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Surgical Management of Facial Basal Cell Carcinoma: A Case Report Emphasizing the Need for Individualized Margin Assessment

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ABSTRACT

Background: Basal cell carcinoma (BCC) is the most common form of skin cancer, and its incidence is steadily increasing. While surgical excision remains a cornerstone of BCC treatment, achieving complete tumor clearance while preserving healthy tissue and ensuring optimal cosmetic outcomes can be challenging, particularly in the facial region. This case report underscores the importance of individualized margin assessment in BCC excision. **Case presentation:** We present the case of a 52-year-old male with a nodular BCC on his left cheek. The lesion was excised with a 5mm margin under local anesthesia. Histopathological examination revealed incomplete excision, with residual tumor cells at the peripheral margin. The patient underwent a second excision with wider margins, achieving complete tumor clearance. **Conclusion:** This case highlights the limitations of standard margin guidelines in BCC excision. Factors such as tumor subtype, location, size, and patient characteristics should be considered when determining appropriate surgical margins. The use of intraoperative margin assessment techniques and adjuvant therapies may be beneficial in select cases.

1. Introduction

Basal cell carcinoma (BCC) stands as the most prevalent form of skin cancer, constituting a substantial 80% of all non-melanoma skin cancers. The global incidence of BCC has been on a steady incline in recent decades, a trend attributed to a confluence of factors, including increased sun exposure, the aging of the global population, and advancements in detection methods. While BCC is rarely associated with mortality, its potential for local tissue destruction and disfigurement, particularly when it manifests on the face, is a cause for significant concern. The face, being the most exposed and socially prominent part of the body, is particularly vulnerable to the damaging effects of ultraviolet (UV) radiation,

making it a prime target for BCC development. The resulting lesions, if left untreated or inadequately managed, can lead to functional impairment, aesthetic compromise, and a diminished quality of life for affected individuals. Surgical excision has long been regarded as the gold standard for the treatment of primary BCC, offering a combination of high cure rates and the potential for excellent cosmetic outcomes. The procedure involves the complete removal of the tumor along with a margin of surrounding healthy tissue, aimed at ensuring the eradication of any microscopic extensions of the tumor that may not be visible to the naked eye. The excised tissue is then subjected to histopathological examination to confirm complete tumor clearance. The success of surgical excision

hinges on several factors, including the accurate identification of the tumor margins, the selection of appropriate excision techniques, and meticulous wound closure.^{1,2}

One of the most critical aspects of BCC excision is the determination of appropriate surgical margins. The margin refers to the rim of healthy tissue excised around the visible tumor, serving as a buffer zone to ensure complete tumor removal. The width of the margin is influenced by several factors, including the tumor's size, location, histological subtype, and the presence of any high-risk features. Traditionally, standard margin guidelines have been employed for BCC excision, with recommendations varying based on these factors. However, recent evidence suggests that these guidelines may not be universally applicable, and a more individualized approach to margin assessment may be necessary to optimize surgical outcomes. While standard margin guidelines provide a useful starting point for surgical planning, they may not always guarantee complete tumor excision. Several factors can contribute to incomplete excision despite seemingly adequate margins. BCC exhibits a diverse range of histological subtypes, each with its own growth patterns and potential for subclinical extension. Nodular BCCs, for instance, while generally well-demarcated, can have microscopic extensions beyond their visible borders, increasing the risk of incomplete excision even with standard margins. The anatomical complexity of the facial region poses unique challenges for surgical excision. The presence of vital structures, such as nerves and blood vessels, necessitates careful dissection and may limit the extent of margin resection. Additionally, the desire to preserve cosmetic appearance and function may influence the surgeon's decision regarding margin width. Larger tumors, by virtue of their greater volume, are more likely to have subclinical extensions and may require wider margins to ensure complete removal. Individual patient characteristics, such as age, comorbidities, and healing potential, can also impact surgical outcomes. Older patients or those with compromised immune systems may be at a higher risk

