



Review Article

Unusual cutaneous metastatic carcinoma

Sory J. Ruiz, Suhair Al Salihi, Victor G. Prieto, Priyadharsini Nagarajan, Michael T. Tetzlaff, Jonathan L. Curry, Doina Ivan, Carlos A. Torres-Cabala^{*,1}, Phyu P. Aung^{*,1}

Department of Pathology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA



ARTICLE INFO

Keywords:
Metastatic
Skin
Carcinoma

ABSTRACT

Most of metastatic tumors to the skin are from primary tumors of the breast, lung, or from melanoma; metastases to the skin from primary carcinomas at other sites are rare. Cutaneous metastases of visceral carcinomas most often occur in patients with advanced disease, and are associated with a poor prognosis. We report 6 cases of nonmammary, nonpulmonary carcinoma metastatic to the skin. Most patients were elderly with advanced disease at the time of diagnosis of skin metastasis. The primary tumor sites included the thyroid, esophagus, biliary tract, ovary, and prostate. Awareness of these rare cases of metastasis to the skin will help pathologists and clinicians make the correct diagnosis.

1. Introduction

Metastatic involvement of the skin happens in fewer than 10% of patients with malignancy. Most patients with skin metastases have advanced disease at the time skin metastases are diagnosed. Metastasis to the skin is usually associated with a dismal prognosis. The primary tumors that most commonly metastasize to the skin are breast carcinoma, lung carcinoma, and melanoma. Metastasis to the skin from primary carcinomas at other sites is uncommon. Skin metastases are most often located near the primary tumor, but distant metastasis to skin can also occur, which can make the diagnosis challenging. The head and neck region is the most common site of distant metastases in skin. Here, we report 6 cases of metastasis to the skin from nonmammary, nonpulmonary primary carcinomas.

2. Methods

After receiving institutional review board approval, through a search of our pathology database, we identified cases of biopsy-proven cutaneous metastatic carcinoma originating from nonmammary, nonpulmonary primary tumors and diagnosed in the period from January 2018 through February 2019 at The University of Texas MD Anderson Cancer Center. Melanomas, sarcomas, and hematolymphoid neoplasms were not included. For each case, the patient's medical records were reviewed to obtain clinical information regarding the patient's course of disease and the clinical presentation of the rare cutaneous metastasis.

3. Results

Six cases of cutaneous metastasis from primary tumors that rarely metastasize to the skin were included in this study. Table 1 summarizes the demographic and clinicopathologic characteristics and outcomes of the patients. Five of the 6 patients were 60 years of age or older at the time of diagnosis of the cutaneous metastases, and 4 of the 6 patients were male. Four patients presented with mass lesions, and 2 presented with cutaneous plaques. The primary tumor sites were thyroid ($n = 2$), esophagus ($n = 1$), biliary tract ($n = 1$), ovary ($n = 1$), and prostate ($n = 1$).

3.1. Case 1

A 52-year-old woman was diagnosed with anaplastic thyroid carcinoma. The neoplasm showed epithelioid and spindle cell morphology with pleomorphism and occasional multinucleation, as well as focal glandular and papillary growth with cytologic features, consistent with a papillary thyroid carcinoma. The tumor was invasive into soft tissues of the neck at the time of diagnosis. Initial immunohistochemical (IHC) studies showed that the tumor cells were positive for TTF1, pan-keratin, and cytokeratin-7 and negative for CK20, CDX2, estrogen receptor, GCDPF-15, and Napsin A. Two months later, the patient presented with a pleomorphic, high-grade neoplasm in the lung, and IHC studies revealed PAX8 positivity, supporting a diagnosis of metastatic anaplastic thyroid carcinoma. The patient was treated with paclitaxel, protein-bound paclitaxel, bevacizumab, and atezolizumab. Eight months after

* Corresponding authors at: The University of Texas MD Anderson Cancer Center, 1515 Holcombe Blvd, Unit 85, Houston, TX 77030, USA.

E-mail addresses: ctcabala@mdanderson.org (C.A. Torres-Cabala), PAung@mdanderson.org (P.P. Aung).

¹ Equal contribution.

Table 1
Demographic and clinicopathologic characteristics and outcomes of patients with carcinoma metastatic to the skin.

