Elizabeth M. Dugan, MD,[2] Maral Kibarian Skelsey, MD[2]

[1] Georgetown University School of Medicine, Washington, DC
[2] Dermatologic Surgery Center of Washington, DC

ABSTRACT

Skin cancers are often misdiagnosed or diagnosed late in skin of color (Fitzpatrick types 4-6) resulting in increased morbidity and mortality. Rare skin cancers such as Eccrine Porocarcinoma (EPC), which accounts for 0.005% to 0.01% of all epidermal skin neoplasms, are even less likely to be accurately diagnosed in skin of color. Eccrine Porocarcinoma is often misdiagnosed as Squamous cell carcinoma (SCC), Basal Cell Carcinoma (BCC), melanoma, and seborrheic keratosis. The paucity of case reports of EPC in skin of color adds to the challenge of achieving accurate, timely diagnosis and treatment in this patient population. The purpose of this research is to review case reports of EPC documented in skin of color, highlighting salient clinical and histopathological characteristics of EPC, and to describe an additional case of EPC in skin of color that was initially misdiagnosed as seborrheic keratosis. Our search combined “eccrine porocarcinoma” and one of the following terms: “ethnic skin”, “skin of color”, “black”, “dark skin”, “African American”, “Indian”, “Native American”, “Asian”, “Hispanic”, “Indigenous Peoples”, “Middle Eastern” —as these tend to correspond with Fitzpatrick IV – VI types. Google scholar, PubMed, and Ovid MedLine Databases were used to search for articles. Case reports ranging from 1994 to present day were included in analysis.

INTRODUCTION

Skin cancers are often misdiagnosed or diagnosed late in skin of color (Fitzpatrick types 4-6) resulting in increased morbidity and mortality. Rare skin cancers such as Eccrine Porocarcinoma (EPC), which accounts for 0.005% to 0.01% of all epidermal skin neoplasms, are even less likely to be accurately diagnosed in skin of color.[1] Misdiagnosis of EPC is common due to its resemblance to skin cancers such as SCC, BCC, melanoma, and presence of atypical cell types in histology. The lack of case reports of EPC in skin of color adds to the challenge of achieving an accurate and timely detection, diagnosis, and treatment in this patient population. The purpose of this research is to review case reports of EPC documented in skin of color, identify, and highlight salient clinical and histopathological characteristics of EPC in this patient population, and to describe an additional case of EPC in skin of color encountered in the clinic that was initially misdiagnosed as seborrheic keratosis.

METHODS

Our search combined “eccrine porocarcinoma” and one of the following terms: “ethnic skin”, “skin of color”, “black”, “dark skin”, “African American”, “Indian”, “Native American”, “Asian”, “Hispanic”,

"Indigenous Peoples", "Middle Eastern" —as these tend to correspond with Fitzpatrick IV – VI types. Google scholar, PubMed, and Ovid MedLine Databases were used to search for articles. Case reports ranging from 1994 to present day were included in analysis.

CASE REPORT

We present a case of an 82-year-old African American male (Fitzpatrick type 5/6), who was referred to the Dermatologic Surgery Center of Washington for an enlarging nodule on the right lateral malleolus. Initial biopsy by the referring physician 3 years prior demonstrated a seborrheic keratosis. Past medical history was significant for bilateral kidney transplant 7 years prior secondary to diabetic nephropathy.

The cutaneous exam showed a 2 x 1.5 cm skin colored nodule with an erosive center on the right lateral malleolus (Figure 1).

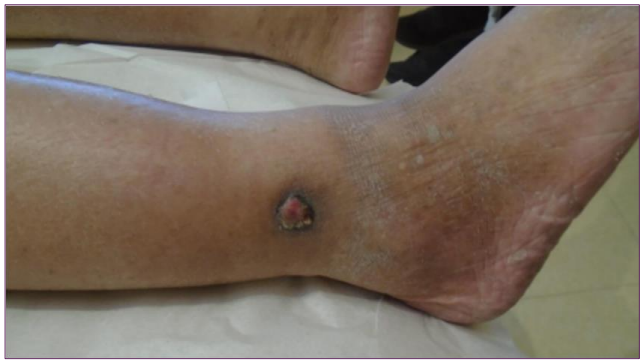

Figure 1.

