Original Article

Clinical and Histopathological Characteristics of Cutaneous Metastases from Solid Organ Cancers: Experience of Dermatology in a Tertiary Referral Hospital

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Abstract

Background/Aim: In various studies, it is shown that cutaneous metastases of solid organ cancers are associated with advanced stage disease, lower disease-specific survival rate, and poor prognosis. Metastatic cutaneous disease may be observed in different morphologies. Histopathologically epidermal/dermal/epidermodermal infiltration, solid/nodular structures, interstitial pattern, and perineural invasion may be evident as accompanying features. In the present study, we aim to analyze demographical, histopathological, and clinical characteristics of cutaneous metastases from solid organ cancers in 37 patients. **Materials And Methods:** Thirty-seven patients diagnosed with biopsy-proven cutaneous metastases of solid organ cancers between January 2006 and January 2019 were retrospectively evaluated in the study. **Results:** Breast cancer was the primary cancer in 22 patients, whereas 13 patients were diagnosed with other solid organ cancers. The most common solid cancer which presented with skin metastases was breast cancer (22, 59.5%) followed by lung cancer (3, 8.1%), whereas colorectal cancer and lung cancer were the two most common cancers which metastasized to the skin in male patients. Two patients had cancer of primary unknown. The mean age at the diagnosis of first cutaneous metastasis was 58.1 ± 12.4 years. Twenty-six (70.3%) patients had primary cancer diagnosed first, whereas 11 (29.7%) patients had cutaneous metastasis diagnosed first. Breast cancer is shown to metastasize to the trunk at a significantly higher rate compared with other types of solid cancers ($P = 0.02$). Nodule (37.8%, 14) was the most frequently observed primary lesion of the cutaneous metastases morphologically, followed by plaque (18.9%, $n = 7$), tumor (13.5%, $n = 5$), and papule (8.1%, $n = 3$). Seven (18.9%) patients presented with more than one morphology. Histopathologically, micronodular structure was the most commonly observed structure. The mean time between the diagnosis of primary cancer and death was 60.62 ± 53.93 months (range: 6–156). The mean duration between the appearance of cutaneous metastasis and death was 10.5 ± 6.4 months (range: 1–24). There was not any statistically significant difference between the primary cancer type and the eluded time between death and primary cancer diagnosis. In addition, we were not able to find any statistically significant relationship between living-to-dead ratio and primary cancer type, presence of other organ metastases, and treatment status at the time of the emergence of cutaneous metastases. **Conclusion:** All in all, we would like to highlight the importance of diagnostic skin biopsy, especially in elderly patients presenting with cutaneous nodules of unknown origin. The possibility of cutaneous metastasis should always be kept in mind in patients with a history of malignancy even after long periods of recovery.

Keywords: Breast neoplasms, neoplasm metastasis, pathology, skin

Introduction

Cutaneous metastases of internal malignancies are rarely observed and reported to have an overall incidence of 5.3%.[1] Cutaneous metastases are generally associated with advanced disease stage and decreased life expectancy. They can also be the first presenting sign of an internal malignancy.[2,3] Metastatic extension of an internal malignancy to the skin may develop in several ways including hematogenous spread, lymphatic spread, and

Submission: 25-10-2021 **Revision:** 30-01-2022
Acceptance: 04-02-2022 **Web Publication:** 16-06-2022

Access this article online

Quick Response Code:

Website: www.tjdonline.org

DOI: 10.4103/tjd.tjd_123_21

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How to cite this article: Bostan E, Akdogan N, Gokoz O. Clinical and histopathological characteristics of cutaneous metastases from solid organ cancers: Experience of dermatology in a tertiary referral hospital. Turk J Dermatol 2022;16:44-51.

