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HISTOPATHOLOGICAL FEATURES OF BASAL CELL CARCINOMA AND DEFECT RECONSTRUCTION USING RHOMBOID FLAP: A CASE REPORT

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ABSTRACT
Basal cell carcinoma (BCC) is the most prevalent type of nonmelanoma skin cancer, primarily associated with chronic ultraviolet exposure and typically affecting elderly individuals. This case report aims to describe the clinicopathological features and management of BCC in an 81-year-old woman who presented with a hyperpigmented nodule on the left mandibular region. A comprehensive approach was undertaken, including clinical assessment, dermoscopic evaluation, and histopathological examination. The lesion was surgically excised, and the resulting defect was reconstructed using a rhomboid flap. This procedure achieved complete tumor clearance and successful defect closure, with favorable aesthetic and functional outcomes and no postoperative complications. This case highlights the effectiveness of rhomboid flap reconstruction in restoring tissue intergrity following BCC excision, emphasizes the improtance of early diagnosis and histopathology confirmation, and highlights the role of surgical technique in optimizing patient prognosis. Furthermore, the findings contribute to the body of evidence supporting the rhomboid flap as a reliable option for facial reconstruction following oncologic surgery, enhancing postoperati ve recovery and quality of life for patients undergoing facial oncologic surgery.

Keywords: breech presentation; moxibustion; pregnant women; rebozo technique

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INTRODUCTION

Basal cell carcinoma (BCC), also known as basalioma, is classified under nonmelanoma skin cancers, distinct from melanoma. It represents the most commonly diagnosed skin cancer worldwide. This malignancy arises from basal cells in the deepest epidermal layer and is characterized by aggressive, locally invasive growth, although metastasis is rare. Nonetheless, BCC is capable of infiltrating subcutaneous tissues, including fascia, muscle, and bone, leading to significant tissue destruction and morbidity when left untreated (Tang et al., 2019).

Epidemiologically, BCC accounts for 75–80% of all nonmelanoma skin cancer cases globally, with incidence increasing over recent decades (Panda, 2010). Over the past 30 years, BCC incidence has risen by an estimated 20–80% (McDaniel & Steele, 2025).The likelihood of developing BCC increases with age, with the median age at diagnosis being 68 years. Although mortality is uncommon, it occurs more frequently among immunocompromised patients. Metastatic BCC, comprising about 1% of cases, is usually linked to tumors with aggressive histopathological patterns such as morpheaform, metatypical, basosquamous, or infiltrative subtypes. When metastasis occurs, it most often involves lymph nodes, bone, lungs, and skin. The mean age at death from BCC is higher than that from squamous cell carcinoma (SCC), with an estimated age-adjusted mortality rate of 0.12 per 100,000 population (McDaniel & Steele, 2025).Mortality risk is further associated with

advancing age, male sex—at more than twice the rate observed in females and the white racial phenotype (McDaniel & Steele, 2025).

The etiopathogenesis of BCC involves both genetic and environmental factors, with chronic ultraviolet B (UVB) exposure (290–320 nm) being the most common trigger. Genetic susceptibility has been linked to alterations on chromosome 1 and variants on chromosomes 5, 7, 9, and 12, impairing protective mechanisms against UV damage. Environmental carcinogens such as hydrocarbons, arsenic, coal, tar, topical methoxsalen, and UV radiation also contribute (Ju et al., 2021; Teng et al., 2021). Oncogenic stimuli including immunosuppression, chronic wounds, or acute trauma can further promote keratinocyte proliferation, resulting in neoplastic lesions resembling BCC (Tang et al., 2019). Clinically, BCC typically arises on sun-exposed areas, especially the face, causing substantial morbidity if untreated. Literature indicates that 50% of cases occur on the cheeks and forehead, 28% on the nose and nasolabial folds, 17% periocularly, and 5% on the lips (Martens et al., 2018; McDaniel & Steele, 2025; Skoda et al., 2018; Teng et al., 2021). Lesions usually present as one or more small, waxy, translucent nodules, often round, with a raised central area resembling a pearly structure (Lewin & Carucci, 2015; Mackiewicz-Wysocka et al., 2013; Tang et al., 2019).