Age, y	Sex	Primary tumor site	Primary tumor type	Skin metastasis site	Skin metastasis type	Skin metastasis lesion	Interval from diagnosis of primary tumor to diagnosis of skin metastasis	Sites of prior metastasis	Clinical outcome at last follow-up
52	F	Thyroid	Anaplastic thyroid carcinoma	Hip	Nodule	Nodule	10 months	Lung, mediastinal lymph nodes	Dead
78	M	Thyroid	Papillary thyroid carcinoma	Face	Nodule	Nodule	96 months	Lymph nodes of neck, lung	Dead
63	M	Esophagus	Adenocarcinoma	Scalp	Plaque	Plaque	31 months	Lung, rib	Alive
63	M	Biliary tract	Cholangiocarcinoma	Face	Ulcerated nodule	Ulcerated nodule	8 months	Colon, brain	Alive
72	F	Ovary	Low-grade serous carcinoma	Neck and left shoulder	Nodule	Nodule	27 years	Mediastinal lymph nodes and soft tissue of the thorax and left thigh	Alive
60	M	Prostate	Adenocarcinoma	Pubic area	Plaque	Plaque	97 months	None	Alive

the initial diagnosis, the patient presented with metastasis to mediastinal lymph nodes. Two months after the diagnosis of lymph node metastasis, the patient presented with a 3-cm dermal nodule on the left posterior hip. Biopsy showed a pleomorphic neoplasm with predominantly epithelioid and focal spindle cell component involving the deep dermis; the epidermis was spared. Morphologic findings were consistent with metastasis from thyroid primary tumor and supported by expression of PAX8 by tumor cells (Fig. 1). At the time of diagnosis of the skin metastasis, the patient was treated with radiation to the neck, lenvatinib, everolimus, and pembrolizumab. The disease progressed with multiple bone metastases with impending pathological fracture, which necessitated prophylactic intramedullary nail placement in the right humerus. The patient died with progressive disease at another institution 14 months after the initial diagnosis.

3.2. Case 2

A 78-year-old man presented for evaluation of a lesion on the nose. The patient had a history of papillary thyroid carcinoma metastatic to the right lung. The patient had initially been treated with a total thyroidectomy and radioactive iodine, followed by a revised wide local excision 8 months later, which showed extensive involvement by carcinoma of lymph nodes and soft tissues of the neck, laryngeal cartilage, and periosteum of clavicle. Imaging studies at the time of wide local excision revealed bilateral lung nodules. Three years after the initial diagnosis, when the patient was transferred to our hospital for further management, the patient's surgical specimens were reviewed, and molecular studies revealed BRAFV600E mutation; the patient was treated with dabrafenib and trametinib. Seven years after the initial diagnosis, a biopsy of an enlarging right upper lobe lesion did not show typical morphologic features of papillary thyroid carcinoma but instead showed marked pleomorphism with epithelioid and spindle cell components. IHC studies showed that tumor cells in the lung lesion were positive for PAX8 and BRAF V600E mutant and negative for TTF1, desmin, and S100. The morphologic and IHC findings for the lung lesion were most consistent with metastatic thyroid carcinoma with anaplastic transformation, and treatment with dabrafenib and trametinib was continued and palliative radiation was added. One year later, the patient presented for evaluation of a small nodular skin lesion on the nose. Morphologic findings showed a carcinoma with marked pleomorphism and epithelioid and spindle cell components involving the dermis. IHC studies showed that the tumor cells were positive for BRAFV600E and CD10 (focal) and negative for PAX8, TTF1, pan-cytokeratin cocktail, desmin, p63, ERG, CD34, CD30, and melanocytic markers. These findings were consistent with metastatic anaplastic thyroid carcinoma (Fig. 2). The patient died of a presumed sudden cardiac event 3 months after the diagnosis of the skin lesion.

3.3. Case 3

A 63-year-old man was diagnosed with a moderately to poorly differentiated adenocarcinoma of the esophagus. The patient was treated with chemoradiation followed by surgical resection 8 months after the initial diagnosis. Pathologic evaluation of the surgical specimen showed residual poorly differentiated carcinoma. Two years after the surgical excision, the patient presented with metastatic poorly differentiated adenocarcinoma in the rib and right lung; IHC studies showed that the tumor cells were positive for CDX2 and negative for TTF1 and NapsinA. The lung lesion was treated with stereotactic radiation and chemotherapy. Four months after completion of treatment for the metastatic rib and lung lesion, he presented with a 3-cm erythematous plaque with superficial excoriations on the right side of the scalp. Morphologic evaluation showed a poorly differentiated carcinoma involving the dermis with extensive single cell growth pattern. The lesional cells were positive for CDX2. These findings were consistent with metastatic adenocarcinoma from the esophagus (Fig. 3). At