direct cutaneous invasion.[4] Tumoral cells obtain the fundamental properties which allow them to transcend the primary site from which they origin, invade the lymphatics and blood vessels, and proliferate in a new site including skin forming a new tumoral mass.[5] According to a study by Lookingbill *et al.*,[6] the most common primary carcinomas which metastasize to the skin in males are malignant melanoma, lung, oral cavity, and large intestine cancers; whereas in females breast cancer, melanoma, large intestine, ovary, and lung cancers are the ones that are most commonly associated with cutaneous metastasis. Clinically, cutaneous metastases may present with different morphologies including papule, plaque, patch, nodule, or tumor formation. Therefore, they may simulate both malignant and benign, miscellaneous primary cutaneous neoplasms including pyogenic granuloma, squamous cell carcinoma, adnexal tumors, or inflammatory/infectious skin conditions such as cellulitis or erysipelas.[7-9] So, histopathological examination and immunohistochemical studies play fundamental roles to determine the correct diagnosis and enable the proper management in such cases. A high index of suspicion and a low threshold for skin biopsy are required to establish the diagnosis of cutaneous metastasis. In the present study, we aimed to analyze demographical, clinical, pathological, and immunohistochemical features of cutaneous metastases from various solid organ cancers and to determine the prognostic factors in patients presenting with cutaneous metastasis.

Materials And Methods

The present study was designed as a retrospective study conducted by review of electronic medical data records, clinical pictures, and histopathology specimens belonging to 37 patients diagnosed with biopsy-proven cutaneous metastasis of solid organ cancers between January 2006 and December 2019. Patients with cutaneous metastases of hematologic malignancies and primary skin cancers such as malignant melanoma and squamous cell carcinoma were excluded. The study was approved by the Institutional Review Board. Demographical data (gender, age at the diagnosis of primary cancer, and cutaneous metastasis), personal/family history, primary solid cancer type, morphology, number, and localization of the cutaneous metastasis, temporal relationship (before vs. after) between the diagnosis of primary cancer and the diagnosis of cutaneous metastasis, time interval between the appearance of cutaneous metastasis and primary cancer diagnosis, treatment status at the emergence of metastasis and living-to-dead ratio at the end of the follow-up period, and duration between the diagnosis of primary cancer and death and that between the diagnosis of cutaneous metastasis and death were determined using electronic medical data records. All histopathology slides belonging to 37 patients were re-evaluated by a dermatopathologist and a dermatologist (OG, EB) to further determine the infiltration pattern (epidermal, dermal, epidermodermal, dermal and subcutaneous), the presence of necrosis, hemorrhage, perineural invasion, inflammation, vascularity, trabecular pattern, single file growth pattern, stromal myxoid degeneration, signet ring cells, micronodular, solid/nodular, or glandular structure for each case. Immunohistochemical staining characteristics are also further evaluated for chosen cases.

IBM SPSS for Windows Version 22.0 and MS Excel were used for statistical analyses. Categorical variables were given as frequencies and percentages. Numerical variables were shown as mean ± standard deviation (minimum-maximum) or median. The Kolmogorov–Smirnov and Shapiro–Wilk tests were used to determine whether numerical variables are normally distributed. For the normally distributed numerical variables, independent-samples *T*-test was used to compare the mean values of variables belonging to two independent groups, whereas one-way analysis of variance test was used for more than two independent groups. For the non-normally distributed numerical variables, the Mann–Whitney *U*-test was used to compare the median values of variables for two independent groups, whereas the Kruskal–Wallis *H*-test was chosen in the presence of more than two independent groups. The χ^2 test and Fisher's exact test were used to determine the relationship between categorical variables. The correlation between two numerical variables was determined by Spearman's correlation test. A *P*-value of less than 0.05 is accepted as statistically significant.

Results

Thirty-seven Turkish patients with cutaneous metastases from solid organ cancers were included in the study. Eleven (29.7%) patients were male; whereas 26 (70.3%) patients were female. Overall, the mean age at the diagnosis of the primary cancer was 54.6 ± 13.1 years (range: 29–85). The mean ages at the diagnosis of the primary cancer were 54.2 ± 12.7 and 55.7 ± 14.5 years for females and males, respectively. The overall mean age at the diagnosis of the first cutaneous metastasis was 58.1 ± 12.4 years (range: 29–85): 58.7 ± 11.5 years for females and 56.8 ± 14.5 years for males. The mean elapsed time between the appearance of cutaneous metastasis and the diagnosis of primary cancer was 61.3 ± 63.3 months (range: 3–288) for patients with cutaneous metastases occurring after the primary tumor. There was no statistically significant difference between the type of primary cancer (grouped as breast, other solid organ cancer types, and primary unknown cancers) and the elapsed time between the cutaneous metastasis and the diagnosis of primary cancer ($P > 0.05$). In addition, no statistically significant correlation was found between the age at the time of primary cancer diagnosis and the duration between the appearance of cutaneous metastasis and primary cancer (ρ= -0.15,

$P > 0.05$). Lastly, 21 (56.8%) patients in our study cohort already had other internal organ metastases (most commonly, bone and lung metastases) when cutaneous metastatic lesions were present.