There was palpable inguinal lymphadenopathy but no cervical or axillary lymphadenopathy. Pathology findings showed an exophytic lesion of skin with a well demarcated proliferation of atypical epithelial cells that emanated from the epidermis and extended into the dermis. This proliferation contained small duct-like structures within and resembled anastomosing wide bands of cells. Many epithelial cells were found to have enlarged, hyperchromatic, and pleomorphic nuclei surrounded by eosinophilic cytoplasm. There are also atypical mitoses present and the neoplasm was surrounded by a prominent fibrovascular stroma (Figure 2).

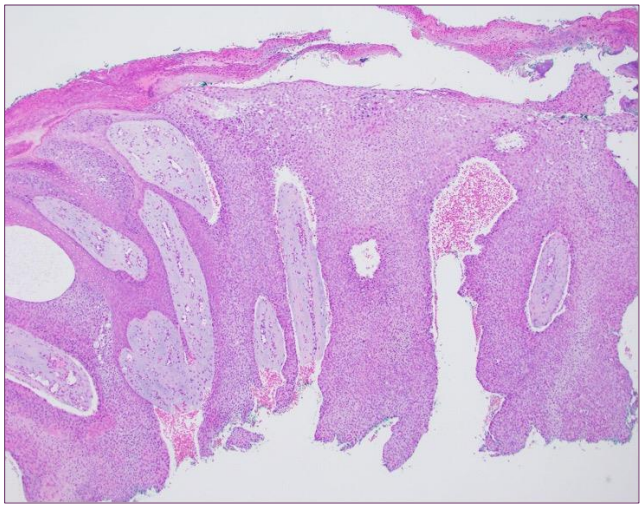

Figure 2.

Mohs surgery was performed with the tumor being cleared after 2 stages and there is no evidence of recurrence or metastatic disease at 10 months follow-up.

RESULTS

Robson et al. conducted one of the largest reviews of EPC, which contains 69 cases and offers a comparator dataset to this review.[1] Our review identified 12 additional cases of EPC described in patients of color whose ethnic origins included Japanese, Indian, Hispanic, and African American, making n = 13 with the present case. The cases as presented in Table 1, showed a slightly higher predilection in females (n=8) compared to

Table 1.

Paper Author	Gender, Ethnicity	Age	Location of lesion	Gross findings/Misdiagnosis if present	Years of lesion growth	Lymph Node Enlargement present?	Microscopic Features	Treatment
1) Cowden et al.[3]	Male, African American	56	Right Upper Back	4x5 cm polypoid mass with occasional bleeding	1-2 years	Not reported	Anastomosing cords of bland epithelial cells of poroma type penetrating the dermis; sections with cytological atypia, squamous differentiation, clear cell change and abnormal mitotic activity; associated with a fibrovascular stroma. 0-6 mitoses per hpf	Mohs micrographic surgery, 3 stages. Did not show for follow-up appointments
2) Cowden et al.[3]	Female, African American	71	Right Heel	Large verrucous plaque containing a moist red nodule	> 1 year	Not reported	Proliferation of atypical epithelial cells with ductal differentiation emanating from the epidermis and extending into the dermis. 9 to 35 mitoses per hpf. 2.75 mm depth	Mohs micrographic surgery with clear margins
3) Girishkumar et al.[4]	Female, African American	40	Anterior aspect of left leg	2.5x2cm, indurated, firm pigmented lesion. Superficial ulceration	> 20 years	No	Extended into dermis, pattern of broad bands and well-defined satellite islands. Islands of tumor cells infiltrated subcutaneous adipose tissue. Cells were cuboidal, uniform. Moderate cytoplasm, indistinct borders. Nuclei were ovoid, prominent nucleoli with slight pleomorphism. 11 mitoses per hpf	Wide excision, transposition flap
4) McMichael et al.[5]	Female, African American	71	Left ear	2.0 cm x 1.7 cm irregularly shaped nodule on antihelix of the left ear; smooth multilobed and deep purple in color, hyperpigmentation in multiple areas. Sites of excoriation, no bleeding or purulence	>20 years	No cervical lymphadenopathy	Poorly circumscribed neoplasm involving epidermis and extending to the base of biopsy. Anastomosing bands and sheets of squamous and basaloid cells focally exhibiting ductular differentiation, including the formation of cuticles. Moderate pleomorphism.	Mohs surgery total removal of lesion done in 1 stage
5) Goel et al.[6]	Male, African American	42	Plantar surface of right foot	n/a	>2 years	Diffuse anterior/posterior cervical lymphadenopathy, right axillary mass, bilateral inguinal lymphadenopathy	Basaloid cells with eosinophilic cytoplasm beneath an ulcerated surface. Diffuse areas of necrosis, individual cell necrosis, and numerous mitotic figures. Ductular structures lined by an eosinophilic, basement membrane like material. Ducts were highlighted by a polyclonal CEA.	Passed away 2 years after initial diagnosis secondary to widespread eccrine porocarcinoma
6) Ramasendaran et al.[7]	Female, Asian	65	Left forearm	Hard-pedunculated mass over the anteromedial aspect of the left mid-forearm measuring 6 × 5 cm, erythematous, cauliflower-like growth with a stalk measuring approximately 1cm, and visible feeding vessels. Referred for melanoma.	>5 years	No lymphadenopathy, no nodal involvement or distant metastasis	Inconspicuous intercellular bridges extending into the dermis. Atypical cells include eosinophilic cells, pigmented cells with focal squamous differentiation, and ductal-like structures. Nuclear atypia with frequent mitoses and focal necrosis. Stroma shows proliferation of reactive vessels and mild chronic inflammation. Tumor cells immunoreactive to CK 7 and non-reactive to S100. Tumor depth >35mm, increased mitotic activity. "High risk histology type."	Excision of left forearm lesion under general anesthesia
7) Godinez-Puig et al.[8]	Female, Hispanic	80	Left thigh	2.2 x 1.7 cm sessile, smooth, deep purple, nodule on the left lateral posterior thigh. Dermoscopic exam revealed exophytic nodule with greenish blue pigmented	>10 years, more aggressive growth over past 3 months	No lymphadenopathy	Dermal infiltrative nodule with large, interconnected lobules and strands of large polygonal cells with focal ductal differentiation.	Mohs micrographic surgery tumor negative margins achieved after 2 stages

