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Single Case

Pigmented Superficial Basal Cell Carcinoma of the Nipple-Areola Complex: A Case Report

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Keywords
Basal cell carcinoma · Nipple-areola complex · Dermoscopy · Cosmetics · Dermatologic surgery

Abstract

Introduction: Basal cell carcinoma (BCC) is the most common type of skin malignancy, accounting for approximately 80% of all non-melanoma skin cancers (NMSCs). Ultraviolet (UV) exposure is a significant risk factor for BCC development, which typically occurs in sun-exposed areas. BCC arising in non-sun-exposed regions, such as the nipple-areola complex (NAC), is exceedingly rare, with fewer than 100 cases reported globally. This report describes a case of pigmented superficial BCC in the NAC of a 76-year-old Asian woman. ***Case Presentation:*** A 76-year-old Asian female presented with a 5-year history of a slowly enlarging lesion on her left breast, with recent rapid growth. Physical examination revealed a 10 mm × 8 mm blue-gray, pearl-like plaque on the NAC. Histopathology confirmed pigmented superficial BCC. Preoperative imaging, including breast ultrasound, chest computed tomography (CT), SPECT-CT, and axillary lymph node ultrasound, showed no evidence of metastasis. The patient underwent standard surgical excision with a 10 mm margin, followed by pathologic evaluation, confirming clear margins. The patient was discharged on the second postoperative day and remained asymptomatic at a 3-month follow-up. ***Conclusion:*** Pigmented superficial BCC of the NAC is an uncommon presentation due to the area's minimal sun exposure and lack of pilosebaceous units. This case underscores the importance of considering BCC in non-sun-exposed areas, particularly in elderly patients. While nonsurgical options such as photodynamic therapy may offer superior esthetic outcomes, the patient's financial constraints led to the selection of a cost-effective surgical excision, which successfully eliminated the tumor.

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Introduction

Non-melanoma skin cancers are the most common human malignancies, with steadily rising incidence. Basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) account for the vast majority of non-melanoma skin cancer, at around 99% [1]. BCC can occur in any part of the body, with the highest incidence on sun-exposed areas. Most of them are located on the face, followed by the trunk, lower and upper extremities, neck, and scalp [1]. BCC occurring in the nipple-areola complex (NAC) is extremely rare, with fewer than a hundred cases reported in the worldwide literature [2]. This is attributed to the area's minimal exposure to sunlight. Generally, BCC is a tumor with very low invasiveness. However, when it invades the NAC, it may exhibit a greater potential for metastasis. This can be ascribed to the distinctive anatomical characteristics of the nipple, including the inward projection of lactiferous ducts, coupled with its abundant vascular and lymphatic networks [3]. We present a case of a 76-year-old elderly female who developed BCC on the NAC, highlighting the importance of not overlooking the possibility of BCC occurring in areas not typically exposed to sunlight.

Case Report

A 76-year-old Asian female presented with a 5-year history of a slowly enlarging lesion on her left breast and recently noted to have grown more rapidly. She reported no discomfort such as pain, pruritus, or systemic symptoms. Her medical history included hyperlipidemia but no hypertension, heart disease, diabetes, hepatitis, or tuberculosis. She had no personal or family history of skin or breast cancer, no significant sun or radiation exposure, and no history of immunosuppression or arsenic exposure.

Physical examination revealed an elderly female in no apparent distress. Vital signs were stable. Examination of the left breast revealed a pigmented plaque with superficial erosion, measuring 10 mm × 8 mm. The surrounding skin was normal (shown in Fig. 1). The rest of the physical examination was unremarkable.

Breast ultrasound scan, computed tomography (CT) scan of the chest, SPECT-CT, and axillary lymph node ultrasound scan identified no evidence of metastasis. Dermoscopic findings of the lesion showed multiple blue-gray globules, spoke-wheel areas, leaf-like areas, and erosions (shown in Fig. 2). And we did a pathological biopsy on the patient. The histopathological examination demonstrated nests of tumor cells arising from the surface epidermis. Each tumor nest had a palisading arrangement, and there was a small cleft around the tumor nests (shown in Fig. 3), proven to be pigmented superficial BCC.