Overall, the most common solid cancer which presented with skin metastases was breast cancer (22, 59.5%), followed by lung cancer (3, 8.1%), whereas colorectal cancer and lung cancer were the two most common cancers which metastasized to the skin in male patients. The distribution of solid organ cancer types is shown in Table 1. Twenty-six (70.3%) patients had primary cancer diagnosed first, whereas 11 (29.7%) patients had cutaneous metastasis diagnosed first; hence, in 11 out of 37 patients, cutaneous metastasis was the first clinical sign of the associated internal malignancy. The mean elapsed time between the emergence of cutaneous metastasis and the diagnosis of primary cancer was 61.3 ± 63.3 months (range: 3–288) for patients with primary tumor diagnosed first. Nodule was the most frequent primary lesion observed in 37.8% ($n = 14$) of the cutaneous metastases, followed by plaque (18.9%, $n = 7$), tumor (13.5%, $n = 5$), and papule (8.1%, $n = 3$). Seven (18.9%) patients presented with more than one morphology. No statistically significant difference was found between primary cancer type and clinical morphology of the cutaneous lesions ($P > 0.05$). Head and neck involvement was noted in 7 (18.9%) patients, whereas chest involvement was observed in 26 (70.3%) patients. Four patients presented with cutaneous metastases involving extremities. Breast cancer was more likely to metastasize to the trunk when compared with other solid organ cancers. There was a statistically significant difference between primary cancer type (breast, other solid organ cancer types, and primary unknown cancers) and metastatic lesion localization (trunk, head and neck, and extremities) ($P = 0.02$). Different morphological presentations and anatomical localizations of cutaneous metastases belonging to various solid organ cancers are shown in Figure 1.

Eleven cases (29.7%) had single cutaneous metastasis; whereas 70.3% ($n = 26$) of the cases had multiple cutaneous metastatic lesions. The mean age of the patients at the time of primary cancer diagnosis who presented with multiple cutaneous metastatic lesions was significantly lower than the mean age of the patients who presented with a single metastatic lesion ($P = 0.001$). Twelve (54.5%) patients with cutaneous metastasis were asymptomatic; whereas two (9.1%) patients reported to have itching and eight (36.4%) patients had pain at the sites of cutaneous metastases. Twenty-one (56.8%) patients already had other organ metastases when the diagnosis of cutaneous metastasis is made, whereas 43.2% ($n = 16$) of the patients did not have any other organ metastases. During the retrospective follow-up period of 13 years, 64.9% ($n = 24$) of the patients presented with cutaneous metastases survived, whereas 35.1% ($n = 13$) of the patients lost their lives. The mean duration between the appearance of cutaneous metastasis and death was 10.5 ± 6.4 months (range: 1–24). The mean time between the diagnosis of primary cancer and death was 60.62 ± 53.93 months (range: 6–156). There was no statistically significant difference between the primary cancer type and the eluded time between death and primary cancer diagnosis ($P > 0.05$). In addition, no statistically significant correlation was found between the age at the diagnosis of primary cancer and the time between death and primary cancer diagnosis ($\rho = -0.31$ and $P > 0.05$). Nineteen (51.4%) patients were on treatment, whereas 18 (48.6%) patients were not receiving any treatment at the time of diagnosis of cutaneous metastasis. No statistically significant difference was found between the treatment status at the appearance of cutaneous metastases and dead-to-living ratio at the end of the study period ($P > 0.05$). Also there was no statistically significant difference between dead-to-living ratio at the end of the study period and the presence or absence of other organ metastases at the time of the diagnosis of cutaneous metastases ($P > 0.05$). We believe that we might not be able to show the expected difference between the dead-to-living ratio and the presence of any other organ metastases at the time of diagnosis of cutaneous metastases, as we had a small sample size which is the limitation of our study.