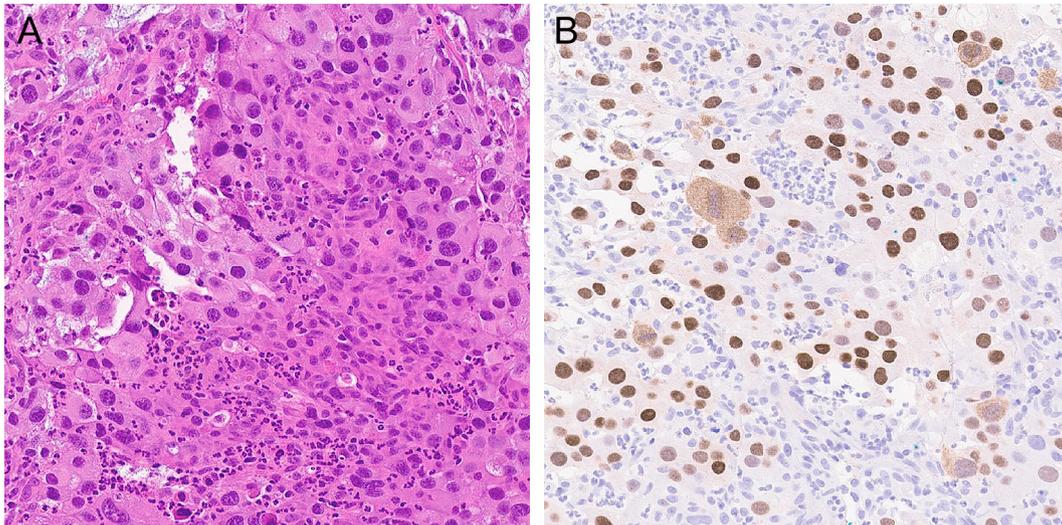


Fig. 1. Metastatic anaplastic thyroid carcinoma involving deep dermis. A, Pleomorphic cells with frequent mitotic activity (H&E, 20 \times). B, PAX8 immunohistochemical study highlighting the tumor cells (20 \times).

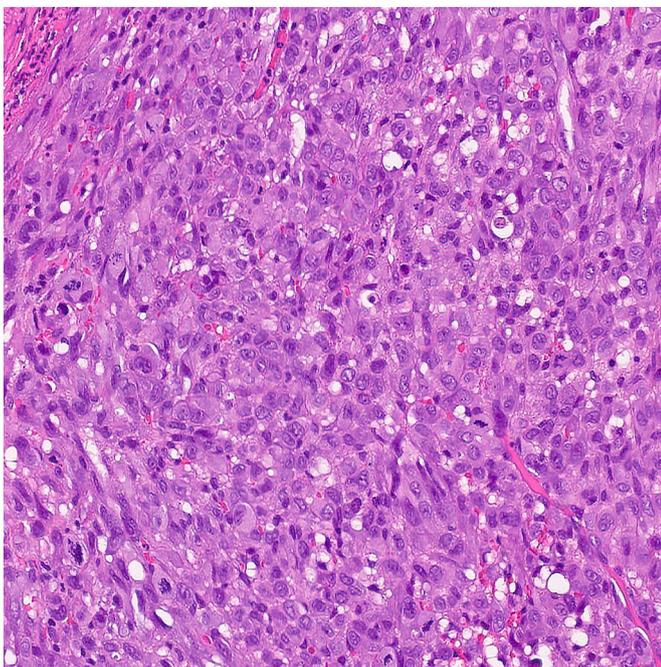


Fig. 2. Metastatic anaplastic thyroid carcinoma involving the dermis exhibiting nuclear pleomorphism and frequent mitotic activity (H&E, 20 \times).

the time of this report, the patient is receiving treatment with neoadjuvant chemoradiation.

3.4. Case 4

A 63-year-old man was diagnosed with moderately differentiated cholangiocarcinoma and treated with chemotherapy. IHC studies of the primary tumor showed that the tumor cells were positive for CK19, CDX2, villin, and cytokeratin-7 (focal) and negative for CK20. During the first 6 months after the initial diagnosis, the patient was diagnosed with metastatic disease involving the colon, liver, omentum, and brain. Pembrolizumab was added to the chemotherapy, and he also received gamma knife treatment for the brain metastasis. Eight months later, the patient presented with a 2.8-cm ulcerated nodule on the left cheek that he had first noticed 3 months earlier and had been growing since that

time (Fig. 4A). Histomorphologic findings showed a moderately differentiated adenocarcinoma involving superficial and deep dermis with desmoplastic stroma. The morphologic findings were consistent with metastatic cholangiocarcinoma (Fig. 4B). At the time of this report, the patient is receiving palliative care.

