memo (2019) 12:185–188
https://doi.org/10.1007/s12254-019-0471-z

memo
magazine of european medical oncology

Solitary scalp metastatic lesion as a sign of breast cancer recurrence—a case report

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Received: 14 November 2018 / Accepted: 8 January 2019 / Published online: 29 January 2019

Summary
Background Scalp tumors are rare and account only for 2%. Nevertheless, the scalp region accounts for 4–6.9% of all cutaneous metastases. Metastatic cutaneous lesions are more often found in women with breast cancer than in those with other internal malignancies.
Methods Case report.
Results A 59-year-old woman, who had been clinically diagnosed with stage-IIIA (T_3 N_{2a} M_0) invasive ductal right breast carcinoma in August 2015, was treated by neoadjuvant chemotherapy with good partial response. Breast conservative surgery was done and she received post-operative adjuvant radiotherapy and hormonal treatment with letrozole. Two years later, the patient noticed a slowly growing, painless scalp nodule. A PET-CT scan was performed and demonstrated scalp mass at the left temporal region. Excisional biopsy was performed; histopathologic examination revealed poorly differentiated adenocarcinoma. In addition, detailed immunohistochemical staining was performed. Accordingly, patient was given radiotherapy and second line hormonal treatment was added, with disease-free survival of one year.
Conclusions Despite its rarity, solitary scalp metastasis should be considered in the differential diagnosis in patients with a history of cancer especially breast cancer.

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Keywords Scalp nodule · Radiotherapy · Chemotherapy · Ductal breast carcinoma · Hormonal therapy

Background

Being the most commonly diagnosed cancer in women, breast cancer is the second leading cause of cancer deaths among women in the United States [1]. With an incidence exceeding 20%, metastatic cutaneous lesions are more often found in women with breast cancer than in those with other internal malignancies [2].

Among all skin tumors, scalp tumors are rare and account only for 2%. Nevertheless, the scalp region accounts for 4–6.9% of all cutaneous metastases and this relatively high frequency as a metastatic site is most probably due to the abundant blood supply, immobility, and warmth of this region [3]. Although neoplastic metastasis to the scalp can occur in metastatic cancer patients, it is uncommon to be the first site of recurrence [4], and rarely appears as a solitary lesion [1]. Internal malignancies can invade the skin through different mechanisms including hematogenous spread, lymphatic spread, or by direct extension from a primary tumor [5].

Internal malignancy rarely metastasize to skin as their first presentation, with incidence of just 0.8% and usually in advanced stage [3]. However, it has been documented that breast cancer has a high incidence of 23.9% of cutaneous metastasis [6]. Skin metastasis may occur at almost any location with a predilection to the anterior chest wall, abdomen and head and neck. It has been noted that cutaneous metastasis from breast cancer occurs late, in contrast to lung cancer which usually metastasizes early. Also, gastrointestinal (GIT) tumors can metastasize to skin causing Sister Joseph nodules (umbilical nodules) [7]. Skin metastases usually carry poor prognostic im-