Histopathological specimens of all 37 patients were re-evaluated by a dermatopathologist and pathologist. In some cases, immunohistochemical studies were used to aid in the diagnosis of the primary cancer. In our cohort, the most common type of metastatic cancer was infiltrative ductal carcinoma of the breast, followed by lung and colorectal adenocarcinoma. The infiltration pattern was classified as epidermal, dermal, epidermodermal, dermal, and subcutaneous. The infiltration pattern was dermal in 29 (78.4%) cases, and 3 (7.9%) cases showed epidermodermal infiltration, whereas 5 (13.5%) cases had dermal and subcutaneous infiltration pattern [Table 1]. Micronodular structure is defined as small rounded aggregates of neoplasm infiltration. Micronodular structure was the most common structure observed in 43.2% ($n = 16$) of the patients, followed by glandular structure ($n = 13$, 35.1%) and solid/nodular structure ($n = 11$, 29.7%) [Table 1]. Of 22 cases of breast cancer metastases, 12 (54.5%) cases showed micronodular structure followed by glandular structures (8, 36.4%), single file growth pattern (7, 31.8%), solid/nodular pattern (5, 22.7%), and interstitial pattern (3, 13.6%). Alveolar pattern, high vascularity, and clear cells suggested the diagnosis of renal cell carcinoma metastasis. PAX-8 immunostaining was used to confirm the diagnosis [Figure 2]. Signet-ring cells were present in all cases of colorectal cancer and stomach cancer. Less frequently trabecular pattern (breast cancer and epithelioid sarcoma) and stromal myxoid degeneration (lung adenocarcinoma) were observed. Figure 2 shows histopathological images belonging to the cutaneous metastases of different solid

Table 1: Histopathological characteristics of cutaneous metastases from solid organ cancers in relation to cancer type

	Breast cancer (*n*=22)	Colorectal cancer (*n*=2)	Lung cancer (*n*=3)	Gallbladder cancer (*n*=1)	Renal cell carcinoma (*n*=2)	Mucoepidermoid carcinoma (*n*=1)	Ovary carcinoma (*n*=1)	Vulva carcinoma (*n*=1)	Primary unknown (*n*=2)	Stomach (*n*=1)	Epithelioid sarcoma (*n*=1)	Total number
Infiltration pattern, *n* (%)												
Dermal	16 (72.7%)	1 (50%)	3 (100%)	1 (100%)	2 (100%)	—	1 (100%)	1 (100%)	2 (100%)	1 (100%)	1 (100%)	29
Epidermal+dermal	2 (9.1%)	—	—	—	—	1 (100%)	—	—	—	—	—	3
Dermal+subcutaneous	4 (18.2%)	1 (50%)	—	—	—	—	—	—	—	—	—	5
Necrosis or hemorrhage	Necrosis 4 (18.2%) Hemorrhage 1 (4.5%)	—	Necrosis 2 (66.7%)	—	Hemorrhage 2 (100%)	—	—	—	Necrosis 2 (100%)	—	—	11
Glandular structure	8 (36.4%)	1 (50%)	1 (33.3%)	1 (100%)	—	1 (100%)	—	—	—	1 (100%)	—	13
Micronodular structure	12 (54.5%)	1 (50%)	1 (33.3%)	—	—	—	1 (100%)	—	—	—	1 (100%)	16
Single file	7 (31.8%)	1 (50%)	—	—	—	—	—	—	—	—	—	8
Solid/nodular structure	5 (22.7%)	—	1 (33.3%)	1 (100%)	—	—	1 (100%)	1 (100%)	1 (50%)	—	1 (100%)	11
Perineural invasion	7 (31.8%)	1 (50%)	—	—	—	—	—	—	—	—	—	8
Inflammation	7 (31.8%)	—	—	1 (100%)	2 (100%)	—	—	—	—	—	—	10
Interstitial pattern	3 (13.6%)									1 (100%)		4
Other features	Trabecular pattern (*n*=4, 18.2%)	Signet-ring cells (*n*=2, 100%), trabecular pattern (*n*=1, 50%)	Stromal-myxoid degeneration (*n*=1, 33.3%)	—	Alveolar pattern, clear cells, high vascularity (*n*=2, 100%)	—	—	—	—	Signet-ring cells (*n*=1, 100%)	Trabecular pattern (*n*=1, 100%)	