3.5. Case 5

A 72-year-old woman presented for evaluation of skin nodules. She had a remote history of ovarian low-grade serous carcinoma that was managed initially with hysterectomy and bilateral salpingo-oophorectomy. After the initial diagnosis of primary disease, the patient presented 16 years later with metastasis to supradiaphragmatic lymph nodes, 21 years later with metastasis to soft tissue of the thorax, and 25 years later with metastasis to soft tissue of the left thigh. The patient had been treated with several chemotherapy regimens over the years. At the time of presentation for evaluation of skin nodules, approximately 27 years after the initial diagnosis of primary disease, the patient had 2.5-cm subcutaneous nodules on the posterior aspect of the neck and the left shoulder, which she had first noticed 3 months earlier. The posterior neck nodule was biopsied, and histomorphologic findings showed a low-grade papillary lesion with frequent psammoma bodies involving superficial and deep dermis. The tumor cells were positive for PAX8. These findings were consistent with metastatic low-grade serous carcinoma (Fig. 5). The patient underwent wide local excision of the metastatic skin disease. At the time of this report, the patient is alive with no disease and continues clinical follow-up.

3.6. Case 6

A 60-year-old man presented for evaluation of skin lesions in the suprapubic area. He had previously been diagnosed with adenocarcinoma of prostate, Gleason score 9 (4 + 5), which was initially treated with hormonal therapy, neoadjuvant chemotherapy (enzalutamide, ipilimumab), and radiation. Seven years after the initial diagnosis, the patient had presented with osseous metastasis and received additional chemotherapy (docetaxel, cabazitaxel, and carboplatin). One year later, the patient presented for evaluation of firm pink plaques on the suprapubic area. A biopsy showed a moderate to poorly differentiated adenocarcinoma involving deep and superficial dermis; there was minimal involvement of the epidermis (Fig. 6A). The malignant cells had prominent central nucleoli. An IHC study with NKX3.1 was positive in tumor cells (Fig. 6B). The findings were consistent with metastasis

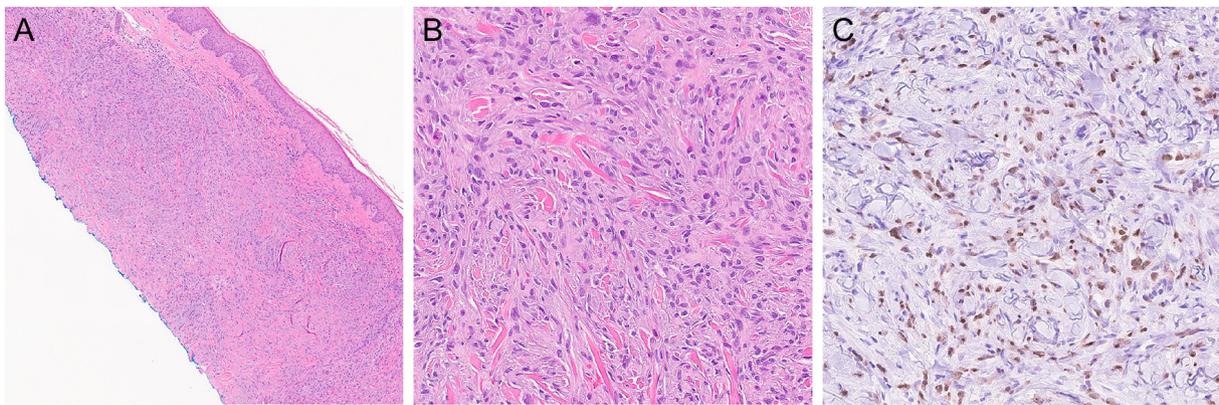


Fig. 3. Metastatic poorly differentiated esophageal adenocarcinoma infiltrating the dermis. A, A diffuse cellular infiltrate infiltrating into the dermis with no obvious epidermal involvement (H&E, 4×). B, Pleomorphic cells with scattered mitotic activity (H&E, 20×). C, CDX2 immunohistochemical study highlighting the tumor cells (20×).