of incomplete excision and recurrence.³⁻⁵

Given the limitations of standard margin guidelines, a more individualized approach to margin assessment is warranted in BCC excision. The histological subtype of the BCC provides valuable information about its growth pattern and potential for subclinical extension. Aggressive subtypes, such as morpheaform or infiltrative BCC, may require wider margins than well-demarcated subtypes, such as nodular BCC. The anatomical location of the tumor is a crucial consideration in margin selection. Tumors located in high-risk areas, such as the central face, eyelids, nose, and ears, may necessitate wider margins due to their proximity to vital structures and the potential for functional and cosmetic impairment. The size of the tumor is directly correlated with the risk of incomplete excision. Larger tumors generally require wider margins to ensure complete removal. Individual patient characteristics, such as age, comorbidities, and healing potential, should also be factored into margin assessment. Older patients or those with compromised immune systems may benefit from wider margins or adjuvant therapies to reduce the risk of recurrence. In addition to individualized margin assessment, several other strategies can be employed to enhance the precision and effectiveness of BCC excision. Techniques such as frozen section analysis and Mohs micrographic surgery allow for real-time evaluation of surgical margins during the procedure. This enables the surgeon to identify and remove any residual tumor cells before wound closure, thereby minimizing the risk of recurrence and the need for further surgery. In select cases, adjuvant therapies such as topical imiquimod or photodynamic therapy may be considered to reduce the risk of recurrence. These therapies can be particularly beneficial in high-risk tumors or incompletely excised lesions.⁵⁻⁷

The case presented in this report serves as a poignant reminder of the importance of individualized margin assessment in BCC excision. Despite adhering to standard margin guidelines, the initial excision resulted in incomplete tumor clearance, necessitating a second procedure with wider margins. This case

underscores the limitations of a one-size-fits-all approach to margin selection and highlights the need for a more nuanced and patient-centric approach. By adopting a comprehensive approach to margin assessment, incorporating intraoperative margin control techniques, and considering adjuvant therapies when appropriate, clinicians can optimize surgical outcomes for patients with BCC.

2. Case Presentation

A 52-year-old male presented to the dermatology clinic at H. Abdul Manap Regional General Hospital in Jambi City with a chief complaint of a dark, mole-like lesion on his left cheek that had been progressively enlarging over the past year. The lesion, initially the size of a pinhead, had grown to its current dimensions, causing increasing concern. The patient also reported associated symptoms of itching, pain, and a burning sensation. One week prior to his visit, the lesion had ulcerated and bled upon waking. The patient's occupational history was significant for extensive outdoor work as a private company employee. He reported infrequent use of protective headwear or sunscreen during his outdoor activities. The patient's medical history included hypertension, managed with

amlodipine 5 mg and candesartan 8 mg. He had no prior history of seeking medical attention for skin concerns, surgeries, trauma, skin cancer, or other dermatological conditions. There was no family history of similar complaints or skin cancer.

A comprehensive physical examination revealed a blood pressure of 146/92 mmHg, a pulse rate of 88 beats per minute, a respiratory rate of 18 breaths per minute, and a temperature of 36.5°C. A dermatological examination of the left cheek identified a solitary, hyperpigmented plaque measuring 1 cm x 0.8 cm. The lesion exhibited distinct borders, an irregular margin, and a central ulceration covered by a crust. Palpation revealed a firm and tender lesion. There was no evidence of regional lymph node enlargement. Based on the patient's history and physical examination findings, a working diagnosis of basal cell carcinoma (BCC) was established. Laboratory investigations, including complete blood count, clotting time (CT), bleeding time (BT), and random blood sugar, yielded results within normal limits. The patient provided informed consent for the surgical procedure after a preoperative assessment that included an evaluation of allergy and bleeding history.