				globules interspersed by prominent irregular arborizing vessels resembling a pigmented BCC.			Zones of tumor necrosis were also identified. Nuclear atypia and frequent mitotic activity	
8) Vleugels et al.[9]	Female, Hispanic	59	Left ventral forearm	2.5-cm pink to violaceous pedunculated nodule with hemorrhagic crusting on a 1.5-cm base	3 years	No lymphadenopathy but 2 years later tumor reappeared in left axilla	Small cuboidal cells forming duct-like lumina that extended into the reticular dermis. ~10mm tumor depth, lobular infiltrative growth, numerous mitoses. Comedonecrosis, nuclear and cytoplasmic pleomorphism, and atypical mitotic figures.	Negative margin Mohs micrographic surgery, radical left axillary lymphadenectomy
9) Nakanishi et al.[10]	Male, Japanese	74	Leg	Brown-black nodule measuring 9 x 7 mm is surrounded by a slightly elevated whitish halo	n/a	n/a	Irregular nests of atypical cells extended into the dermis. Poroid tumor cells were PAS positive. Dendritic melanocytes containing melanin are intermingled with the tumor cells. Eosinophilic globules are evident within some tumor cells. Dendritic cells containing melanin positive for HMB-45 and S-100. Tumor cells: Negative for CEA, HMB-45, S-100. Positive for AE1-AE3, KL-1.	10 months follow up showed no recurrence or metastasis of tumor
10) K.Hara, S.Kamiya	Female, Japanese	77	Back	10 x 12 mm, surrounded by papules forming an incomplete ring measuring 22 x 18mm	n/a	Small axillary lymph nodes were palpable	Irregular nests of atypical cells in the acanthotic epidermis with extension into deep dermis. In nests, aggregates of small basaloid cells and larger cells with abundant eosinophilic cytoplasm. Dendritic melanocytes containing melanin were intermingled with the tumor cells.	Wide local excision, 17mos later patient died of pneumonia with no evidence of residual tumor
11) Masamati et al.[11]	Female, Indian	29	Parieto occipital scalp	6x5x3cm, showing surface ulceration with focal loss of hair and along with loss of pigmentation. Mobile mass, free from underlying structures and bled on touch Misdiagnosis as soft tissue sarcoma	1 year	None	Infiltrating tumor with polygonal to cuboidal cells having pleomorphic vesicular nuclei. Prominent one to two nucleoli, moderate to abundant pale cytoplasm arranged in lobules, nests and cords. Separated by thick fibrous septae. Tumor depth of 8mm with infiltrating borders, mitotic rate > 14/10 hpf, few lymphatic tumor emboli and foci of tumor necrosis indicating poor prognosis. + for CEA, PAS stain	Local excision with negative margins, Recurrence after 6 mos of surgery
12) Maeda et al.[12]	Male, Japanese	58	Left waist	Flat, dark tumor of 1 cm in diameter developed on a pre-existing pigmented spot Misdiagnosis of malignant melanoma.	>30 years	Left lower leg reached the inguinal region. Scrotal swelling. Left supraclavicular lymph node enlargement.	Intraepidermal nests contained more dendritic melanocytes than in the adjacent epidermis	Not specified
13) Current Case	Male, African American	82	Right lateral malleolus	2 x 1.5 cm skin colored nodule with an erosive center	>3 years	Inguinal lymphadenopathy	Exophytic lesion of skin proliferation of atypical epithelial cells emanating from the epidermis into the dermis. Small duct-like structures within and resembled anastomosing wide bands of cells. Epithelial cells with enlarged, hyperchromatic, and pleomorphic nuclei surrounded by eosinophilic cytoplasm. Atypical mitoses present, neoplasm surrounded by a prominent fibrovascular stroma.	Mohs surgery

