

Infiltrative basal cell carcinoma of the scalp: Five-month post-excision follow-up with z-plasty reconstruction

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Abstract

Introduction: Basal cell carcinoma (BCC) is the most common non-melanoma skin cancer, accounting for 75–80% of cases. Although typically slow-growing and rarely metastatic, certain histological variants, such as infiltrative BCC, can exhibit aggressive local behaviour and high recurrence risk. Commonly associated with prolonged ultraviolet exposure, BCC may also arise from non-traditional risk factors such as chronic trauma.

Case Illustration: We report a case of infiltrative BCC on the scalp of a 48-year-old male physician with a history of chronic trauma. The lesion evolved over three years from a 0.5 cm pruritic, erythematous papule into a 2.2 cm ulcerated nodule. The patient underwent wide local excision and Z-plasty reconstruction. Histopathology revealed basaloid cell nests infiltrating the dermis with fibrotic stroma, consistent with the infiltrative subtype. At five-month follow-up, the surgical site had healed, but a new erythematous papule was noted, raising concern for recurrence. The patient denied systemic symptoms but reported mild pruritus.

Discussion: This case highlights an unusual presentation of BCC in a non-sun-exposed region, possibly triggered by chronic mechanical irritation. Infiltrative BCC is characterized by its subclinical extension and higher recurrence rates. Subtle changes at post-operative sites may indicate early recurrence, necessitating vigilant long-term follow-up. Clinical examination, dermoscopy, and histopathological confirmation are essential for early detection and intervention.

Conclusion: Infiltrative BCC can present in atypical locations and behave aggressively despite initial treatment. Early recognition and multidisciplinary follow-up are key to optimizing outcomes and preventing recurrence.

Keywords: basal cell carcinoma, chronic trauma, recurrence, scalp, skin neoplasms

Abstrak

Pendahuluan: Karsinoma sel basal (KSB) merupakan kanker kulit non-melanoma yang paling sering dijumpai, mencakup sekitar 75–80% dari seluruh kasus. Meskipun umumnya tumbuh lambat dan jarang bermetastasis, beberapa varian histologis tertentu, seperti KSB tipe infiltratif, dapat menunjukkan perilaku lokal yang agresif serta risiko kekambuhan yang tinggi. KSB umumnya berhubungan dengan paparan sinar ultraviolet jangka panjang, namun dapat pula muncul akibat faktor risiko non-tradisional, seperti trauma kronis.

Ilustrasi Kasus: Kami melaporkan suatu kasus KSB infiltratif pada kulit kepala seorang laki-laki berusia 48 tahun dengan riwayat trauma kronis. Lesi berkembang selama tiga tahun, bermula dari papul eritematosa pruritik berukuran 0,5 cm menjadi nodul ulseratif berdiameter 2,2 cm. Pasien menjalani eksisi lokal luas diikuti dengan rekonstruksi Z-plasti. Pemeriksaan histopatologi menunjukkan sarang sel basaloid yang menginfiltrasi dermis dengan stroma fibrotik, sesuai dengan sub tipe infiltratif. Pada evaluasi lima bulan pasca-operasi, area pembedahan telah sembuh, namun ditemukan papul eritematosa baru yang menimbulkan kecurigaan terhadap kekambuhan. Pasien tidak mengeluhkan gejala sistemik, tetapi melaporkan pruritus ringan.

Diskusi: Kasus ini menyoroti presentasi KSB yang tidak lazim pada area yang tidak terpapar sinar matahari, yang kemungkinan dipicu oleh iritasi mekanik kronis. KSB infiltratif ditandai oleh perluasan subklinis dan angka kekambuhan yang lebih tinggi. Perubahan klinis yang samar pada area pasca-operasi dapat menjadi tanda awal kekambuhan, sehingga diperlukan pemantauan jangka panjang yang ketat. Pemeriksaan klinis, dermoskopi, serta konfirmasi histopatologis merupakan komponen penting dalam deteksi dini dan penatalaksanaan yang tepat.