The main complication of BCC stems from its local invasiveness. Although the tumor grows slowly, untreated lesions can extend into deeper tissues and cause significant destruction, especially in delicate areas such as the eyes, nose, or ears. BCC is characterized as a slow-growing but locally invasive neoplasm, with an estimated doubling time of six months to one year. Lesions along the nasofacial sulcus or retroauricular region are more likely to develop extensively. Metastasis remains exceedingly rare, but inadequate or incomplete excision may cause severe local tissue damage and disfigurement (Lewin & Carucci, 2015; Tang et al., 2019).

Diagnosis of BCC requires patient history, clinical examination, and histopathological confirmation to identify specific subtypes. Patients often present with dark facial patches that bleed easily and fail to heal, or with enlarging nevi displaying irregular surfaces, sometimes with pruritus or pain. Histopathological features vary: superficial BCC shows budding of malignant cells from the basal epidermis into the dermis, while peripheral tumor cells typically form palisading arrangements. Epidermal atrophy, minimal dermal invasion, and chronic inflammatory infiltrates in the upper dermis may also appear (Niculet et al., 2022; Tang et al., 2019). Management is guided by anatomical location and histopathology. Broadly, treatment includes surgical methods such as excision, curettage, electrodessication, and Mohs micrographic surgery (MMS), and nonsurgical modalities including radiotherapy and chemotherapy. Proper therapy selection is vital to reduce recurrence risk (McDaniel & Steele, 2025; Queirolo et al., 2023).

Local flap reconstruction after BCC excision is commonly used to restore form and function. Among available options, the rhomboid flap has proven versatile and reliable in facial reconstruction. Advantages include design simplicity, excellent vascularity, aesthetic contouring, and high patient satisfaction (dos Santos et al., 2022). Recent reports reinforce its utility across different facial subunits. For instance, a series on large cheek defects post-BCC excision showed that combining a rhomboid flap with a Burow advancement flap achieved favorable functional and cosmetic outcomes (De Vera et al., 2023). In the medial canthal region, a delicate area, both superiorly and inferiorly based modified rhomboid flaps have provided tension-free closures with excellent aesthetic results in one-year follow-up studies (Tasch et al., 2022).

This case report aims to elucidate the histopathological features of nodular BCC in an 81-year-old female patient. Simultaneously, it evaluates clinical outcomes following use of rhomboid flap reconstruction to repair the excision defect. The report highlights the importance of histopathological examination in diagnosing and subtyping BCC, which directly influences

therapeutic decision-making. It also emphasizes the rhomboid flap as a dependable reconstructive technique for closing surgical defects post-BCC excision, ensuring oncological safety and favourable functional and aesthetic outcomes. By presenting this case, the study could contribute to clinical practice by integrating histopathological insights with reconstructive approaches, offering guidance for future management of similar cases.

METHOD

This study presents a single case report describing the diagnosis, clinical management, surgical intervention, and postoperative follow-up of a patient with basal cell carcinoma (BCC) of the facial region. Data for this report were obtained through comprehensive anamnesis, detailed physical and dermatological examination, dermoscopic assessment, and histopathological analysis. All examinations and management procedures were conducted at Prof. Chairuddin P. Lubis Hospital, Medan. Diagnostic confirmation was established via histopathological examination of excised tissue specimens. Clinical and supporting data including lesion characteristics, dermoscopic features, laboratory findings, and surgical records were analyzed qualitatively and documented in narrative form. Surgical management consisted of local wide excision of the BCC lesion with appropriate safety margins, followed by defect reconstruction using a rhomboid flap technique. Postoperative care, monitoring, and patient follow-up were systematically documented to assess wound healing, functional outcomes, and any complications. This case report focuses on the individualized clinical approach to BCC, and aims to provide insights into practical aspects of diagnosis, surgical management, and reconstruction, particularly for facial basal cell carcinoma cases managed in a hospital setting.