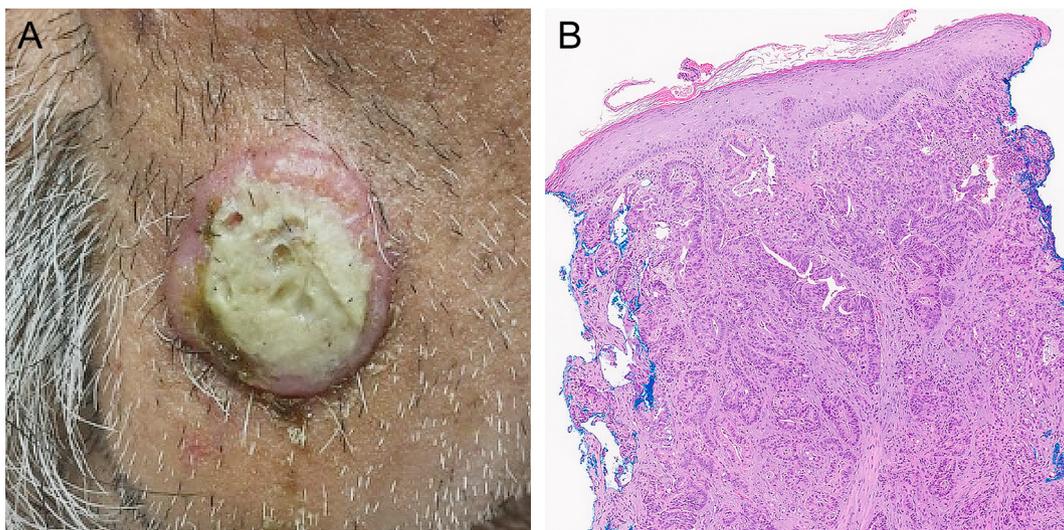


Fig. 4. Metastatic cholangiocarcinoma involving superficial and deep dermis. A, Photograph of 2.8-cm ulcerated lesion on the left cheek. B, a moderately differentiate adenocarcinoma predominantly involving dermis (H&E, 10×).

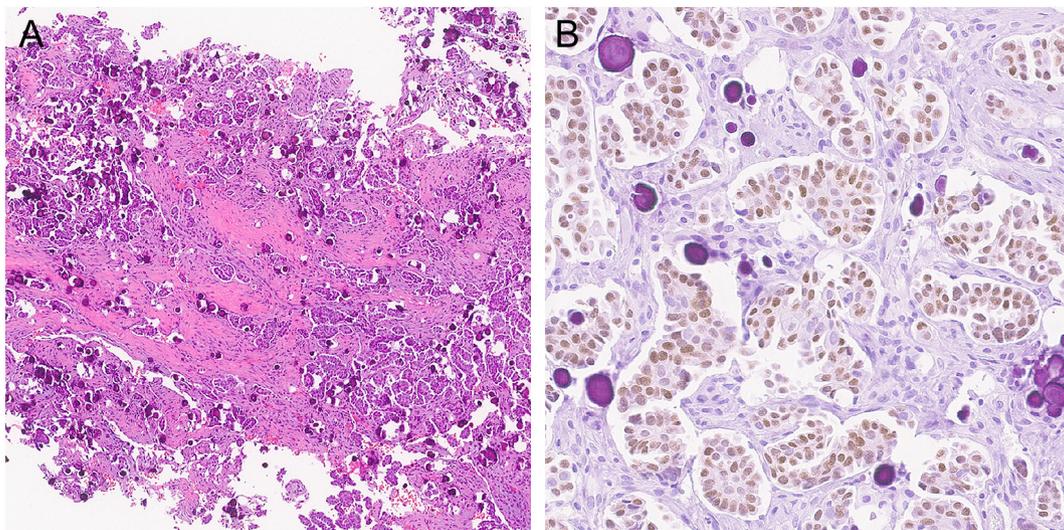


Fig. 5. Metastatic low-grade serous ovarian carcinoma involving deep dermis. A, Infiltrating clusters of atypical cells with papillary features admixed with calcification/psammoma bodies (H&E, 10×). B, PAX8 immunohistochemical study highlighting the tumor cells, with psammoma bodies present in the background (20×).

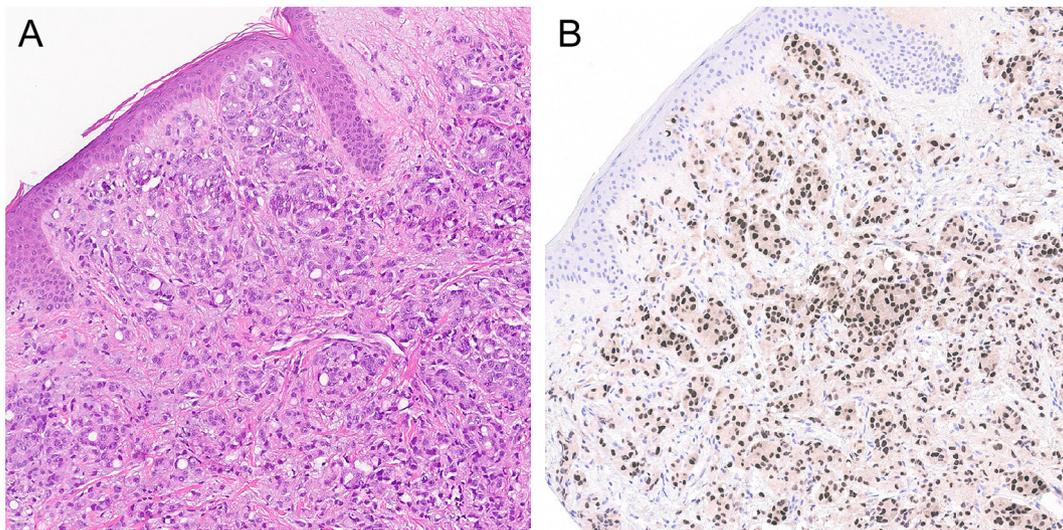


Fig. 6. Metastatic prostate adenocarcinoma involving superficial and deep dermis. A, A moderately to poorly differentiated adenocarcinoma predominantly involving dermis with no prominent epidermal involvement (H&E, 10 \times). B, NKX3.1 immunohistochemical study highlighting the tumor cells; focal involvement of the epidermis is present (10 \times).

from the prostatic adenocarcinoma. At the time of this report, the patient is alive and continues to receive hormonal therapy and radiation.