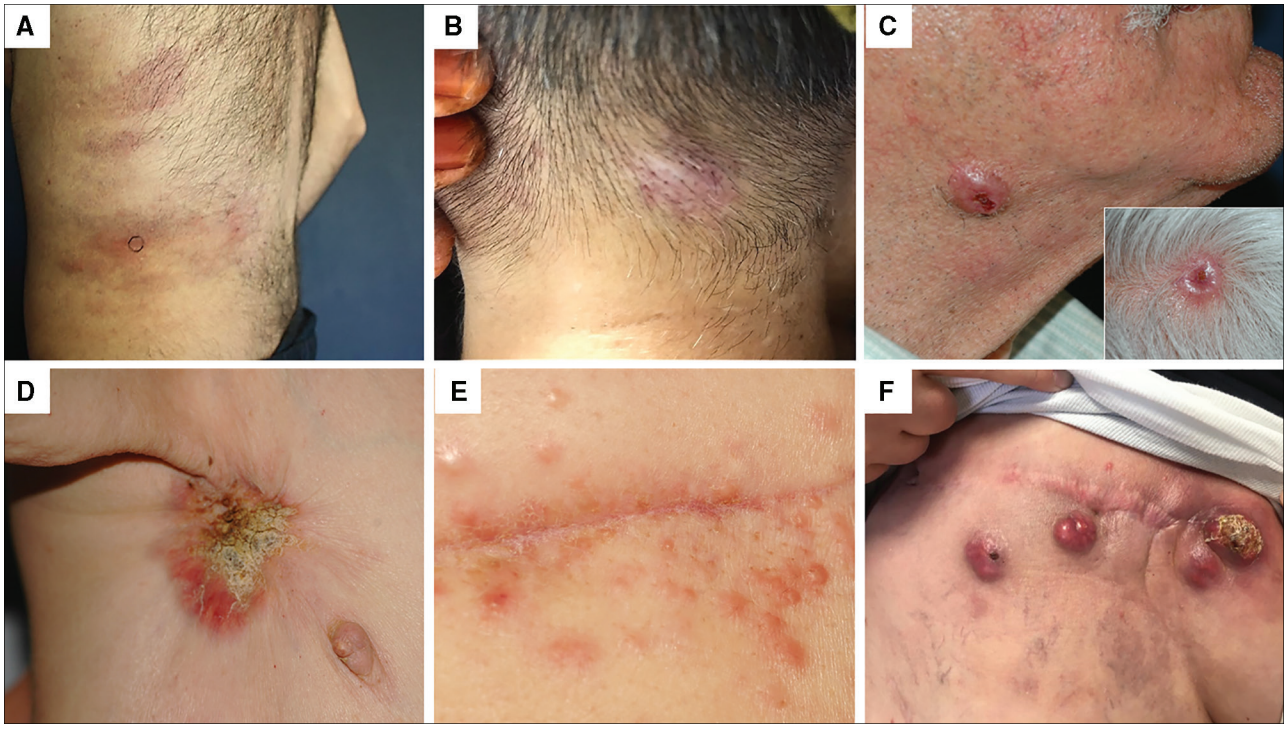

Figure 1: Cutaneous metastases of colorectal cancer presenting as ill-defined, violaceous, erythematous patches involving the lateral trunk (a). Cutaneous metastasis of renal cell carcinoma presenting as a single, pinkish nodule upon the occipital area (b). Mucoepidermoid carcinoma metastases presenting as centrally hemorrhagic-crusted, shiny, indurated nodules on the lateral neck and scalp (c). Cutaneous metastasis of infiltrative ductal breast carcinoma presenting as scaly-crusted plaques with erythematous borders (d), flesh-colored papules (e), and indurated violaceous nodules (f) on the chest.

