Case Report

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The Bilobed Rotation-Advancement Flap for Aesthetic Reconstruction of a Facial Defect After Excision of Giant Basal Cell Carcinoma: A Long-Term Follow-Up Case Report

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Abstract

Introduction: Giant basal cell carcinoma (GBCC) of the face is a rare condition that requires both proper oncologic control and acceptable aesthetic outcomes, which is a significant challenge due to the complex reconstructive demands of the post-excision defect.

Case Report: A male patient in his late 60s presented with an ulcerated GBCC measuring 4.5 × 6 cm involving the right cheek. The diagnosis was confirmed preoperatively by punch biopsy, and surgical management was planned to obtain complete excision while addressing the anticipated aesthetic and functional sequelae of a large facial defect. Wide local excision was performed with a 1-cm margin, after which immediate reconstruction was conducted using a regional bilobed rotation-advancement flap. The flap was designed to mobilize adjacent hair-bearing cervical skin to maximize tissue compatibility and restore the natural appearance of the involved facial subunit. Histopathologic examination confirmed pigmented GBCC with clear margins and no perineural or lymphovascular invasion. Postoperatively, facial nerve function was maintained, healing was uneventful, and long-term follow-up indicated stable reconstruction without any evidence of recurrence.

Conclusion: This case highlights the bilobed rotation-advancement flap as an advantageous technique for reconstruction of selected sizable defects after excision of GBCC. The favorable long-term outcome indicates that, when properly planned, this technique can accomplish functional preservation, oncologic safety, and aesthetically acceptable restoration without the need for more extensive reconstructive procedures.

Key words: Basal cell carcinoma (BCC), Bilobed rotation-advancement flap, Facial defect, Reconstructive surgical procedures

Introduction

Basal cell carcinoma (BCC) is the most prevalent form of non-melanoma skin carcinoma, predominantly occurring in the head and neck region [1]. There are approximately 27 histopathological subtypes of BCC. These tumors are generally slow-growing and exhibit a non-aggressive nature. However, certain histological forms, such as micronodular, morpheaform, and metatypical subtypes, have a poor prognosis because they exhibit more aggressive behavior [2]. As a result of spontaneous mutations in the PTCH gene, certain genetic diseases, such as Gorlin syndrome and xeroderma pigmentosum, have been linked to BCC phenotypic manifestation and a greatly elevated risk of development. Environmental factors, such as sun exposure, trauma, and smoking, also contribute to tumor development [3]. Giant basal cell carcinoma (GBCC) is a very rare variant, accounting for less than 1% of all BCC cases [4]. According to the TNM staging system, BCCs larger than 5 cm are staged as T3 lesions and are often referred to as GBCC [5]. Both the complexity of reconstruction after resection and the likelihood of metastasis are directly impacted by the size of GBCC [6]. Aggressive in nature, GBCC is much less common than smaller BCCs and has a propensity to invade deep tissues, such as muscles and bone, and even spread. These

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malignancies are therefore linked to a bad prognosis. GBCCs usually develop slowly and do not show any symptoms for years until they start to negatively impact the patient's quality of life. They can cause discomfort, severe anemia, hypoproteinemia from constant loss of blood and exudate, sepsis, and dangerous infections. Tumors larger than 5 cm in diameter carry up to a 25% risk of metastasis [2]. A range of surgical and nonsurgical treatments is available for BCC, including curettage, cauterization, surgical excision, cryotherapy, radiotherapy, and photodynamic therapy [7, 8]. Facial GBCCs, in particular, can involve multiple superficial and deep layers, including the superficial musculoaponeurotic system (SMAS) [9]. After excision of facial skin tumors, various reconstructive options are available, such as primary closure, skin grafting, local and regional flaps, and distant and free flaps. The goals in treating BCC are complete tumor excision, maximum functional preservation, and satisfactory aesthetic outcomes [10]. The choice of reconstructive technique depends on factors, such as the size and location of the defect, and the depth of tissue involvement [11]. Due to the lower prevalence of the GBCC subtype, few studies have been published detailing its excision and reconstruction. Most reports have focused on Mohs micrographic surgery (MMS), favored for its tissue-sparing properties, which can lead to less complex and more cosmetically favorable reconstructions [4]. While MMS is commonly regarded as the gold standard for treating facial BCCs [12], conventional excision and flap reconstruction, followed by appropriate margin assessment, is available as an alternative when MMS is not accessible. In our study, we encountered a large lesion with an extensive defect post-excision. In such cases, a local flap or, in certain situations, a skin graft may be necessary for tissue healing. To achieve the best possible aesthetic results, using a local flap for major defects presents challenges in both flap design and implementation. In contrast, skin grafting entails problems, such as postoperative pain, wound care at the donor site, color mismatch, and variations in skin texture, especially when the graft is taken from the lower limbs. For male patients with lesions in facial hair-bearing areas, these cosmetic mismatches, such as a lack of hair follicles, can be extremely irritating. A bilobed rotation-advancement flap offers a reliable solution that facilitates mobilization of adjacent tissues, distributes wound tension across multiple vectors, and enhances resurfacing with skin of similar texture and color. In male patients, the implementation of neighboring hair-bearing tissue may further optimize the aesthetic consistency of the reconstructed area. Although bilobed flaps are widely used in reconstruction, their application in large cheek defects requires careful vector planning to avoid distortion of adjacent aesthetic subunits. In this case report, we highlight the use of a regional bilobed rotation-advancement flap designed from cervical skin, chosen for its adequate elasticity and hair follicle density, and discuss the reconstruction challenges and favorable surgical outcomes to emphasize the rationale for flap selection and the favorable long-term reconstructive outcome.