RESULT

Case description, diagnosis, management, and evaluation

An 81-year-old Batak woman, married, presented to the Dermatologic Surgery Clinic of Dr. Pirgandi General Hospital, Medan, on April 10, 2025, with the chief complaint of a reddish-black nodule on the left lower jaw that had been present for approximately two years. The lesion initially appeared four years earlier as a dark pigmented macule resembling a mole, about the size of a corn seed, which gradually enlarged and became raised, without associated pruritus. The patient reported that the lesion often bled easily when accidentally touched. No similar lesions were found elsewhere on the body. She reported a history of frequent gardening activities with prolonged sun exposure and rarely used sunscreen or protective headwear. The patient had no history of cardiovascular disease, hypertension, diabetes mellitus, or malignancy, and no family history of similar complaints. There was no history of drug or food allergies.

On physical examination, the patient was in good general condition, alert (compos mentis), with blood pressure of 120/90 mmHg, pulse 92 beats/minute, respiratory rate 20 breaths/minute, body temperature 37.1°C, and good nutritional status. Dermatological examination revealed a well-defined hyperpigmented nodule with an irregular surface, raised borders, and firm consistency, measuring 4 × 3 × 0.5 cm on the left mandibular region (Figure 1). Dermoscopic examination demonstrated arborizing vessels, blue-grey ovoid nests, and ulceration. The differential diagnosis included basal cell carcinoma (BCC), malignant melanoma, and squamous cell carcinoma. A provisional diagnosis of BCC was established.

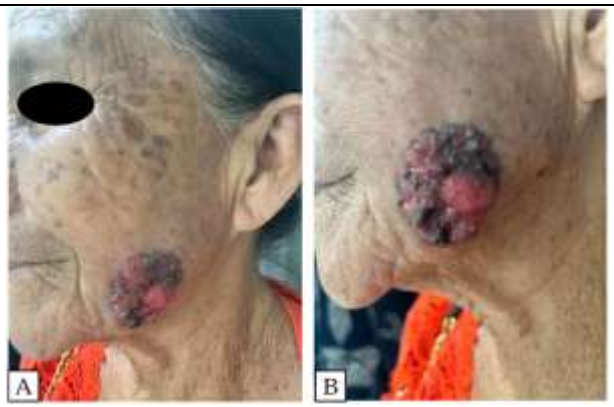

Figure 1. (A, B) Initial presentation. A well-defined hyperpigmented nodule with an irregular surface, raised borders, and firm consistency, measuring 4 × 3 × 0.5 cm, located in the left mandibular region.

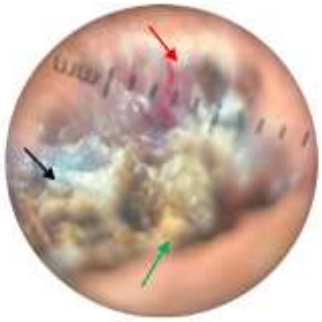

Figure 2. Dermoscopic examination showing arborizing vessels (red arrow), blue-grey ovoid nests (black arrow), and ulceration (green arrow).

The patient was scheduled to undergo laboratory testing, surgical excision, and histopathological examination. Laboratory investigations, including complete blood count, random blood glucose, and coagulation profile, were all within normal limits. The patient was then informed about the planned excision procedure, and informed consent was obtained. Preparation for the surgical excision was subsequently carried out (Figure 3).

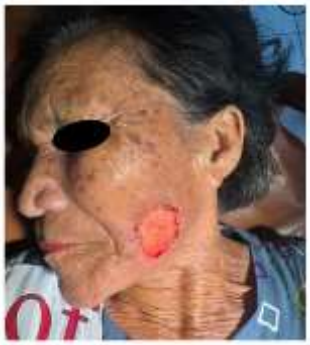

Figure 3. Patient after surgical excision.

The patient was advised to return for follow-up three days after surgery and was prescribed a seven-day course of ciprofloxacin 500 mg twice daily, mefenamic acid 500 mg three times daily, vitamin C 250 mg once daily, and antacid syrup 15 mL three times daily. At the third postoperative day follow-up, the surgical site appeared moist. Treatment was continued, and the patient was instructed to change the dressing every two days.