Kesimpulan: KSB infiltratif dapat muncul pada lokasi atipikal dan menunjukkan perilaku agresif meskipun telah dilakukan terapi awal. Pengenalan dini serta tindak lanjut multidisiplin berperan penting dalam mengoptimalkan luaran klinis dan mencegah kekambuhan.

Kata kunci: karsinoma sel basal, neoplasma kulit, rekurensi, skalp, trauma kronik

Introductions

Basal cell carcinoma (BCC) is a low-grade, slow-growing cutaneous neoplasm that arises from the basal layer of the epidermis and invades surrounding tissue.¹ It accounts for approximately 75–80% of non-melanoma skin cancers (NMSC). The incidence of BCC has risen significantly over the past three decades, with reports suggesting a 20–80% increase. Men are more frequently affected than women, and individuals with fair skin are at higher risk than those with darker skin tones.²

Clinically, BCC typically appears as a shiny, pink papule or nodule with surface telangiectasia. While metastasis is rare, BCC can be highly destructive and disfiguring if not treated adequately.³ Pathogenesis commonly involves mutations in the Hedgehog signaling pathway, particularly in the patched 1 (PTCH1) gene, which encodes a receptor for the sonic hedgehog ligand. Dysregulation of this pathway contributes significantly to carcinogenesis in BCC.⁴

Primary risk factors for BCC include prolonged ultraviolet (UV) exposure, genetic predisposition, arsenic ingestion, ionizing radiation, and chronic trauma. Treatment selection depends on histologic subtype, anatomical location, patient comorbidities, and recurrence risk. Surgical excision with clear margins remains the gold standard, especially for high-risk tumors. Mohs micrographic surgery is preferred in cosmetically sensitive or high-recurrence areas due to superior tissue preservation and cure rates. Other treatment options include topical agents for superficial BCC, radiation therapy for inoperable tumors, and Hedgehog pathway inhibitors such as vismodegib or sonidegib for advanced cases.^{5,6} This case highlights an unusual anatomical and etiological presentation of infiltrative BCC in a non-sun-exposed scalp region, while also reinforcing the importance of early recognition of potential recurrence and the critical role of multidisciplinary follow-up.

Case Illustration

A 48-year-old male physician presented with a lesion on the scalp, initially noticed three years prior as 0.5 cm shiny, erythematous papule that was intensely pruritic, leading to repeated scratching. Over time, the lesion ulcerated, bled intermittently, and progressively enlarged. The patient denied significant sun exposure due to routine helmet use while commuting and denied any family history of malignancy. He reported

no systemic symptoms such as weight loss, fever, or lymphadenopathy.

Clinical examination revealed a 2.2 cm translucent nodular lesion with central ulceration and telangiectasia (Figure 1). There were no palpable lymph nodes. The patient underwent wide local excision with 4 mm margins, followed by rotational Z-plasty flap closure. Histological analysis revealed nests and cords of basaloid cells infiltrating the dermis, with peripheral palisading, peritumoral clefting, and surrounding fibrotic stroma. Mitoses were present, consistent with infiltrative BCC (Figure 4). Sutures were removed one month post-operatively, with no signs of infection or dehiscence (Figure 2).



Figure 1. Pre-operative lesion on occipital region



Figure 2. One-month post-operative appearance

At the five-month follow-up, the patient reported occasional mild pruritus and discomfort at the scar site. He denied the appearance of new lesions. But physical examination showed a well-healed Z-shaped scar with a new erythematous papule at the surgical site (Figure 3). The patient had been self-medicating with an herbal supplement and declined

topical scar treatments. He was advised to continue routine dermatological follow-up, avoid scratching the lesion site, and use protective equipment during his work.