Considering that the patient was an elderly lady, and the examination results revealed no signs of metastasis, we decided to use standard surgical excision followed by intraoperative frozen pathologic evaluation of margins after a consultation with the patient and her family. The nipple and areola were surgically removed with 10 mm margin and primary closure. We did a postoperative pathologic evaluation as well. The surgical specimen was part of the breast skin, measuring 2.0 × 1.8 cm. The depth of excision was subcutaneous adipose tissue. The intraoperative and postoperative pathologic evaluation were both found to have negative margins.

The patient was discharged on the second postoperative day. Following surgery, non-medical treatment was employed as clear resection margins were confirmed microscopically. At the 3-month follow-up, the patient remained asymptomatic, with no clinical evidence of local recurrence or metastasis (shown in Fig. 4)

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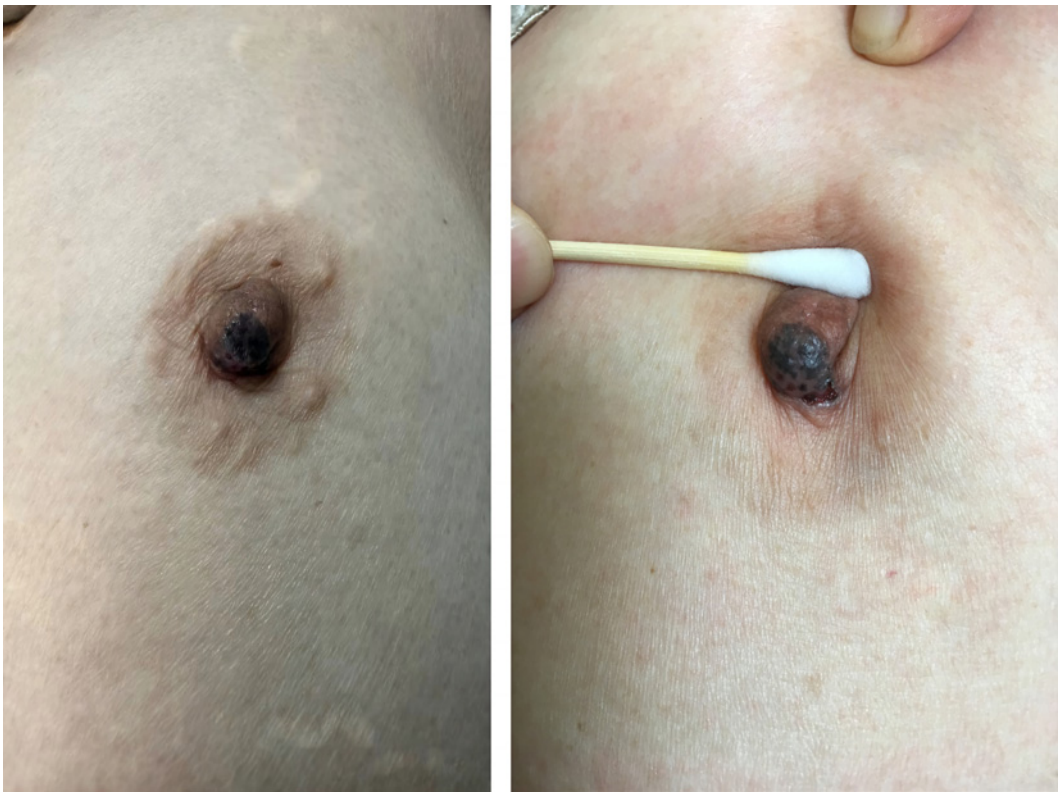

Fig. 1. Left breast BCC showing blue-gray, pearl-like papule plaque.

Discussion

BCC is the most common type of skin malignancy. UV exposure is the major risk factor for induction of tumorigenesis [4]. As a housewife, our patient had moderate exposure to sunlight through her life, no family history of tumors, no history of ionizing radiation, nor was there a history of arsenic exposure in her family. It is unclear why she developed BCC in such an area where had not had exposure to the sun in the past. A detailed investigation has revealed that she has no history of trauma or frequent friction in this area.