4. Discussion

Metastasis to the skin occurs in fewer than 10% of cases of carcinoma. In line with what we found in this series, in which 5 of the 6 patients were 60 years of age or older at the time of diagnosis of skin metastases, previous studies in the literature have established that most cases of carcinoma metastatic to the skin occur in older adults. Several studies have found that carcinoma of the breast is the primary carcinoma that most commonly metastasizes to skin, accounting for 51% of all cases of cutaneous metastasis and 73% of all cases of cutaneous metastasis in women [1-4]. This explains why cutaneous metastases are more common in women (the female to male ratio is 3:2) [5]. A study conducted in 10 Veterans Affairs hospitals in which over 95% of subjects were men showed that the primary tumors that most commonly metastasized to skin were lung carcinoma (which accounted for 29% of cases of skin metastasis) and melanoma (18%), followed by gastrointestinal carcinoma (14%) and genitourinary carcinoma (10%). Other studies have reported similar findings in males [6].

In the pediatric population, the neoplasms that most commonly metastasize to the skin are neuroblastoma and hematolymphoid neoplasms; melanoma and sarcoma are less common sources of skin metastasis in children [7]. By age group, the primary neoplasms that most commonly metastasize to skin are as follows: neonates and infants, neuroblastoma, followed by acute myelogenous leukemia; children age 3 to 5 years, acute lymphoblastic leukemia, followed by neuroblastoma; children 7 to 11 years of age, non-Hodgkin lymphomas; and teenagers, Hodgkin lymphoma [7].

Cutaneous metastasis is rarely the initial manifestation of cancer. In 95% of cases, cutaneous metastases are detected after the initial diagnosis in a patient with stage III or IV disease [2,3]. Schoenlaub et al. found that the median survival in patients with carcinoma metastatic to the skin was 6.5 months, with survival varying depending on the primary tumor, being worst for metastasis of lung (median survival, 2.9 months) and best for metastasis of breast (median survival, 13.5 months) [8]. The interval between initial diagnosis and diagnosis of skin metastasis is variable and can be up to 10 years after the initial diagnosis. Therefore, a prior history of malignancy must be taken into consideration in patients who present with cutaneous carcinomas not typical for primary cutaneous tumors. In this series, a patient with high-

grade adenocarcinoma of the prostate presented with cutaneous metastasis 8 years after the initial diagnosis, and a patient with low-grade serous ovarian carcinoma presented with cutaneous metastasis 27 years after the initial diagnosis.

The sites of cutaneous involvement are generally close to the primary tumor site, but distant cutaneous metastases also occur. The head and neck area is one of the most common locations for distant cutaneous metastases. In this series, 3 patients with a primary tumor in the thorax or abdomen (esophagus, biliary tract, and ovary) had metastasis to the skin of the head and neck, and 1 patient with an anaplastic thyroid carcinoma had metastasis to the skin of the hip.

Cutaneous metastases present most often as mass lesions, often multiple [2,5]. Nonetheless, unusual clinical presentations that clinically resemble benign cutaneous lesions are not uncommon. In this series, 4 of 6 patients presented with nodules (1 ulcerated), and the other 2 presented with plaque lesions. A plaque lesion can raise the possibility of an inflammatory or infectious disorder; therefore, it is important to maintain a high index of suspicion in patients with a prior history of malignancy who present with plaque lesions and to biopsy such lesions when clinically indicated.

Two of the patients in this series had metastatic thyroid carcinomas. Cutaneous metastasis of thyroid carcinoma is rare and usually occurs in patients with disseminated disease. Papillary type is the most common type of thyroid carcinoma to metastasize to the skin (41%), followed by follicular (28%), anaplastic (15%) and medullary (15%). Survival after development of cutaneous metastasis of thyroid carcinoma ranges from 1 month to 7 years, with a mean of 19 months [9]. In our study, both patients with cutaneous metastasis from thyroid carcinoma had the anaplastic type, both had cutaneous metastases diagnosed after the initial primary tumor diagnosis, and both died at 3 months after diagnosis of the cutaneous metastasis. In one of the cases (case 2), the primary diagnosis was a papillary thyroid carcinoma, and 7 years later, the patient presented with a cutaneous metastasis best characterized as anaplastic thyroid carcinoma. Anaplastic transformation of a well-differentiated papillary thyroid carcinoma in a metastatic site is a rare event and portends aggressive clinical behavior. In these cases, loss of expression of TTF1, thyroglobulin, and, less frequently, PAX8 can be seen, as also occurs in cases of a metastasis from one of the types of carcinoma that more commonly metastasizes to skin, making the diagnosis challenging [10,11]. In our case, positivity for *BRAFV600E*, as in the primary papillary thyroid carcinoma, along with the morphologic findings, supported the diagnosis.