Case Report

The patient was a 69-year-old non-smoking male with no comorbidities or associated illnesses. He reported sustained UV exposure, especially throughout the day, as a farmer. He was referred to the Ear, Nose, and Throat (ENT)/Head and Neck Surgery Department by a dermatologist for a large, visible lesion on the lateral aspect of his face. Initial clinical evaluation revealed normal vital signs: blood pressure 135/87 mmHg, heart rate 70 bpm, respiratory rate 13 breaths per minute, and no fever or hypothermia. On examination, a significant, slow-growing necrotic lesion was observed on the right cheek. The lesion involved the overlying skin of the zygomaticotemporal, infraorbital, parotidomasseteric, and buccal regions. (Figure 1).

The patient recalled first noticing a red papular lesion on the right cheek approximately three years prior to diagnosis. Due to extremely limited access to healthcare, the lesion remained untreated and progressively enlarged, eventually ulcerating and reaching its current dimensions of 4.5 × 6 cm and maximum depth of 4.2 cm. Morphological examination revealed an irregular surface with a centrally ulcerated cavity. The central part of the lesion appeared necrotic with scattered hemorrhagic spots, while the lesion’s edges were well-defined. The overall appearance was consistent with ongoing tissue destruction and chronic inflammation, characteristic of an advanced ulcerative form of GBCC. The patient's main complaints included pain, difficulty with eating and speaking, foul odor from the lesion, and severe social distress caused by the disfigurement. The dermatologist performed a punch biopsy, which confirmed the GBCC diagnosis. A comprehensive systemic evaluation

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was performed to screen for any malignant or premalignant lesions, particularly in high-risk locations for melanoma, and no unusual findings were discovered. Laboratory tests revealed moderate leukocytosis with acceptable liver enzyme values. The patient was hospitalized in the ENT surgery unit and began receiving intravenous prophylactic Cefazolin at a dose of 1 gram every 6 hours for two days. Acetaminophen was used to ease the pain. Preoperative computed tomography was performed to evaluate the involvement of the parotid gland, muscles, deep soft tissues, orbit, and underlying bone, as well as perineural invasion. The findings suggested the possibility of tumor extension into deep tissues, given the lesion's size and chronicity. However, intraoperative evaluations revealed no involvement of underlying bone structures (skull or orbit). The tumor was surgically excised once preoperative planning was finished. An incision was made in the superior, inferior, anterior, and posterior orientations, leaving a 1cm safety zone around the clearly damaged tissue.

Figure 1. Clinical Image Showing a 69-Year-Old Man with a Pigmented Giant Basal Cell Carcinoma (GBCC) of Right Cheek at Presentation, Showing a Central Ulceration at Facial Hair-Bearing Region.