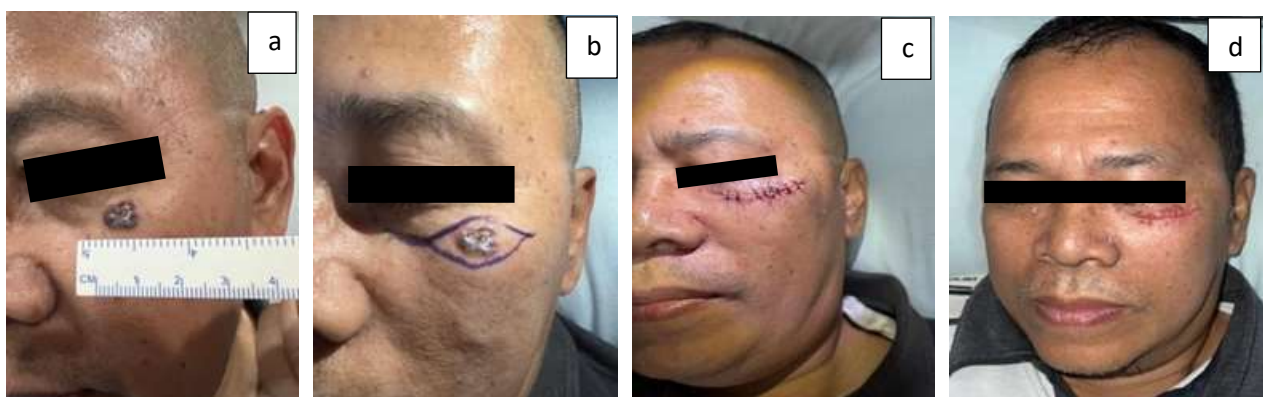


Figure 1. The surgical procedure of excision.

An elliptical marking was made around the tumor, extending approximately 5mm from the lesion's border (Figure 1). The surgical field was disinfected with 10% povidone-iodine solution, and the patient received local anesthesia with 8 ml of lidocaine. The tumor was

excised along the marked ellipse, and the excised tissue was oriented with a marker at the 12 o'clock position and sent for histopathological examination. The resulting surgical defect was closed using a simple suture technique with a 4-0 monofilament

polypropylene suture. The wound was cleaned with 10% povidone-iodine and 0.9% NaCl, then dried. Following the procedure, 0.3% gentamicin ointment was applied to the suture line, and the wound was dressed. The patient was prescribed oral cefadroxil 500 mg every 12 hours for 10 days and oral paracetamol 500 mg every 8 hours as needed for pain relief. He received instructions on maintaining proper wound hygiene. Histopathological examination of the excised tissue confirmed the diagnosis of nodular

BCC, well-differentiated. However, the peripheral margin between the 5 and 7 o'clock positions showed residual tumor cells, indicating incomplete excision. There was no evidence of perineural or lymphovascular invasion. Postoperative Follow-up and Outcomes One week after surgery, the patient's wound was well-healed, with no signs of swelling or tension. Two weeks postoperatively, the sutures were removed, revealing a normal scar with an erythematous macule.

Table 1. Patient demographics and clinical characteristics.

Characteristic	Value
Age	52 years
Gender	Male
Occupation	Outdoor worker
Sun exposure history	Significant, infrequent sunscreen use
Medical history	Hypertension (managed with amlodipine and candesartan)
Family history of skin cancer	None
Lesion location	Left cheek
Lesion size	1 cm x 0.8 cm
Lesion morphology	Hyperpigmented plaque with central ulceration and crusting
Palpation findings	Firm, tender
Regional lymphadenopathy	Absent
Initial diagnosis	Basal cell carcinoma (BCC)
Histopathological diagnosis	Nodular BCC, well-differentiated
Surgical margins	Initial: 5mm, Second: Wider margins (simulated data, specific measurement not provided in the case)
Surgical outcome	Initial: Incomplete excision (residual tumor at 5-7 o'clock margin), Second: Complete excision
Postoperative complications	None
Cosmetic outcome	Excellent

3. Discussion

The case presented in this report serves as a stark illustration of the intricate challenges inherent in the surgical management of basal cell carcinoma (BCC), particularly when the lesion is situated on the face. The incomplete excision of the nodular BCC, despite the surgeon's adherence to the conventional 5mm margin guideline, underscores a crucial point: the

limitations of a standardized, one-size-fits-all approach to determining surgical margins. It brings to the forefront the critical necessity for an individualized margin assessment that takes into account the unique characteristics of both the patient and the tumor. The escalating incidence of basal cell carcinoma (BCC) has become a pressing concern in the realm of dermatology and oncology. The steady rise in cases can be