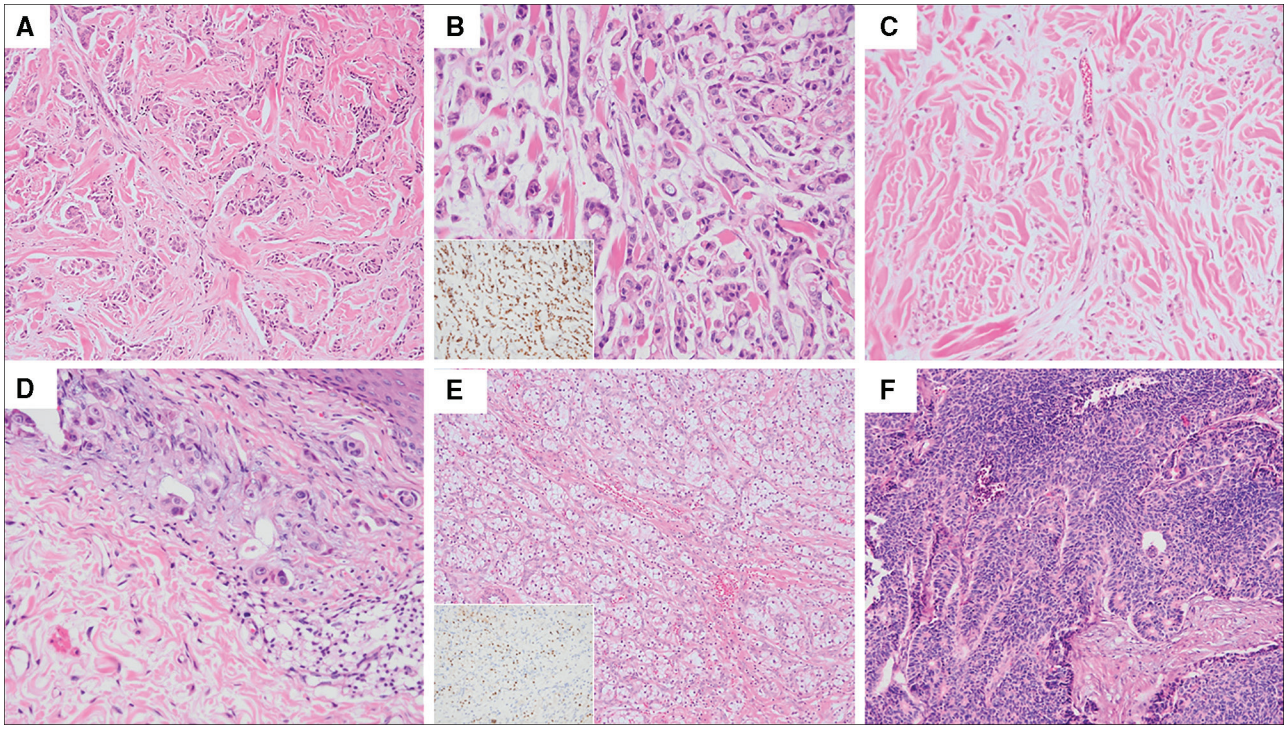

Figure 2: Micronodular type of metastasis in infiltrative ductal carcinoma of breast (a) (H&E ×100). Trabecular, glandular structures and signet-ring cells in colorectal cancer metastasis (b) (H&E, ×200), inset (CK20, ×200). Breast carcinoma metastasis with interstitial infiltration pattern (c) (H&E, ×200). Metastasis of lung carcinoma with glandular structures and stromal myxoid degeneration (d) (H&E, ×200). Renal cell carcinoma metastasis showing alveolar structures with clear cells and rich vascularity (e) (H&E, ×100), inset (PAX8, ×200). Metastasis of adenocarcinoma of gall bladder showing predominantly solid/nodular pattern (f) (H&E ×100).