males (n= 5), consistent with findings by Robson et. al. The age in patients of color (range: 29-82, average: 61.84, median: 65 years) was slightly younger than the average and median age reported by Robson et.al (range: 29-91, mean: 73, median: 78), but in line with observations that EPC affects the elderly in their sixth or seventh decade of life. In patients of color, the tumor showed variable appearance, as a sessile or pedunculated mass, verrucous plaques, nodules, and some with bleeding and ulcerations. The most common site of EPC in patients of color was the lower extremity (~50%), but also appeared on the head, neck, and upper extremity, consistent with the literature. A long period of clinical history is the norm for EPCs, ranging from 2 weeks to 60 years. The average preoperative duration of reported lesion growth in patients of color was similar to that reported by Robson et. al, with 8.81 years vs. 9 respectively. Most of the histopathology findings showed eccrine ductal differentiation, but malignant squamous cells, melanocytes, and clear cells were also present in many cases. 3 out of the 13 cases of EPC in skin of color were classified as “pigmented EPC”, coined by Hara and Kamiya in 1995 to describe histology showing melanocyte symbiosis with tumor cells. Dendritic cells containing melanin stained positive for HMB-45 and S-100 whereas ductal tumor cells were reactive to markers such as CEA, CK-7 and non-reactive to S-100. Approximately 33% (n=4) patients of color had lymph node involvement, >7 mm depth of tumor invasion, and >14 mitoses per high power field, which are associated with poor prognosis in patients with EPC. This is higher than the 20% lymph node metastasis for EPC cases that Robson et. al report in their review.

DISCUSSION

The review of a small number of cases seem to suggest a more advanced EPC tumor presentation in patients of color than lighter skinned patients. This trend is similar to findings in melanoma which showed that Hispanic (26%) and Black patients (52%) had more advanced melanoma at presentation compared with Caucasian patients (16%).[2] The 33% lymph node metastasis observed in patients of color with EPC is higher than the rates of metastatic BCC in all races: 0.0028 to 0.55%, but similar to rates of metastatic SCC that develops within a chronic scarring process more seen in skin of color: 20–40%.[2]

CONCLUSION

Clinicians should also be aware of atypical clinical and histological variants of EPC in people of color such as pigmented EPC, which can be confused for malignant melanoma. Misdiagnosis of EPC can have significant consequences given that the cancer has the potential to be aggressive. It is thought that 20% of EPC recur locally, an additional 20% metastasize, and mortality rates of 67% are seen when local lymph nodes are involved.[3] Therefore, the differential diagnoses of these lesions must be considered and ruled out using thorough dermatopathological analysis. Additional case details and a larger sample size are needed before determining diagnostic and treatment guidelines, mortality, and risk associated with EPC in skin of color.

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Corresponding Author:
Maral Kibarian Skelsey MD
5530 Wisconsin Ave # 820
Chevy Chase, MD 20815
Email: Dr.Maral.Skelsey@mohs-md.com

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