Cutaneous metastases from ovarian neoplasms are rare, with an incidence between 1.9% and 5.1% of patients with ovarian neoplasms [14]. Most cases present as a mass in the abdominal skin, often with multiple lesions. The skin of the chest and breast can also be involved. The skin at the site of surgical incision or in the periumbilical region (where skin metastases are known as Sister Joseph's nodules) is the most common location. Most cases of cutaneous metastases from ovarian neoplasms are from high-grade serous carcinoma, although there are rare reports of low-grade serous carcinoma and Brenner tumor metastatic to the skin [12-14]. The case reported in this series was a low-grade serous carcinoma that metastasized to the neck region 27 years after the initial diagnosis.

One of the patients in this series had high-grade adenocarcinoma of the prostate (Gleason score 9) metastatic to the pubic area, which presented as a plaque. Cutaneous metastases from carcinoma of the genitourinary tract are rare and arise most frequently from primary tumors of the kidney (66%) or bladder (17%), followed by prostate (12%) and testis (4%). These skin lesions usually present as macules or plaques and are likely to be confused with inflammatory disorders. The most common location is the abdominal skin. The prognosis is poor; more than 95% of patients with cutaneous metastases from primary genitourinary tract carcinomas die within 1 year after diagnosis of skin metastasis [15]. Adenocarcinoma of the prostate metastatic to the skin is unusual, and when it occurs, it typically presents as nodules in the skin of the pubis or genitals; however, distant cutaneous metastases have also been reported [16,17].

Few reports are available of cutaneous metastasis of adenocarcinoma of esophagus and cholangiocarcinoma, the primary tumor types of 2 of the patients in our series. Skin is a rare site of metastasis for these carcinomas, and when skin metastases occur, the abdominal skin is the most common location. Distant metastases have also been reported [18-20].

The main differential diagnosis in cases of carcinoma metastatic to the skin is primary adnexal carcinoma. Clinicohistopathologic features that favor primary adnexal carcinoma include a long-standing history of the lesion, dermal foci of lymphovascular invasion (present in up to 25% of cases), and a lesion present in the deep dermis involving the subcutaneous tissue without epidermal connection. The histomorphology of a cutaneous metastasis often closely resembles that of the primary tumor site, which facilitates recognition of the metastasis. The distinction between primary adnexal carcinoma and carcinoma metastatic to the skin is more challenging in cases of metastatic small cell carcinoma (which closely resembles Merkel cell carcinoma) and sarcoma. Additional knowledge of the patient's clinical history and IHC stains is useful for rendering a definitive diagnosis. Most metastatic adenocarcinomas are correctly identified by the pathologist on the basis of morphologic features, but some primary adnexal tumors, including sebaceous carcinoma, high-grade adnexal carcinoma, and clear cell hidradenoma, are more likely to be confused with metastatic lesions [3].

Several studies have shown that immunohistochemistry for p63 is useful in distinguishing primary adnexal carcinomas from metastatic disease. Ivan et al. reported strong or moderate staining for p63 in all adnexal carcinoma of the skin, while all cases of carcinomas metastatic to the skin were negative; these authors also showed, in another study, that metastases from primary adnexal carcinomas retained expression of p63 in most cases [21,22]. D2-40 also plays a role in this distinction: primary adnexal neoplasms are often positive for this marker, while metastatic carcinomas are negative [23]. Other authors have found limitations with use of p63 alone and have recommend use of panels of markers. One study showed that the IHC markers B72.3, calretinin, p63, CK5/6, BerEP4, and CK20 were differentially expressed in metastatic and primary adnexal neoplasms [3]. In this study, no isolated marker was either sensitive or specific enough to be sufficient on its own. Positive p63 expression had the highest sensitivity for primary adnexal tumor (96%) but low specificity. B72.3 was positive in most carcinomas

and negative in 72% of primary adnexal tumors. Calretinin was negative in 72% of metastatic carcinomas and positive in 64% of adnexal tumors. CK5/6 was positive in all adnexal tumors tested and but only 56% of metastatic carcinomas. A panel of p63, B72.3, calretinin, and CK5/6 correctly identified most adnexal tumors, with limitations in cases of sebaceous carcinoma due to overlapping staining patterns [3].