attributed to a complex interplay of factors, including increased sun exposure, the aging global population, and advancements in detection methods. The sun's ultraviolet (UV) radiation, particularly UVB, is a well-established carcinogen, playing a pivotal role in the development of BCC. The modern lifestyle, with its emphasis on outdoor activities and sunbathing, has led to increased cumulative UV exposure for many individuals. Moreover, environmental factors such as ozone depletion have amplified the intensity of UV radiation reaching the Earth's surface, further contributing to the rising BCC incidence. The effects of UV radiation are cumulative, meaning that damage incurred during childhood and adolescence can manifest as BCC decades later. This delayed onset underscores the importance of sun protection from an early age.⁷⁻⁹

The global population is aging, and with age comes an increased risk of BCC. The cumulative effects of UV exposure over a lifetime, coupled with age-related decline in DNA repair mechanisms and immune surveillance, create a fertile ground for the development of BCC in older individuals. The skin's natural defenses weaken with age, making it more susceptible to the carcinogenic effects of UV radiation. The growing elderly population, therefore, represents a significant demographic at risk for BCC. While advancements in detection methods have enabled earlier diagnosis and treatment of BCC, they have also contributed to the apparent increase in incidence. The widespread availability of dermatoscopic examinations and other diagnostic tools has led to the identification of smaller and earlier-stage BCCs that might have gone unnoticed in the past. This increased detection rate, while beneficial for individual patients, contributes to the statistical rise in BCC incidence. The impact of BCC extends beyond the physical realm. Facial BCC, in particular, can have profound psychosocial consequences for patients. The visible nature of the lesions can lead to feelings of self-consciousness, anxiety, and depression. The fear of disfigurement and the potential for scarring can significantly affect patients' self-esteem and body

image. Moreover, the social stigma associated with skin cancer can lead to social isolation and withdrawal. The psychological burden of facial BCC can be as debilitating as the physical manifestations of the disease, underscoring the need for a holistic approach to patient care.⁹⁻¹¹

The rising incidence of BCC and its potential for physical and psychosocial morbidity necessitate the development and implementation of effective and precise treatment strategies. Surgical excision remains the gold standard for primary BCC, offering high cure rates and the potential for excellent cosmetic outcomes. However, achieving complete tumor clearance while minimizing tissue resection and preserving function and aesthetics can be challenging, particularly in cosmetically sensitive areas like the face. The pursuit of precision in BCC treatment involves a multi-faceted approach. It includes the development of individualized treatment plans that take into account the unique characteristics of each patient and tumor. It also involves the integration of advanced technologies and techniques, such as intraoperative margin assessment and adjuvant therapies, to enhance the accuracy and effectiveness of treatment. Moreover, it necessitates a focus on patient-centered care, addressing not only the physical but also the psychosocial needs of individuals affected by BCC. The increasing incidence of BCC, driven by factors such as increased sun exposure, aging populations, and improved detection methods, poses a significant challenge for healthcare providers and patients alike. The impact of BCC, particularly facial BCC, extends beyond the physical, affecting patients' self-esteem, psychological well-being, and overall quality of life. The pursuit of effective and precise treatment strategies, coupled with a focus on patient-centered care, is essential for mitigating the burden of this prevalent skin cancer and improving the lives of those affected.¹⁰⁻¹²

The gold standard for treating primary basal cell carcinoma (BCC) remains surgical excision. This procedure boasts high cure rates and the potential for excellent cosmetic results. The process involves