Histopathological examination received a single tissue specimen from the left mandibular region, reddish-black in color, with firm yet friable consistency. Microscopic evaluation of the excised skin tumor specimen, comprising epidermis, subepidermis, and dermis, revealed the following findings:

the epidermis, lined by stratified squamous epithelium, showed mild hyperkeratosis. Proliferating basaloid cells were arranged in macronodular and micronodular structures with an infiltrative growth pattern extending into the subepidermal layer. The proliferating basaloid cells exhibited enlarged, pleomorphic, hyperchromatic nuclei, increased nuclear-to-cytoplasmic ratio, scant eosinophilic cytoplasm, and peripheral palisading. Peritumoral clefting was observed, along with occasional atypical mitoses. In the subepidermal layer, adnexal structures appeared within normal limits, surrounded by fibromyxoid connective tissue, with focal lymphocytic infiltration and dilated blood vessels. The dermis contained mature adipocytes with normal structure and morphology. Based on the macroscopic and microscopic histopathological findings of the excised specimen, the lesion was diagnosed as nodular basal cell carcinoma (nodular BCC), classified as ICD-O code 8097/3 with topography C44.3 (skin of face).

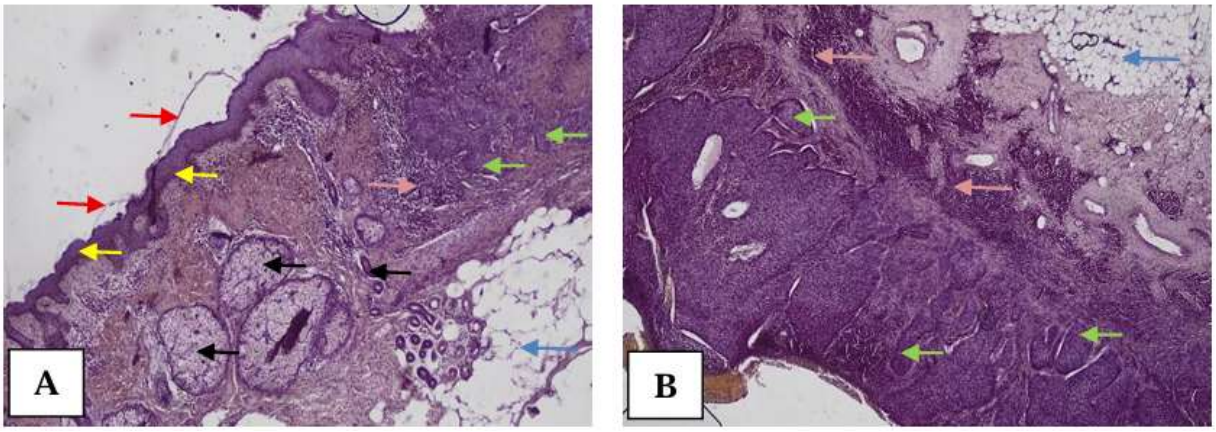

Figure 4. Microscopic findings. The epidermis is lined by stratified squamous epithelium (yellow arrow) with mild hyperkeratosis (red arrow). Proliferating basaloid cells form macronodular and micronodular structures with an infiltrative growth pattern extending into the subepidermal layer (green arrow). The subepidermis shows adnexal structures within normal limits embedded in fibromyxoid connective tissue (black arrow). Lymphocytic inflammatory infiltrates are present (orange arrow). The dermis consists of mature adipocytes (blue arrow). (A) Hematoxylin and eosin, 40×. (B) Hematoxylin and eosin, 100×.