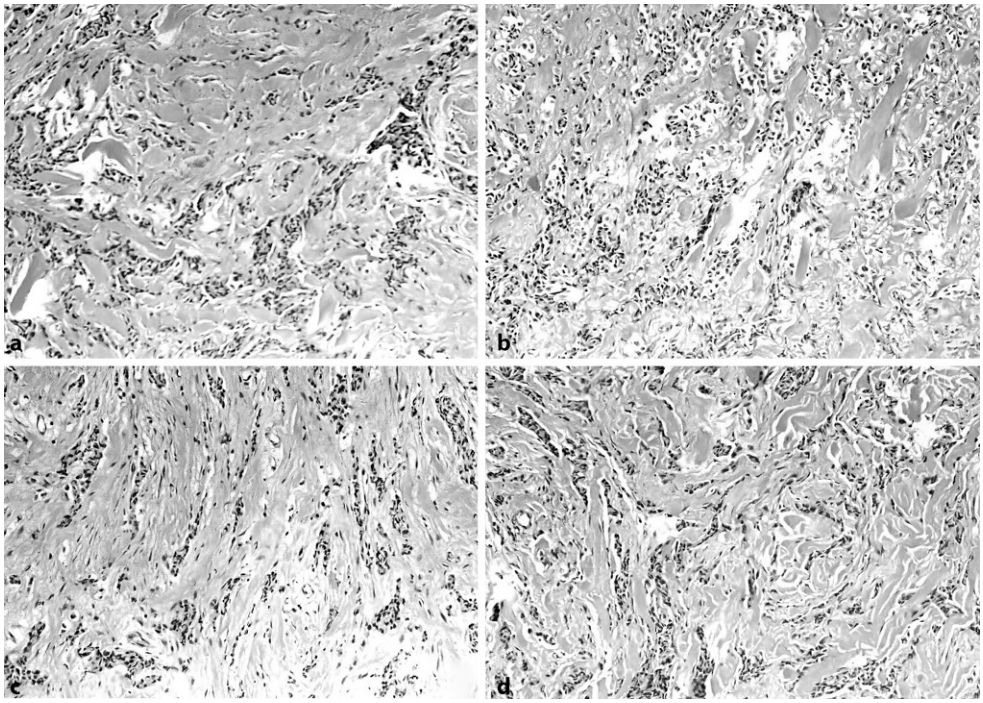

Fig. 1 Histopathologic findings of scalp nodule *(low- and high-power views)* (hematoxylin and eosin (H&E)). **a** Malignant epithelial cells with marked degree of anaplasia in the form of increased nucleus-cytoplasm ratio, pleomorphism, hyperchromasia, frequent mitosis. **b** Poorly defined acinar formation surrounded by a desmoplastic stroma. **c** Poorly differentiated adenocarcinoma showing cords and sheets of malignant epithelial cells of marked anaplastic features. **d** Malignant epithelial cells of marked anaplastic features surrounded by a desmoplastic stroma

plications with the highest reported median survival times of 13.8 months for breast cancer, and lowest for lung cancer with 2.9 months, while for all other cancers about 6.5 months [7].

The clinical diagnosis of a cutaneous metastatic lesion is done through histopathological examination of a biopsy specimen, which usually shows invasion by malignant cells similar to that of the primary tumor [8]. Cytokeratin (CK) profile is used to establish the site of primary tumor. A combination of CK7 and CK20 has shown success to differentiate between subsets of carcinomas, including breast cancer metastasis, and may be used in conjunction with other markers to establish diagnosis of the primary tumor [9].

The prognosis of cutaneous metastasis depends mainly on the pathology and behavior of the primary neoplasm and its response to treatment. In general, cutaneous metastasis from breast cancer usually occurs in late stages and is poorly amenable to treatment [8].

The management of scalp metastasis is mainly based on appropriate treatment of the primary tumor. However, most skin lesions with or without soft tissue infiltration are usually associated with systemic relapse and are not easily manageable by local treatment (as surgery and/or radiotherapy) [10].

Here, we describe an exceedingly rare case of a patient with invasive ductal carcinoma presenting with recurrence in the form of a solitary scalp metastatic lesion successfully treated by surgical excision and radiotherapy.

Case presentation

A 59-year-old postmenopausal female presented with unremarkable past history. Family history in first- and second-degree relatives were negative for breast and ovarian cancer. She had a known case of invasive ductal right breast carcinoma, diagnosed clinically stage-IIIA (T_3 N_{2a} M_0), and grade II on August 2015, detailed immunohistochemical staining revealed tumor cells were strongly positive for estrogen receptors while progesterone and HER2neu receptors were negative and Ki67 was 8%. She was treated by neoadjuvant chemotherapy in the form of 3 cycles of fluorouracil epirubicin cyclophosphamide (FEC), and 3 cycles of taxotere with good partial response. Breast conservative surgery was done and staging after neoadjuvant chemotherapy was $_{y}T2_{y}N2M0$. Post-operative adjuvant radiotherapy 4500cGy/20 fractions/4 weeks to the breast and regional supraclavicular and infraclavicular lymph nodes regions was given. Since the patient had been amenorrhoeic for 2 years without any ovarian suppression and estradiol and follicle-stimulating hormone (FSH) were in the menopause range, she started adjuvant hormonal treatment with letrozole 2.5 mg once daily.

Two years later, in February 2017, the patient noticed a slowly growing, painless scalp nodule; she sought medical advice at the Kasralainy Hospital Oncology Clinic. Clinical examination revealed a movable non-ulcerated nodule in the left temporal region measuring approximately 3 cm in diameter. There were no signs of infection and the overlying skin was normal. A PET-CT scan was performed and demonstrated a low-grade scalp ill-defined soft tissue mass

measuring 2 × 2.5 × 1.5 cm with maximum standardized uptake value (SUVmax) of 4.2 at the left temporal region. Accordingly, a provisional diagnosis of a malignant lesion was made.