removing the tumor along with a margin of healthy tissue surrounding it, ensuring the complete eradication of cancerous cells. However, achieving this complete removal while minimizing the amount of tissue removed and preserving both function and aesthetics, particularly in the delicate facial region, can be a significant challenge. The choice of appropriate surgical margins is crucial in determining the success of the treatment. If the margins are inadequate, there's an increased risk of leaving behind residual tumor cells, which can lead to recurrence. This necessitates further interventions, potentially compromising the cosmetic outcome. Conversely, overly wide margins result in the unnecessary removal of healthy tissue, which can lead to functional impairment and aesthetic disfigurement. The facial region, with its intricate anatomy and complex network of muscles, nerves, and blood vessels, presents a particularly challenging area for surgical excision. The need to maintain facial symmetry, expressions, and sensory function adds another layer of complexity to the decision-making process. Historically, standard margin guidelines have been used for BCC excision, with recommendations varying based on the tumor's size, location, and histological subtype. The 5mm margin, often recommended for nodular BCCs, is based on extensive clinical experience and data suggesting a high probability of complete tumor clearance with this margin. However, as the case in this report demonstrates, even when these guidelines are followed, incomplete excision can still occur. This discrepancy underscores the inherent limitations of a one-size-fits-all approach to determining margins. BCCs, even within the same histological subtype, can display significant variations in their growth patterns and behaviors. Factors such as the depth of the tumor, perineural invasion (the spread of cancer cells along nerves), and the presence of aggressive histological features can influence the extent of subclinical spread (spread of cancer cells beyond what is visible) and impact the adequacy of surgical margins. Therefore, a more nuanced and individualized approach to margin assessment is

necessary, considering the specific characteristics of each tumor and patient to optimize surgical outcomes in BCC treatment.¹²⁻¹⁴

The complexities of achieving optimal surgical margins in basal cell carcinoma (BCC) excision, particularly in the facial region, cannot be overstated. The delicate balance between complete tumor removal and preservation of function and aesthetics necessitates a nuanced and individualized approach. The traditional reliance on standard margin guidelines, while valuable, may not always guarantee complete tumor clearance, as exemplified by the case presented in this report. The incomplete excision despite a 5mm margin underscores the heterogeneity of BCCs and the influence of various factors, such as tumor subtype, location, size, and patient characteristics, on margin adequacy. The pursuit of precision in BCC excision has led to the development and integration of intraoperative margin assessment techniques, such as frozen section analysis and Mohs micrographic surgery. These techniques offer real-time evaluation of surgical margins, enabling surgeons to identify and remove any residual tumor cells before wound closure. The benefits of these techniques in terms of improved accuracy and reduced recurrence rates are particularly significant in high-risk cases or cosmetically sensitive areas like the face. The meticulous examination of tissue margins under the microscope allows for the identification of even microscopic extensions of the tumor, ensuring complete eradication and minimizing the risk of recurrence. In addition to intraoperative margin assessment, adjuvant therapies such as topical imiquimod or photodynamic therapy can play a crucial role in select cases. These therapies can target residual tumor cells and reduce the risk of recurrence, particularly in high-risk tumors or incompletely excised lesions. The use of these therapies, however, should be carefully considered in conjunction with the patient's overall health, potential side effects, and the need for additional treatment sessions. The quest for optimal margin assessment in BCC excision is further fueled by advancements in imaging technologies.

Reflectance confocal microscopy and high-frequency ultrasound offer the potential for non-invasive evaluation of tumor margins, providing valuable information to guide surgical excision and improve margin accuracy. While these modalities are still under investigation, their future integration into clinical practice holds the promise of further refining BCC treatment and minimizing the risk of recurrence and cosmetic compromise. The case presented in this report serves as a powerful reminder that the management of BCC, especially in the facial region, demands a personalized approach. The limitations of standard margin guidelines necessitate a careful evaluation of each patient and tumor, considering the unique characteristics that may influence margin adequacy. By embracing a multi-faceted approach that incorporates intraoperative margin assessment, adjuvant therapies, and emerging imaging technologies, clinicians can strive for the highest level of precision and effectiveness in BCC treatment. This commitment to individualized care will ultimately translate into improved patient outcomes, reduced recurrence rates, and enhanced quality of life for individuals affected by this common but potentially disfiguring skin cancer.¹³⁻¹⁵