Table 2: Comparison of our data with other studies in the literature

	The present study	Gan *et al.*[3]	Saeed *et al.*[13]	Sittart and Senise[17]	Choi *et al.*[15]
Number of patients	37	35	77	209	401
The most common internal malignancies with cutaneous metastasis	Overall: breast cancer Female: breast cancer Male: colorectal and lung cancer	Overall: breast cancer Female: breast cancer Male: unknown primary	Overall: lung cancer	Overall: breast cancer Female: breast cancer Male: lung cancer	Overall: breast cancer Female: breast cancer Male: lung cancer
The mean age at the diagnosis of cutaneous metastasis	58.1 years (range: 29–85)	65 years (range: 41–88)	62 years (range: 38–83)	Range: 8–99 years	55.8 years (range: 19–90)
Female to male ratio	2.36	1.5	0.013	2.22	2.29
The mean duration between the appearance of cutaneous metastasis and the diagnosis of primary cancer	61.3 months	55 months	2.9 years	—	32.8 months
The most common morphology	Nodule	Nodule	Nodule	—	Nodule
The most common localization	Chest	Chest	Abdomen/groin	Anterior thorax	Chest
Cutaneous metastasis diagnosed simultaneously with the primary cancer or before the primary cancer (%)	29.7	34	24.7	—	5.2

organ cancers, which presented with different features. Eight cases (21.6%) showed perineural invasion, whereas 10 cases (27%) presented with inflammation. Less frequently signet-ring cells, trabecular pattern, stromal-myxoid degeneration, and alveolar pattern were also noted.

Discussion

Cutaneous metastases seen in the course of internal malignancies are generally associated with poor prognosis and low survival rate and point out widely disseminated disease status.[10,11] Even though they are most commonly observed in the advanced stages of internal cancers, cutaneous metastases may rarely be the only presenting sign of an otherwise asymptomatic, occult internal malignancy.[3] In our cohort, 26 (70.3%) patients had primary cancer diagnosed first, whereas 11 (29.7%) patients presented with cutaneous metastasis first. Similarly, in a study by Gan *et al.*,[3] cutaneous metastases were the first presentation in 34% of the patients. Ovary cancer, lung cancer, and kidney cancer are reported to be the most common solid organ cancers that present with cutaneous metastases as the first sign.[12] In our study, the solid organ cancers which presented with skin metastasis first (n = 11) were infiltrative ductal carcinomas of the breast (n = 6, 54.5%), primary unknown tumor (n = 2, 18.2%), and lung cancer (n = 3, 27.3%). In the present study, the mean age at the diagnosis of primary cancer was 58 years, whereas in studies by Gan *et al.*,[3] Guanziroli *et al.*,[11] and Saeed *et al.*,[13] the mean ages were 65, 73, and 62 years, respectively. Table 2 shows comparison of our study with other studies related to solid organ cutaneous metastases with respect to the number of patients, age, gender, localization, morphology of the cutaneous lesions, and the eluded time between the appearance of cutaneous metastasis and primary cancer diagnosis. In the present study, the mean time between the appearance of the metastatic skin lesions and primary cancer was 61.3 months (range: 3–288 months). In the study by Gan *et al.*,[3] the mean duration between the diagnosis of the primary cancer and the development of cutaneous metastases was reported to be 4.6 years (range <1 month to 20 years), which is close to our average time, and emphasized the fact that cutaneous metastasis may be seen even after long periods of quiescent disease.

Cutaneous metastases are generally associated with advanced stages of solid organ cancers[16]; in correlation with these data, 56.8% (n = 21) of the patients in our study cohort already had other internal organ metastases when cutaneous metastatic lesions were present. In a study of 141 patients with skin metastasis by Hu *et al.*,[10] 73.8% of the study had visceral metastases at the time of cutaneous metastasis diagnosis. In the present study, the most common localization of cutaneous metastases was the trunk followed by head and neck, compatible with the studies in the literature.[10-13,16,17] The cutaneous metastases of the breast cancer were found to involve the trunk at a significantly higher rate when compared with other solid organ cancers (P = 0.02). Similarly, Guanziroli *et al.*[11] showed that there is a statistically significant association between the anatomic localizations of the primary cancer and its cutaneous metastasis; most breast and lung cancers were shown to metastasize to the trunk. In two studies by Hu *et al.*[10] and Sittart *et al.*,[17] thorax was found to be the most common localization, followed by the abdomen and scalp. Similar to the results of our study, breast cancer was the most prevalent solid organ cancer presenting with cutaneous metastases in these two studies. So, we can conclude that patients with a history of breast cancer should be self-educated and followed up regularly for detection of any firm papule, nodule, or ulcer formation,

especially within the mastectomy scar area in order not to miss any comprehensible cutaneous metastases. In our study, 11 (29.7%) patients had cutaneous metastasis as the first discernible sign of the underlying malignancy; thus within the light of histopathological features of the given cutaneous metastasis, patients were screened to detect the possible associated solid organ cancer.