Excisional biopsy was performed, and the scalp nodule was easily resected down to the epicranial aponeurosis; and histopathologic examination revealed poorly differentiated adenocarcinoma, showing cords and sheets of malignant epithelial cells of marked anaplastic features, with poor attempts at acinar formation; with negative margins (Fig. 1). In addition, detailed immunohistochemical staining was performed, the tumor cells were strongly positive for estrogen receptors and progesterone while HER2neu receptors were negative and Ki67 receptors were 20%. Accordingly, the patient was given radiotherapy 3000cGy/10 fractions/1 week and second line hormonal treatment exemestane 25 mg once daily was added. The patient remains tumor-free through the last follow-up visit in August 2018, with disease-free survival of one year and therefore considered potentially cured.

Discussion

The most widely accepted definition of metastasis involves a neoplastic lesion arising from another neoplasm with either absent contiguity or close proximity within the same tissue [5], and is considered one of the life threatening characteristics of malignant tumors [10].

Cutaneous metastases are not uncommon and represents about 0.7–9% of all metastases, but occur less often when compared with metastases to other organs of the body. Usually they are difficult to diagnose and may represent the first sign of an internal malignancy, which is considered a poor prognostic sign [8].

SURA et al. [11] describe an interesting case report presented by a solitary scalp mass and diagnosed as schwannoma and further examination and investigations revealed no evidence of neurofibromatosis. Dermoid cysts occur in the head and neck with an incidence of 7% and usually involves the orbit [12]. Other differential diagnoses of soft tissue swellings encountered in the scalp include lipoma, cephalohematoma, Langerhans cell histiocytosis, neurofibroma, and meningoceles or encephaloceles [11].

Although many previous authors [7, 13] concluded that most skin lesions are not readily manageable by local treatment options even in patients with just skin lesions, our patient showed stable response during follow-up after >1 year from local treatment of a scalp metastatic lesion with adjuvant radiation and hormonal therapy.

Recent advances in radiotherapy and chemotherapy have considerably increased survival in all cancer patients. The prognosis regarding cutaneous metastasis primarily depends on type of underlying primary tumor and its responsiveness to treatment [10]. Many authors [10, 14] have reported a better survival in breast cancer patients with cutaneous metastasis, in comparison to other malignancies. In accordance with previous reports, our patient showed good response to local therapy (surgical excision), and radiation and hormonal therapy for both primary breast cancer and metastatic scalp lesion.

Regarding our patient's response to treatment, during follow-up she showed disease-free survival of one year till now. Similarly, in their prospective phase II trial for radical radiation therapy to metastatic breast cancer patients, Trovo et al. [15] concluded that local control was associated with a good progression-free survival, and at the 2-year follow-up more than 50% of the treated patients were free from local and distant progression.

We found no report similar to our case of invasive ductal carcinoma with solitary scalp metastatic lesion, but there is a report by Tomasini et al. [16] of metastatic histiocytoid breast carcinoma presenting as painless eyelid swelling with nodular infiltration, while another case report by Gugle et al. [17] describes metastatic masses mimicking radiation dermatitis, and a third case presenting as targetoid lesions [18]. In a review article, Salemis et al. [3] describes a case report of scalp metastasis as the first presentation but in a patient with hidden small-cell lung cancer.

Conclusion

Solitary scalp metastasis as a sign of breast cancer recurrence is extremely rare. Despite its rarity, solitary scalp metastasis should be considered in the differential diagnosis in patients with a history of cancer especially breast cancer, small-cell lung cancer or malignant melanoma. Early diagnosis and initiation of appropriate therapy for primary breast cancer recurrence with solitary scalp metastasis may result in good disease-free survival.

Acknowledgements We would like to express our gratitude to Dr. Eman Khaled and Dr. Walaa Ahmed Al-Sayed for their contribution regarding histopathological examination.

Compliance with ethical guidelines

Conflict of interest A.A.M. Abdelhafeez, W. Ibrahim, and W. Elsherief declare that they have no competing interests.

Ethical standards All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1975 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from the patient for publication of this case report, including any associated images. A copy of the written consent is available for review by the editor(s) of this journal.

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