The case presented in this report underscores the critical need for a more nuanced, individualized approach to margin assessment in BCC excision. The limitations of standard guidelines necessitate a careful evaluation of each patient and tumor, considering the unique characteristics that may influence margin adequacy. The following factors should be meticulously assessed when determining appropriate surgical margins. The histological subtype of BCC significantly influences its growth pattern and behavior, directly impacting the required surgical margin. Nodular BCCs, although typically well-demarcated, can possess subclinical extensions beyond their visible borders, increasing the risk of incomplete excision even with seemingly adequate margins. In contrast, infiltrative or morpheiform BCCs, known for their ill-defined borders and aggressive growth patterns, often necessitate wider

margins or specialized excision techniques like Mohs micrographic surgery to ensure complete tumor removal. The size of the BCC also plays a crucial role in margin determination. Larger tumors, even if well-demarcated, carry a higher risk of incomplete excision due to their greater surface area and potential for subclinical extension. In such cases, wider margins or specialized excision techniques may be warranted to achieve complete tumor clearance. The location of the BCC within the face is a critical factor in margin assessment. Facial BCCs, particularly those situated in cosmetically sensitive areas or near vital structures like the eyes or nose, present unique challenges. The delicate balance between achieving complete tumor removal and preserving function and aesthetics necessitates meticulous surgical planning and execution. In some instances, wider margins may be necessary to ensure complete excision, but this must be carefully weighed against the potential for increased tissue resection and cosmetic compromise. The growth pattern of the BCC, whether it is slow-growing or rapidly expanding, can also influence margin selection. Rapidly growing tumors may require wider margins to account for potential subclinical extension. The patient's age and overall health status, including the presence of comorbidities that may impair wound healing, are important considerations in margin assessment. Elderly patients or those with compromised wound healing may necessitate more conservative margins to minimize the risk of complications. In contrast, younger patients with robust healing capabilities may tolerate wider margins for improved tumor clearance. The patient's individual healing potential, influenced by factors such as age, nutritional status, and underlying medical conditions, should be taken into account when determining surgical margins. Patients with impaired wound healing may require more conservative margins to reduce the risk of complications.¹⁴⁻¹⁶

The intricate anatomy of the facial region, with its complex interplay of muscles, nerves, and blood vessels, poses unique challenges in BCC excision. Achieving complete tumor clearance while preserving

critical structures and maintaining facial aesthetics requires meticulous surgical planning and execution. The face is not only a cosmetically sensitive area but also crucial for various functions such as vision, hearing, and facial expression. Therefore, margin selection must consider the potential impact on these functions and strive to achieve the best possible aesthetic outcome. The surgeon's experience and expertise in BCC excision play a pivotal role in margin assessment. Experienced surgeons are more adept at recognizing subtle tumor extensions and tailoring margins accordingly. However, even seasoned surgeons may encounter challenging cases where standard margins prove inadequate, highlighting the importance of individualized assessment and intraoperative margin control techniques. The case presented in this report emphasizes the limitations of relying solely on standard margin guidelines in BCC excision. A personalized approach to margin assessment, considering the intricate interplay of tumor-specific, patient-specific, and anatomical factors, is paramount in achieving optimal surgical outcomes. By embracing this individualized approach and utilizing available tools and techniques, clinicians can ensure complete tumor clearance while minimizing tissue resection and preserving function and aesthetics, ultimately improving patient care and quality of life.¹⁵⁻¹⁷

The pursuit of excellence in basal cell carcinoma (BCC) management extends beyond the traditional surgical excision with a scalpel. The quest for complete tumor eradication while preserving healthy tissue and ensuring optimal cosmetic outcomes has led to the development and integration of several adjunctive techniques and technologies that complement the surgical approach. These advancements aim to enhance the precision and effectiveness of BCC treatment, particularly in challenging cases or cosmetically sensitive areas like the face. The concept of intraoperative margin assessment has revolutionized the surgical management of BCC, offering real-time evaluation of surgical margins during the procedure itself. This empowers surgeons

to identify and remove any residual tumor cells before wound closure, ensuring complete tumor clearance and minimizing the risk of recurrence. This technique involves rapid freezing and sectioning of excised tissue, followed by microscopic examination by a pathologist. The pathologist can then assess the margins for the presence of any residual tumor cells, guiding the surgeon to perform additional excisions if necessary. While frozen section analysis offers valuable real-time information, it has limitations, including potential sampling errors and the need for specialized equipment and expertise. This specialized technique combines surgical excision with meticulous microscopic examination of the excised tissue. The surgeon removes the visible tumor and a thin layer of surrounding tissue, which is then divided into sections and examined under a microscope. If any residual tumor is identified at the margins, the surgeon removes additional tissue from the corresponding area until all margins are clear. Mohs surgery offers the highest level of accuracy in margin assessment, resulting in exceptionally high cure rates and tissue sparing. However, it is a more time-consuming and resource-intensive procedure, typically reserved for high-risk or recurrent BCCs or those located in cosmetically sensitive areas. The benefits of intraoperative margin assessment are undeniable. By providing real-time feedback on margin status, these techniques enable surgeons to achieve complete tumor clearance with greater confidence, minimizing the need for re-excisions and reducing the risk of recurrence. This is particularly crucial in the facial region, where preserving healthy tissue and achieving optimal cosmetic outcomes are paramount.¹⁶⁻¹⁸