A 1-cm clinical margin was preferred because the lesion met high-risk criteria for its large size, location, and morphology. Guidelines support wider margins for high-risk BCC to enhance the likelihood of complete histologic clearance while preserving functionally and aesthetically important facial structures [8]. Because the lesion expanded beyond the epidermis and dermis, excision was performed while preserving the facial nerve's superficial branches, notably the marginal mandibular branch. The removed specimens were sent for histological examination, which revealed a pigmented variant of GBCC without perineural or lymphovascular invasion. All surgical margins were clear of tumor involvement. A detailed evaluation of the ensuing surgical defect was conducted, including measures of its size and the flexibility of the surrounding tissue. After tumor excision, the final defect measured 6.5 × 8 cm. The defect's location, size, shape, and orientation were considered when designing a regional bilobed flap. To reduce postoperative scarring, special attention was paid to aligning the reconstruction with relaxed skin tension lines (RSTLs). The purpose of the flap was to mobilize hair-bearing skin into the area affected by the facial deformity. The neck region's skin was selected in the bilobed design to reduce stress at the healing site. In the course of our flap design, the defect was remeasured after excision of the split thickness skin graft to account for contraction related underestimation of the true defect dimensions. A bilobed design was adopted, with the pivot point positioned along the junction of the mid cheek and preauricular aesthetic units at the

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inferolateral border of the defect. The first lobe was drawn laterally across the residual cheek skin toward the auricle and intentionally sized 15%–25% larger in surface area than the defect to compensate for contraction and to ensure adequate reach. The second lobe was designed postero-inferior to the first one, originating from the superior cervical skin posterior to the mandibular angle and extending behind the auricle. Geometrically, the two lobes were oriented with an inter lobe angle of approximately 45°–50°, and the primary lobe was set at a 40°-50° arc relative to the defect, creating a total arc of rotation of roughly 85°–100°. The length of the primary lobe was correlated with 1.0–1.2 times the long axis of the defect, while the secondary lobe was planned at approximately 60%–70% of the dimensions of the primary lobe to reduce distal tip redundancy and enable smooth distribution of rotational tension. Both lobes were elevated in the subcutaneous plane overlying the SMAS, preserving the random pattern vascular supply. Rotation and advancement were carried out consecutively, with the first lobe relocated into the primary defect and the second lobe used to close the secondary defect generated by the primary rotation. Tension distribution was optimized by aligning incision vectors parallel to local RSTLs and by using broad based lobe design to avoid point loading across the cheek–lower eyelid junction. Residual tension was dispersed through wide undermining of the donor site in the cervical region, allowing the final closure to rest evenly without distortion of the lower eyelid or melolabial crease. Any standing cutaneous deformity (dog ear) created at the inferior margin of the transposition arc was considered preoperatively; intraoperatively, it was excised using a horizontal or fusiform excision parallel to the melolabial fold to maintain local contour and prevent step off deformities. This configuration enhanced controlled rotation of the flap, reliable perfusion, and superior aesthetic integration by transferring hair bearing cervical skin into the central cheek defect. To maintain tissue viability, hemostasis was carefully managed, and excessive cauterization was avoided. After a closed-suction drain was placed at the surgical site, skin and subcutaneous sutures were used to create a layered closure. It was covered with a mild pressure dressing. Postoperative wound care included close monitoring of drain output, frequent inspections for hematoma formation during the first 72 hours, application of topical antibiotic ointment to the incision line, and daily dressing changes. (Figure2).

Figure 2. Postoperative Clinical Image of the Right Cheek Following Tumor Excision and Reconstruction with Bilobed-Rotation Advancement Flap, Showing Satisfactory Coverage and Contour of the Defect, Also Demonstrating the Aesthetic Outcome of Using Hair-Bearing Skin Flaps to Reconstruct Large Facial Defects of Giant Basal Cell Carcinoma (GBCC) in Male Patients.

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The patient was followed for 10 years after surgery. At the most recent follow-up visit, the patient reported a significant improvement in pain and psychological status, with pain levels decreasing from 6 to 1 on a 0–10 numeric rating scale. Physical examination revealed complete healing at the surgical site and resolution of all cutaneous lesions. Laboratory tests, including inflammatory markers, were within normal limits. The patient successfully returned to normal daily activities and resumed previous occupational functions. He is now able to perform tasks, such as chewing, which he had previously described as painful. His psychological well-being and social confidence have also markedly improved. Post-treatment care included ongoing wound management, pharmacotherapy, psychological support, and consultations with head and neck surgery and oncology specialists, all of which were appropriately implemented. The patient remained adherent to the prescribed medication regimen and follow-up care throughout the treatment process. Monitoring was conducted in accordance with the American Academy of Dermatology guidelines for 10 years, during which the patient's condition was closely observed. The most recent surveillance showed no evidence of recurrence. As of now, the patient is disease-free and remains under routine follow-up. There have been no signs of recurrence or complications associated with the surgical technique used.