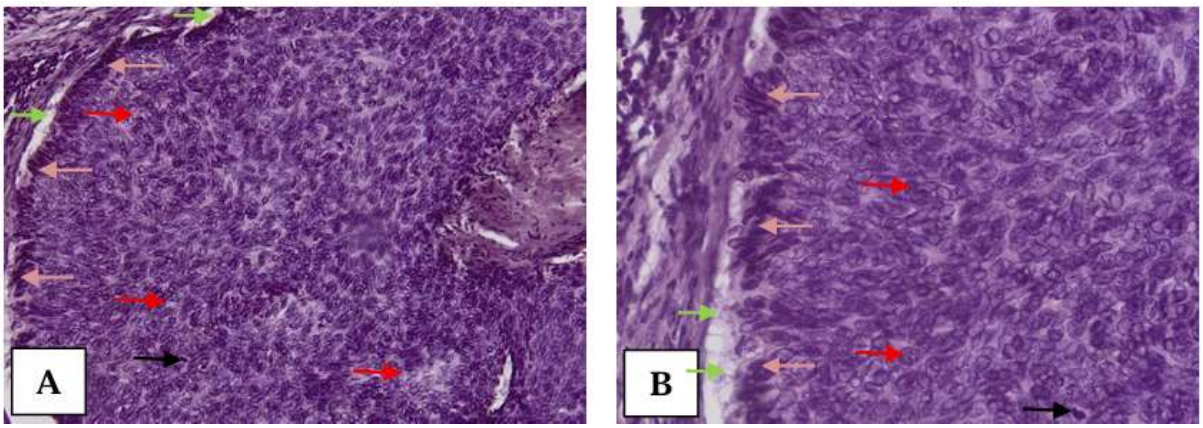

Figure 5. Microscopic findings showing proliferating basaloid cells with enlarged, pleomorphic, hyperchromatic nuclei, increased nuclear-to-cytoplasmic ratio, and scant eosinophilic cytoplasm (red arrow). Peripheral palisading is observed (orange arrow), along with peritumoral clefting (green arrow) and mitotic activity (black arrow). (A) 200×. (B) 400×.

Following the histopathological confirmation, the patient was scheduled for defect closure using a rhomboid flap technique on May 17, 2025 (Figure 6).

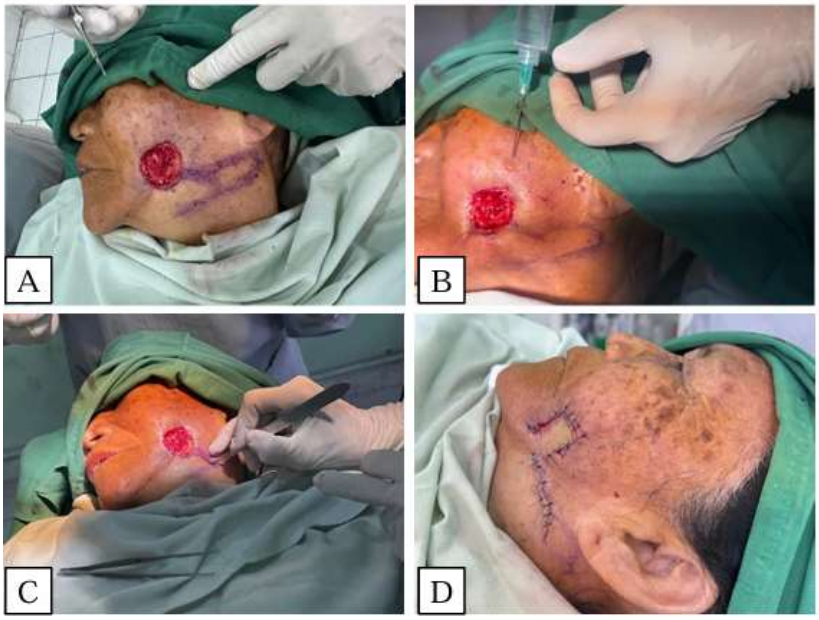

Figure 6. Rhomboid flap procedure. (A) Site marking prior to surgery, (B) local anesthetic infiltration, (C) surgical incision, and (D) postoperative appearance after flap reconstruction.

Postoperative follow-up demonstrated progressive improvement in wound healing. On the third postoperative day, the surgical site appeared moist with no signs of infection (Figure 7A). At the two-week follow-up, the wound showed good granulation and partial epithelialization, with reduced edema and no complications (Figure 7B). By the third week, the flap demonstrated satisfactory integration with the surrounding tissue, with well-healed margins and preserved functional and aesthetic outcomes (Figure 7C).