Recently, BCCs are thought to arise in proportion to the number of pilosebaceous units [2]. Because of the deficiency of pilosebaceous units, BCCs in NAC are rare [3]. This could be another reason for the rarity of BCC occurrence in the NAC, besides its minimal exposure to sunlight. Given the vast global population, we posit that the rarity of this case may also stem from several factors. First, BCC often lacks overt discomfort symptoms, such as pruritus and pain, leading patients to overlook the skin lesion. This tendency is particularly prevalent among elderly individuals. Additionally, the NAC is typically considered a private area, and individuals are often reluctant to expose it to others, including family members. This tendency is more prevalent among the elderly population, who tend to be more conservative, particularly in East Asian societies, where BCC is more common. Both factors could contribute to underreporting and a lack of hospital admissions for such cases. Furthermore, patients who do seek medical care may encounter delays in receiving accurate diagnosis and treatment. Given the site's specificity, patients may be referred to other specialties, such as breast surgery, where non-dermatologists might lack proficiency in identifying BCC accurately.

BCC showed different morphological growth patterns: superficial BCC, nodular, micronodular, infiltrating, sclerosing, pigmented, and fibroepithelial [5]. Our patient is diagnosed

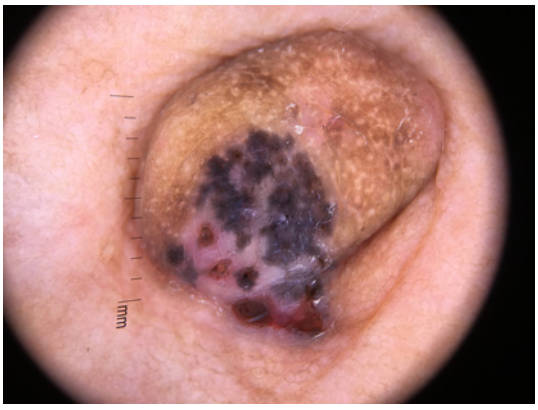

Fig. 2. Dermatoscopy of the left breast.

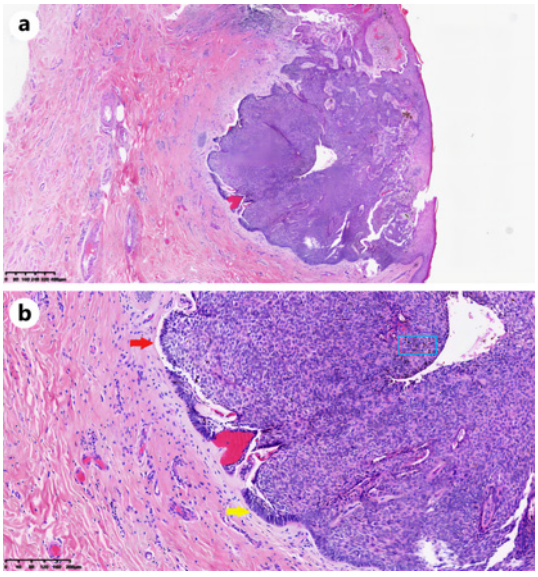

Fig. 3. Histopathology. **a** H&E. ×5: nests of tumor cells arising from the surface epidermis. **b** H&E. ×10: each tumor nest had a palisading arrangement (yellow arrow), a small cleft around the tumor nests (red arrow), focal areas showed melanin pigment (blue rectangle).

with superficial BCC. For BCC, there are numerous treatment modalities available for selection. Surgery is the mainstay of the management for the majority BCCs [6]. There are two types of surgical approach: standard excision or micrographic surgery (Mohs) [6]. As for patients who are not candidates for surgery or when surgery is not possible, radiotherapy has been a valid alternative way [7]. According to the statistics, the recurrence rate after radiotherapy was comparable to that of Mohs surgery [7]. Topical treatment is typically used for superficial BCC in immunocompetent adults. The main drugs are imiquimod and 5-fluorouracil (5-FU) [8]. For low-risk non-facial BCC, destructive treatments can be considered, such as electrocautery (electrodesiccation), cryotherapy, curettage, and laser ablation [7]. For adult patients who have locally advanced BCC and not candidates for surgery or radiation or who have symptomatic metastatic BCC, there are some approved systemic treatments can be considered, including Hedgehog (HH) inhibitors (vismodegib, sonidegib) and cemiplimab [9–11]. In previous cases of NAC BCC, surgery remained the preferred choice for the majority of patients. However, with the continuous advancement in understanding BCC, the cure rates of nonsurgical treatment options have been steadily increasing. Photodynamic therapy has shown remarkable performance in treating superficial BCC, offering both effective treatment outcomes and aesthetically pleasing results for the patient's skin [5]. Considering the lesion's location in a sensitive area, with the intention to preserve the