Discussion

BCC is considered a common cutaneous malignancy. However, the giant variant—defined as BCC measuring more than 5 cm in diameter—is extremely rare, representing less than 1% of all BCC cases. Consequently, there are few studies particularly addressing the clinical manifestations and management of GBCC [3, 13, 14]. Risk factors associated with the advancement of GBCC include delayed diagnosis, patient neglect, prior unsuccessful treatment of BCC, histologically aggressive subtypes (such as morpheaform, micronodular, and metatypical), and a history of prior radiotherapy [15]. The considerable tumor size observed in many GBCC cases appears to derive largely from prolonged delays in seeking medical attention, often resulting from poor socioeconomic conditions. Individuals living in isolated rural areas typically have insufficient public health awareness, limited access to healthcare services, and poor understanding of diagnostic and treatment methods, all of which contribute to delayed presentation and management [12]. In our case study, multiple socioeconomic factors were linked to the progression of the patient's BCC. The most significant of these factors were lack of access to medical care, low income, limited education, and insufficient knowledge about preventive measures for skin diseases. In addition, residing in a hot, arid climate with high UV exposure, combined with an outdoor occupation, such as farming, substantially increased the patient's risk of developing skin damage. These interconnected elements reflect the complex etiology of GBCC and underscore the critical importance of targeted prevention strategies and improving healthcare access for at-risk populations. Histopathologic classification also plays a major role in determining the invasiveness and ultimate size of BCC lesions. The microscopic appearance of the tumor is closely associated with its clinical behavior, allowing GBCCs to be categorized into two groups: those with aggressive features and those with a less aggressive nature [7, 16]. In general, nodular and superficial BCCs are considered less aggressive, whereas morpheaform and infiltrative subtypes are more likely to develop into giant or deeply invasive tumors [7, 17]. Based on both microscopic and gross evaluations of the case under study, the tumor was classified as a nodular subtype with relatively deep extension, as confirmed by solid pigmentation and peripheral palisading. Previous studies have shown that nodular and superficial GBCCs are generally lower-risk lesions and are less likely to progress to giant or highly invasive tumors [3, 7, 17-19]. However, our case challenges these findings, as the nodular GBCC demonstrated deeper invasion and a large tumor size. The histopathological findings of this case indicate that, although rare, nodular GBCC can exhibit aggressive behavior, highlighting the need for close follow-up and comprehensive assessment, regardless of the initial histopathological or clinical subtype. Such cases emphasize the variability in GBCC behavior and the importance of individualized patient management. Due to the extensive defect secondary to tumor excision, GBCC constitutes a major reconstructive challenge, particularly in the facial region, where both functional and aesthetic outcomes must be carefully considered [7]. Various reconstructive approaches have been observed in the literature, including