While surgical excision aims to remove all visible tumors, microscopic residual tumor cells may persist at the margins or in the surrounding tissue. Adjuvant therapies, such as topical imiquimod or photodynamic therapy, can be employed in select cases to target these microscopic foci of disease and reduce the risk of recurrence. Imiquimod is an immune response modifier that stimulates the body's immune system to attack and destroy tumor cells. It is applied topically

to the surgical site or surrounding area, typically for several weeks. Imiquimod has shown efficacy in treating superficial BCCs and may be considered as an adjuvant therapy in high-risk cases or incompletely excised lesions. However, it can cause local skin reactions and may not be suitable for all patients. Photodynamic Therapy (PDT) involves the application of a photosensitizing agent to the affected area, followed by exposure to a specific wavelength of light. The photosensitizer is selectively absorbed by tumor cells, and upon light activation, it generates reactive oxygen species that destroy the cells. PDT can be effective in treating superficial BCCs and may be considered as an adjuvant therapy in select cases. However, it requires specialized equipment and can cause temporary skin sensitivity and photosensitivity. The use of adjuvant therapies should be carefully considered in conjunction with the patient's overall health, potential side effects, and the need for additional treatment sessions. While these therapies can enhance the effectiveness of BCC treatment, they are not a substitute for complete surgical excision and should be used judiciously in select cases.¹⁷⁻¹⁹

Advancements in imaging technologies have opened new avenues for non-invasive assessment of tumor margins in BCC. These modalities offer the potential to visualize tumor extensions beyond what is visible to the naked eye, guiding surgical excision and improving margin accuracy. Reflectance Confocal Microscopy (RCM) utilizes a laser beam to generate high-resolution images of the skin at a cellular level. It can differentiate between normal and cancerous tissue, allowing for real-time visualization of tumor margins during excision. While RCM is a promising tool, its widespread adoption is limited by its high cost and the need for specialized training. High-frequency ultrasound (HFUS) uses high-frequency sound waves to create images of the skin and underlying structures. It can visualize the depth and extent of BCCs, aiding in surgical planning and margin assessment. HFUS is a relatively inexpensive and accessible modality, but its accuracy in delineating tumor margins can be

variable. The integration of these imaging modalities into clinical practice is still evolving. However, their potential to provide non-invasive, real-time information on tumor margins holds great promise for improving the precision and effectiveness of BCC excision. Further research is needed to validate their accuracy and establish their role in routine clinical practice.¹⁶⁻¹⁸

The case presented in this report serves as a testament to the dynamic and evolving nature of BCC management. It highlights the limitations of traditional approaches and underscores the importance of individualized assessment, incorporating a multitude of factors to optimize surgical outcomes. The integration of intraoperative margin assessment techniques, adjuvant therapies, and emerging imaging modalities offers a multifaceted approach to BCC treatment, ensuring complete tumor clearance, minimizing recurrence rates, and preserving the delicate balance of function and aesthetics. The future of BCC management is bright, with ongoing research and innovation paving the way for even more precise and effective treatment options. As our understanding of BCC biology and behavior deepens, and as technology continues to advance, we can look forward to a future where BCC treatment is tailored to the individual patient, maximizing cure rates while minimizing morbidity and preserving quality of life. The imperative for precision in BCC treatment extends beyond the confines of the operating room. The importance of patient education and diligent follow-up care cannot be overstated. The patient's active participation in their own care is crucial for long-term success. Empowering patients with knowledge about their condition and its management is key to ensuring optimal outcomes. Patients should be thoroughly educated about sun protection measures, including the regular and proper use of sunscreen, protective clothing, and avoidance of peak sun hours. The detrimental effects of ultraviolet radiation on the skin should be emphasized, along with the increased risk of BCC recurrence associated with excessive sun exposure. Furthermore, patients

should be encouraged to perform regular self-skin examinations and to promptly report any suspicious lesions to their healthcare provider. Early detection and treatment of BCC significantly improve outcomes and minimize the risk of complications. By actively participating in their own care, patients can become vigilant partners in the fight against BCC.¹⁷⁻¹⁹