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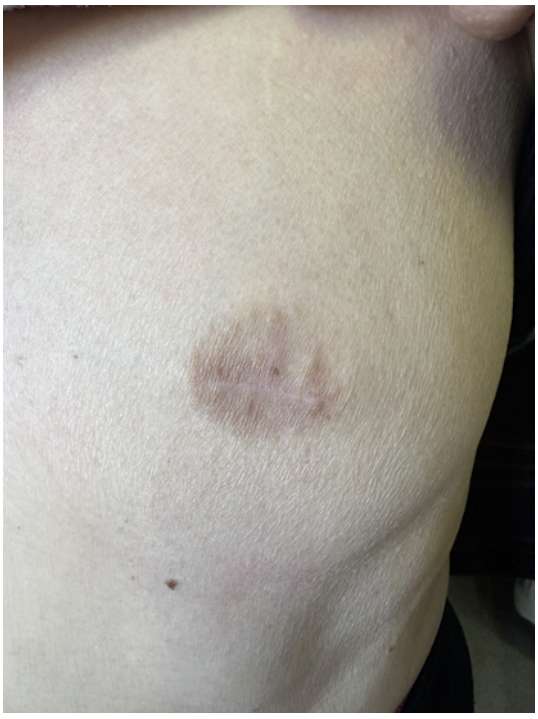

Fig. 4. Postoperative incision site at 3-month follow-up showing well-healed scar tissue, with partial retention of the areola.

integrity of the NAC, we recommended PDT to the patient. However, the patient declined our suggestion due to the significantly lower cost of surgery (approximately USD 30) compared to PDT (approximately USD 1,000).

The NAC is the primary landmark of the breast and plays an important role in cosmesis. Reconstructing the structure of the NAC helps improve patients' satisfaction. And it is also a challenge for the dermatologic surgeon [12]. In order to alleviate the financial burden on the patient and minimize the likelihood of recurrence, we ultimately decided to perform a complete excision of her entire nipple. Considering the increased likelihood of eczema developing in the residual nipple if it becomes damaged, we opted for complete nipple removal. This led to a wider excision of the surrounding tissue. We had a detailed discussion with the patient, who ultimately agreed with our recommendation. The patient's priority was to prevent recurrence of the disease and ensure future quality of life, with minimal concern for cosmetic outcomes. The patient expressed satisfaction with this decision, as she has modest cosmetic demands and prioritizes complete disease eradication and reduced risk of recurrence. While we assessed that PDT might achieve better outcomes, the patient's financial situation and personal preferences should be paramount considerations for us as clinical practitioners. For elderly individuals without cosmetic concerns, curing the disease in the most cost-effective manner is what they truly require.

In summary, we have described a rare case occurring in an elderly Asian woman involving pigmented superficial BCC of the NAC. The occurrence of BCC in this area is rare due to the absence of pilosebaceous units and minimal sunlight exposure. Considering the patient's financial constraints, we ultimately opted for the least costly treatment option, which was surgical intervention. Given that the cost of standard surgery for malignant tumors is largely reimbursable under China's medical insurance policies, the patient expressed satisfaction with the treatment process. The CARE Checklist has been completed by the authors for this case report (available at https://doi.org/10.1159/000542168).

Statement of Ethics

Ethical approval is not required for this study in accordance with local or national guidelines. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Xinru Chen: conceptualization, validation, visualization, and writing – original draft preparation, review, and editing. Na Zhang: review and editing. Hongping Ge: validation and visualization. Xiaoli Zhai: conceptualization and visualization. Meiyan Wang: data curation, investigation, and methodology. Min Zhang: writing – original draft preparation, review, and editing.

Data Availability Statement

All data generated or analyzed during this study are included in this study and its online supplementary material. Further inquiries can be directed to the corresponding author. All the authors read and approved the final version of the manuscript.

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