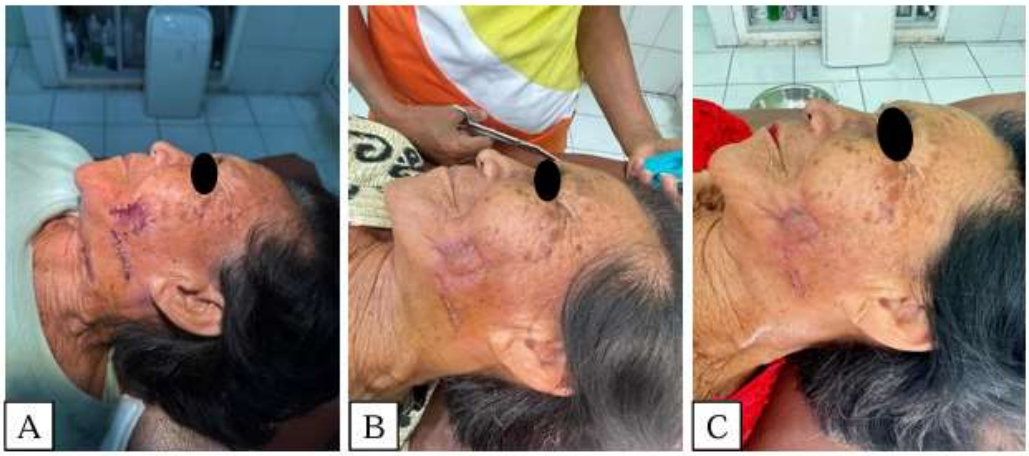

Figure 7. (A) Follow-up at day 3, (B) follow-up at 2 weeks, and (C) follow-up at 3 weeks postoperatively.

The prognosis for this patient was *quo ad vitam* bonam, *quo ad functionam* bonam, and *quo ad sanationem* dubia adbonam.

DISCUSSION

The diagnosis of basal cell carcinoma (BCC) in this patient was established based on history, dermatological examination, and histopathological findings. The patient, an 81-year-old woman, reported a non-pruritic and painless nodule on the left mandibular. The lesion initially appeared four years earlier as a mole, which gradually enlarged and recently became prone to bleeding. Dermatological examination revealed a reddish-black, well-defined nodule with raised borders and irregular surface, firm-to-soft consistency, and measuring 4 × 3 × 0.5 cm in the left mandibular region. Prolonged sun exposure during gardening activities without photoprotection was identified as the main risk factor, consistent with literature indicating that BCC predominantly affects

individuals over 40 years of age, with a predilection for sun-exposed areas such as the head and neck (Lewin & Carucci, 2015; Marzuka & Book, 2015).

Basal cell carcinoma is the most prevalent form of skin cancer. It is distinguished by its tendency to invade surrounding tissues locally, but it rarely metastasizes to distant organs. The tumor is thought to originate from pluripotential cells located in the basal layer of the epidermis or within hair follicles (Fania et al., 2020). The incidence of BCC is reported to be higher in men than in women, with a male-to-female ratio of approximately 3:2. The most common predilection site is the central third of the face. The risk is increased in individuals with outdoor occupations, such as farmers, fishermen, and manual laborers. Its incidence has been reported to be 2.5 times higher in individuals with Fitzpatrick skin types III–IV compared to those with types V–VI (Kim et al., 2009). In addition, excessive sun exposure, smoking habits, and a family history of BCC further increase the risk of developing the disease (Demirseren et al., 2014). Approximately 85% of BCC lesions are found in the head and neck region, with the nodular subtype being the most common. Nodular BCC typically begins as a small papule with central depression (Cameron et al., 2019).