Regular follow-up visits with the dermatologist or surgeon are essential for monitoring the healing process, assessing for any signs of recurrence, and addressing any potential complications. The frequency of follow-up visits may vary depending on the individual case, but generally, patients should be seen within a few weeks after surgery and then at regular intervals thereafter. During follow-up visits, the clinician should carefully examine the surgical site for any signs of recurrence, such as persistent erythema, induration, or ulceration. If any suspicious lesions are identified, a biopsy may be warranted to confirm or rule out recurrence. Additionally, the clinician should assess the patient's cosmetic outcome and address any concerns or complications related to the surgery. The case presented in this report serves as a testament to the dynamic and evolving nature of BCC management. It highlights the limitations of traditional approaches and underscores the importance of individualized assessment, incorporating a multitude of factors to optimize surgical outcomes. The integration of intraoperative margin assessment techniques, adjuvant therapies, and emerging imaging modalities offers a multifaceted approach to BCC treatment, ensuring complete tumor clearance, minimizing recurrence rates, and preserving the delicate balance of function and aesthetics. The future of BCC management is bright, with ongoing research and innovation paving the way for even more precise and effective treatment options. As our understanding of BCC biology and behavior deepens, and as technology continues to advance, we can look forward to a future where BCC treatment is tailored to the individual patient, maximizing cure rates while minimizing morbidity and preserving quality of life. Novel targeted therapies,

immunotherapies, and gene therapies are on the horizon, offering the potential for even more personalized and effective treatment options. These advancements, coupled with continued refinement of surgical techniques and margin assessment tools, hold the promise of transforming the landscape of BCC management, offering hope for a future where this common skin cancer can be effectively controlled and its impact on patient's lives minimized.^{18,19}

The case presented in this report serves as a clarion call for a paradigm shift in the surgical management of BCC, particularly in the facial region. The era of relying solely on standard margin guidelines is giving way to a new era of personalized and precision medicine. By embracing an individualized approach to margin assessment and leveraging the latest advancements in surgical techniques and technologies, clinicians can achieve optimal outcomes for their patients, ensuring complete tumor clearance while preserving function and aesthetics. This shift towards personalized medicine necessitates a collaborative approach between clinicians, pathologists, and patients. Open communication, shared decision-making, and a commitment to evidence-based practice are essential for navigating the complexities of BCC management and delivering the best possible care to patients. The incomplete excision of the nodular BCC in this case, despite adherence to the standard 5mm margin, serves as a powerful reminder of the limitations of a one-size-fits-all approach to margin determination. It highlights the critical need for individualized margin assessment, taking into account the unique characteristics of each patient and tumor. By embracing a personalized approach and utilizing available tools and techniques, clinicians can optimize surgical outcomes, ensuring complete tumor clearance while preserving function and aesthetics. The ongoing evolution of BCC management strategies offers hope for even more precise and effective treatment in the future, ultimately improving the lives of countless individuals affected by this common but potentially disfiguring skin cancer.^{19,20}

4. Conclusion

The case presented highlights the critical importance of individualized margin assessment in the surgical management of facial basal cell carcinoma. While standard margin guidelines offer a valuable framework, they may not always guarantee complete tumor excision. By considering the unique characteristics of each patient and tumor, clinicians can tailor their surgical approach to achieve optimal outcomes, balancing complete tumor removal with tissue preservation and cosmetic considerations. The integration of intraoperative margin assessment techniques and adjuvant therapies can further enhance the precision and effectiveness of BCC treatment, ultimately improving patient care and quality of life.

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