In conclusion, although carcinoma metastatic to the skin is uncommon, it is important to have a high index of suspicion in patients with a known history of malignancy, especially when disease is advanced. Breast and lung tumors are the primary tumors that most commonly metastasize to the skin, but as we show in this series, carcinoma from other organs can metastasize to the locations, including skin distant from the primary tumor.

Funding disclosure

None.

Declaration of competing interest

None.

References

- [1] Hu SC, et al. Rates of cutaneous metastases from different internal malignancies: experience from a Taiwanese medical center. *J Am Acad Dermatol* 2009;60(3):379-87.
- [2] Lookingbill DP, Spangler N, Helm KF. Cutaneous metastases in patients with metastatic carcinoma: a retrospective study of 4020 patients. *J Am Acad Dermatol* 1993;29(2):228-36. Pt 1.
- [3] Sariya D, et al. Clinicopathologic correlation of cutaneous metastases: experience from a cancer center. *Arch Dermatol* 2007;143(5):613-20.
- [4] Wong CY, et al. Patterns of skin metastases: a review of 25 years' experience at a single cancer center. *Int J Dermatol* 2014;53(1):56-60.
- [5] Gan EY, Chio MT, Tan WP. A retrospective review of cutaneous metastases at the national skin Centre Singapore. *Australas J Dermatol* 2015;56(1):1-6.
- [6] Saeed S, Keehn CA, Morgan MB. Cutaneous metastasis: a clinical, pathological, and immunohistochemical appraisal. *J Cutan Pathol* 2004;31(6):419-30.
- [7] Maher-Wiese VL, Wenner NP, Grant-Kels JM. Metastatic cutaneous lesions in children and adolescents with a case report of metastatic neuroblastoma. *J Am Acad Dermatol* 1992;26(4):620-8.
- [8] Schoenlaub P, et al. Survival after cutaneous metastasis: a study of 200 cases. *Ann Dermatol Venereol* 2001;128(12):1310-5.
- [9] Dahl PR, et al. Thyroid carcinoma metastatic to the skin: a cutaneous manifestation of a widely disseminated malignancy. *J Am Acad Dermatol* 1997;36(4):531-7.
- [10] Al-Qsous W, Miller ID. Anaplastic transformation in lung metastases of differentiated papillary thyroid carcinoma: an autopsy case report and review of the literature. *Ann Diagn Pathol* 2010;14(1):41-3.
- [11] Kim H, et al. Anaplastic transformation of papillary thyroid carcinoma only seen in pleural metastasis: a case report with review of the literature. *Head Neck Pathol* 2017;11(2):162-7.
- [12] Dauplat J, et al. Distant metastases in epithelial ovarian carcinoma. *Cancer* 1987;60(7):1561-6.
- [13] Schonmann R, et al. Inflammatory skin metastases from ovarian carcinoma—a case report and review of the literature. *Gynecol Oncol* 2003;90(3):670-2.
- [14] Spencer PS, Helm TN. Skin metastases in cancer patients. *Cutis* 1987;39(2):119-21.
- [15] Mueller TJ, et al. Cutaneous metastases from genitourinary malignancies. *Urology* 2004;63(6):1021-6.
- [16] Brown GT, Patel V, Lee CC. Cutaneous metastasis of prostate cancer: a case report and review of the literature with bioinformatics analysis of multiple healthcare delivery networks. *J Cutan Pathol* 2014;41(6):524-8.
- [17] Powell FC, Venencie PY, Winkelmann RK. Metastatic prostate carcinoma manifesting as penile nodules. *Arch Dermatol* 1984;120(12):1604-6.
- [18] Park JM, et al. A case of esophageal adenocarcinoma metastasized to the scalp. *Ann Dermatol* 2009;21(2):164-7.
- [19] Stein RH, Spencer JM. Painful cutaneous metastases from esophageal carcinoma. *Cutis* 2002;70(4):230-2.
- [20] West KL, Selim MA, Puri PK. Cutaneous metastatic cholangiocarcinoma: a report of three cases and review of the literature. *J Cutan Pathol* 2010;37(12):1230-6.
- [21] Ivan D, Hafeez Diwan A, Prieto VG. Expression of p63 in primary cutaneous adnexal neoplasms and adenocarcinoma metastatic to the skin. *Mod Pathol* 2005;18(1):137-42.
- [22] Ivan D, et al. Use of p63 expression in distinguishing primary and metastatic cutaneous adnexal neoplasms from metastatic adenocarcinoma to skin. *J Cutan Pathol* 2007;34(6):474-80.
- [23] Plaza JA, et al. Value of p63 and podoplanin (D2-40) immunoreactivity in the distinction between primary cutaneous tumors and adenocarcinomas metastatic to the skin: a clinicopathologic and immunohistochemical study of 79 cases. *J Cutan Pathol* 2010;37(4):403-10.