The patient was a housewife who enjoyed gardening as a hobby, which increased her exposure to ultraviolet (UV) radiation (Marzuka & Book, 2015; Tang et al., 2019). The risk of BCC is strongly correlated with cumulative UV exposure, particularly in the UV-B spectrum (290–320 nm), which is known to induce mutations in tumor suppressor genes and plays a key role in BCC pathogenesis. UV-B exposure leads to DNA damage and immune modulation, ultimately resulting in progressive genetic alterations and neoplasm formation. Mutations in the p53 tumor suppressor gene, found in approximately 50% of BCC cases, represent one of the principal molecular mechanisms involved. In addition to chronic sun exposure, other risk factors include immunosuppressive conditions, exposure to chemicals such as arsenic, and genetic disorders such as xeroderma pigmentosum, nevoid basal cell carcinoma syndrome (Gorlin–Goltz syndrome), and albinism. High-intensity sun exposure significantly contributes to the development of BCC, with a latency period of 20–50 years from initial UV-induced damage to the onset of clinical manifestations. Consequently, BCC is most often diagnosed in elderly patients, predominantly affecting sun-exposed areas such as the head and neck (Martens et al., 2018; McDaniel & Steele, 2025; Skoda et al., 2018; Teng et al., 2021).

Dermoscopic examination revealed arborizing vessels, blue-gray ovoid nests, and ulceration, which are characteristic features of BCC. These findings support the non-melanocytic nature of the lesion and are consistent with typical dermoscopic criteria for BCC. Histopathological examination showed basaloid cell nests with peripheral palisading, stromal clefting, enlarged hyperchromatic nuclei, and scant cytoplasm. Tumor cells were present at the deep, superior, lateral, and medial margins, while the inferior margin was free of tumor. These findings are consistent with BCC. According to the literature, the histopathological appearance of BCC may vary depending on the subtype, but most share characteristic features, including malignant basal cells with large nuclei and scant cytoplasm, often accompanied by stromal retraction around tumor nests, forming peritumoral lacunae that serve as a key diagnostic hallmark (Haimovic et al., 2019; Kaya et al., 2025; McDaniel & Steele, 2025; Wojtowicz & Żychowska, 2025).

Differential diagnoses in this patient include BCC, nodular melanoma, and SCC. Nodular melanoma may present as a rapidly growing, darkly pigmented nodule, sometimes with ulceration, and histology shows atypical melanocyte proliferation from epidermis into dermis. Squamous cell carcinoma s more aggressive than BCC, often arising from actinic keratosis or Bowen’s disease, and presents as hyperkeratotic papules, plaques, or ulcerated lesions with indurated margins; histology reveals invasive atypical keratinocytes proliferation invading the dermis (Haimovic et al., 2019; Niculet et al., 2022).

Surgical excision followed by rhomboid flap reconstruction was performed. The rhomboid flap is a full-thickness local transpositional flap based on the dermal-subdermal vascular plexus. It is classically designed as a parallelogram with two 120° and two 60° angles, allowing transposition of adjacent skin and subcutaneous tissue to cover the primary defect. This technique effectively redirects tension from the primary defect to the secondary donor site, minimizing stress on the wound margins and improving cosmetic and functional outcomes. It is particularly advantageous for defects located near free anatomical margins, where simple closure would be suboptimal. Rhomboid flaps have been widely and safely applied for small to medium-sized skin defects, including those on the nose, medial canthus, lower eyelid, temple, and cheek (Bejinariu et al., 2020; A. S. Kang & Kang, 2020). In this case, the prognosis is favorable (quo ad vitam bonam, quo ad functionam bonam, quo ad sanationam bonam), as the tumor was completely excised. Literature consistently reports that basal cell carcinoma has an excellent prognosis with adequate surgical management. Nonetheless, long-term follow-up is required, as 40–50% of patients with primary basal cell carcinoma may develop new lesions within five years.

CONCLUSION

The management of basal cell carcinoma requires prompt diagnosis, complete excision, and careful consideration of reconstructive techniques to ensure optimal outcomes. This case demonstrates that combining through clinical, dermoscopic, and histopathological assessment with surgical excision and rhomboid flap reconstruction can yield excellent functional and cosmetic results. The use of rhomboid flap proved effective in defect closure, reducing morbidity, and preserving facial aesthetics. Early treatment remains critical to prevent local tissue destruction and further complications, while ongoing follow-up ensures timely detection of recurrence. This case reinforces the importance of comprehensive care, patient education on sun protection and regular surveillance to improve patient's quality of life.

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