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primary closure, local flaps, skin grafts, free flaps, and regional flaps. However, the choice of reconstruction technique largely depends on the size, location, and depth of the defect, as well as on patient-specific factors [11]. The ideal reconstruction should achieve maximum match in color and texture with the surrounding skin [20]. Primary closure is generally limited to small defects (less than 2 cm) and is only feasible when there is minimal tissue loss and no significant tension upon approximation of wound edges. Skin grafts are technically simple but may result in color and texture mismatch, contracture, and suboptimal cosmetic outcomes, especially in the facial region [11, 21]. Flaps are classically categorized based on vascular supply, tissue composition, transfer method, and design configuration [22, 23]. Regional and free flaps provide excellent coverage for large and complex defects, but these techniques are associated with longer operative time, greater surgical complexity, and donor-site morbidity. Local and regional flaps are generally considered the first-line option for reconstructing cheek and forehead defects, although their use may be limited by tissue availability and defect size [10]. Common local flap designs used for cheek reconstruction include the rhomboid transposition flap, advancement flap, rotation-advancement flap (such as the Mustardé flap), and V-Y advancement flaps (kite flap). Due to the anatomic characteristics of the cheek, only a limited number of complex local flap designs are suitable for reconstructing defects in this region [20, 24]. In the presented case, we utilized a bilobed rotation-advancement flap to reconstruct the defect, as this technique offers excellent tissue coverage, reliable vascular supply, and optimal color and texture matching with the surrounding skin. The careful geometric planning of this approach enabled the closure of a defect larger than 6 cm without causing excessive vertical tension, while preserving the natural facial contour and preventing distortion of adjacent anatomical regions. Studies have shown that the bilobed flap design offers several advantages over other local flaps. It features a simple design and a relatively straightforward surgical technique, and is composed of well-vascularized tissue that matches the color and texture of the reconstruction site [25]. In this case, the defect was present in the region containing hair follicles, necessitating complete reconstruction of the area with hair-bearing skin to ensure optimal cosmetic outcomes. Therefore, the bilobed flap was preferred to provide maximum harmony in pigmentation and texture with the surrounding tissue. Additionally, in contrast to other local flaps, such as rhomboid or V-Y advancement flaps, the bilobed rotation-advancement flap results in greater mobility and leads to better distribution of tension at the suture line—a crucial factor in managing large defects following GBCC resection. In the study by Moahaparta et al. (2023), the use of rotational cheek flaps or pre-auricular flaps was recommended for the reconstruction of defects resulting from BCC excision in this region, involving approximately 20%–50% of the anatomic surface of the cheek [26]. However, contrary to their findings, the results of managing our case indicate that this approach may not always yield optimal aesthetic or functional outcomes. In contrast, the bilobed rotation-advancement flap may offer a refined and effective alternative in select patients with adequate skin laxity, allowing for better tension redistribution, preservation of tissue contour, and minimization of anatomic deformities. Although the bilobed flap is traditionally used for smaller defects or those in the nasal region, our experience demonstrates that—with appropriate design—it is remarkably adaptable for reconstructing mid-cheek defects, producing favorable cosmetic results. Similarly, the study by Mishra et al. (2024) highlights the use of local transposition flaps for reconstructing cheek defects secondary to BCC excision [27]. However, such techniques may be associated with challenges, including secondary defect formation, inadequate tissue tension distribution, and aesthetic scarring in cosmetically sensitive areas. Compared with these earlier approaches, the bilobed rotation-advancement flap introduced in this case represents a dynamic alternative that integrates the advantages of both rotation and advancement while minimizing complications and donor-site morbidity. Its curved design enables balanced tension distribution, and its alignment with the RSTLs improves the cosmetic outcome, which is particularly critical in the surgical treatment of GBCC. Although the application of the bilobed rotation-advancement flap for reconstructing large GBCC-induced facial defects has been rarely reported, the successful outcome in our case supports the reliability and versatility of this method as a viable reconstructive option. The bilobed rotation-advancement flap allowed mobilization of cervicofacial tissue with similar texture, thickness, and vascular reliability. Its geometric design promoted redistribution of tension

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away from the central defect and along RSTLs, therefore minimizing distortion of nearby anatomical landmarks. In addition, mobilization of adjacent hair-bearing skin facilitated restoration of the natural aesthetic subunit. The 10-year follow-up indicated a stable contour, a satisfactory aesthetic outcome, and the absence of recurrence. Long-term data of this duration are rarely reported in similar case reports. Despite these results, it is important to note that this is a single-case report, and further studies are necessary to more accurately define the indications, limitations, and long-term outcomes of the bilobed rotation-advancement flap for reconstructing large facial defects caused by GBCC. This study has intrinsic limitations, including its single-case design and the lack of an objective assessment of aesthetic outcome. Furthermore, individual variables may influence the rate of reconstructive success, limiting generalizability to other clinical scenarios.

Conclusion

In our experience, the clinical application of the bilobed flap remains a multifaceted and credible choice for reconstructing complex, large facial defects, particularly when precise color–texture matching and contour restoration are critical. As presented in this case, geometric planning, preservation of the subdermal vascular network, and the use of adjacent cervical skin enabled sustained tension distribution and predictable healing. Importantly, meticulous incorporation of hair bearing upper cervical/lower facial skin into the cheek restored the native aesthetic character often lost after large oncologic resections of GBCC. This strategic use of regional aesthetic units provided advanced harmonization with surrounding tissues and improved overall aesthetic outcomes. This case highlights how thoughtful modification of a classic bilobed design can reconstruct the challenging defects while achieving an outcome that is both cosmetically natural and functionally sound.

Ethics Approval and Consent to Participate

The patient provided informed consent, which was recorded in the medical record.

This study was reviewed and approved by the Ethics Committee of Birjand University of Medical Sciences, Birjand, Iran (approval code: IR.BUMS.REC.1404.333).

All procedures were conducted in accordance with ethical principles.

Consent for Publication

Written informed consent for publication of clinical details and clinical images was obtained directly from the patient.

Data Availability Statement

Not applicable.

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Author's Contribution

BSS was responsible for patient management, provided the clinical and pathological data, and critically revised the manuscript. MM wrote and edited the manuscript and analyzed data. EH contributed to the manuscript. All authors read and approved the final manuscript.

Conflict of Interest

The authors declared no conflicts of interest.

Declaration of Generative Artificial Intelligence in Scientific Writing

We have not used any AI tools or technologies to prepare this manuscript.

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