Histopathologically, the most common localization of the infiltration was dermis. Of 22 cases of breast cancer metastases, 16 (72.7%) cases showed infiltrating ductal carcinoma morphology, 4 (18.2%) cases showed infiltrating lobular carcinoma morphology, whereas 2 (9.1%) cases were diagnosed as mixed infiltrating ductal and lobular carcinoma. In contrast, in a study of 45 patients with cutaneous and mucocutaneous metastases, half of the patients with breast cancer showed infiltrating ductal carcinoma morphology, whereas the other half showed infiltrating lobular carcinoma morphology.[11] Overall, the micronodular structure was the most prevalent structure observed in 43.2% of the cases followed by glandular structure and solid/nodular structure.

During the follow-up, 35.1% (n = 13) of the patients lost their lives; the mean survival time between the appearance of cutaneous metastasis and death was 10.54 ± 6.36 months (range 1–24). In contrast, in a study of 77 patients with skin metastases of internal malignancies, only 7 patients remained alive at the end of the study with an average survival time of 7.5 months.[13] However, in this study, cutaneous metastases belonging to systemic lymphomas and malignant melanoma were also included, so we believe that cutaneous metastases might be the reason for the low survival rate observed in this study. We were not able to find any statistically significant difference between the primary cancer type and the average time between the death and diagnosis of cutaneous metastasis. Also, there was no significant relationship between dead-to-living ratio at the end of the follow-up period vs. primary cancer type and dead-to-living ratio at the end of the follow-up period vs. presence/absence of other organ metastases at the time of diagnosis of skin metastasis. Distinctively, a study by Schoenlaub *et al.*[18] showed that patients presenting with skin metastasis of breast cancer have relatively higher median survival time when compared with other malignancies. We believe that we might not be able to show the survival time difference between different solid organ cancer types due to small sample sizes in each group.

Cutaneous metastases may mimic zona zoster, malignant melanoma, squamous cell carcinoma, angioma, pyogenic granuloma, granuloma annulare, and interstitial granulomatous dermatitis.[13,14,19-21] In our study, adnexal tumors, allergic contact dermatitis, cellulitis, zona zoster, sarcoidosis, malignant melanoma, pigmented basal cell carcinoma, pseudolymphoma, B-cell lymphoma, lichenoid drug eruption, and irritated seborrheic keratoses were considered, among the differential diagnoses of what was histologically proven, to be the cutaneous metastases of breast cancer. For the one case of colorectal cancer's cutaneous metastasis present upon the leg, elephantiasis nostras verrucosa was the differential diagnosis, whereas scleroedema and eosinophilic fasciitis were the differential diagnoses for the other case of colorectal cancer. So, cutaneous metastasis of solid organ cancers may mimic other inflammatory skin diseases and benign/malignant cutaneous neoplasms.

Conclusion

All in all, we would like to highlight the importance of diagnostic skin biopsy, especially in elderly patients presenting with cutaneous nodules of unknown origin.[22] Collectively, the present findings suggest that a high index of suspicion for cutaneous metastasis and a low threshold for skin biopsy are the appropriate approaches in elderly patients, even though there is no history of malignancy.

Our study has limitations, in that it was a retrospective study and only small number of patients with cutaneous metastasis of solid organ cancers were included. Prospective studies with a larger number of patients are needed to support our findings.

Ethical Committee approval

The study was approved by the local Ethics Committee with the date/the project number/the decision number: 21.01.2020/GO 20/41/2020/02-23.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

No financial support was provided for the conduct, preparation, collection, analysis, interpretation, and writing of the report.

Conflicts of interest

The authors declare that there are no conflicts of interest.

Data availability statement

The data that support the findings of this study are available from the corresponding author (Ecem Bostan), upon reasonable request.

Authors' contribution

EB: Conceptualization; visualization; writing-original draft. NA: Conceptualization; supervision; writing-review

and editing. OG: Conceptualization; data curation; supervision; and editing.

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