Figure 3. Five-month post-operative appearance

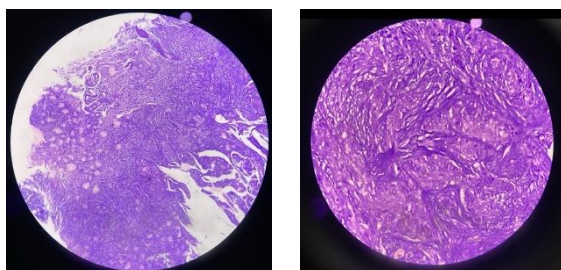


Figure 4. Histopathological appearance under 10x and 40x magnification

Discussion

Infiltrative BCC is a histologically aggressive variant characterized by deeply penetrating cords of tumor cells, often with indistinct clinical margins. Compared to nodular or superficial subtypes, infiltrative BCC has a higher rate of subclinical spread and recurrence.⁷ This case highlights the importance of long-term surveillance following surgical excision of high-risk BCC, particularly in patients with aggressive histological features (infiltrative subtypes) and lesions exceeding 2 cm in diameter.⁸ At five months post-operatively, the patient presented with intermittent pruritus and pain at the surgical site. Physical examination revealed a new erythematous papule within the post-operative scar, raising clinical concern for possible recurrence or post-surgical reactive changes.

The recurrence rate of BCC varies based on multiple factors including tumor subtype, location, size, treatment modality, and margin status. Lesions on high-risk sites (nose, periorbital region, ears), positive surgical margins, immunosuppression, and prior incomplete treatment increase recurrence likelihood. Infiltrative BCCs excised with inadequate margins can recur in up to 40–50% of cases.⁹

Although the patient exhibited no systemic symptoms or palpable lymphadenopathy, any new lesion arising within or adjacent to a surgical scar warrants thorough evaluation. Subtle findings—such as: (1) New papule, nodule, or plaque at the surgical site, (2) Hypertrophic or keloid-like scar changes, (3) Telangiectasia, erythema, or shiny "waxy" appearance, (4) Pruritus, tenderness, or ulceration, (5) Scar thickening, margin irregularity or rolled edges—may represent early signs of recurrence. While residual or recurrent BCC typically presents within the first three years post-treatment, high-risk histologic subtypes like infiltrative BCC tend to recur earlier and more insidiously than nodular or superficial variants. The infiltrative subtype, characterized by irregular tumor margins and deeper dermal invasion, often evades clear excision margins and is associated with increased local recurrence rates, particularly if histologic clearance is not achieved.¹⁰

Close dermatologic follow-up, including dermoscopic examination and possible re-biopsy of suspicious lesions, is essential to confirm or exclude recurrence.¹¹ Imaging modalities such as high-frequency ultrasound or reflectance confocal microscopy may be considered in ambiguous cases, particularly in cosmetically sensitive or surgically altered areas.¹² In this case, the patient was referred back to a dermatologist for further evaluation of the erythematous papule to ensure timely detection and intervention.

Beyond clinical monitoring, patient education plays a pivotal role in recurrence prevention and early detection. Primary risk factor likely contributed to BCC development in this case is chronic mechanical trauma from repeated scratching. The underlying pathomechanism of trauma-induced BCC remains unclear.¹³ Experimental studies by Wong et al. and Kasper et al. have demonstrated that wound healing environments can facilitate tumorigenesis in genetically predisposed cells. PTCH1 and SMO mutations are commonly implicated in sporadic BCC, leading to unchecked Hedgehog pathway

activation.^{14,15} Thus, the patient was counseled to avoid scratching the surgical site and to monitor for any new or evolving skin changes. Lastly, diagnosis of recurrence is based on a combination of clinical evaluation, dermoscopy, and, when indicated, histopathology or imaging.

Conclusion

Infiltrative BCC can arise in atypical, non-sun-exposed locations and may be associated with less common risk factor such as chronic trauma. This case underscores the aggressive nature of infiltrative BCC and the need for wide excision, individualized surgical planning, and vigilant long-term follow-up. Even in the absence of systemic symptoms, subtle changes at the surgical site (such as a new papule) may signal early recurrence. Clinicians should maintain a high index of suspicion and educate patients on scar surveillance to optimize outcomes and prevent delay in re-intervention.

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Conflict of Interests

The authors declare no conflict of interest.

References

1. Baba PUF, Hassan A ul, Khurshid J, Wani AH. Basal cell carcinoma: Diagnosis, management and prevention. *J Mol Pathol*. 2024 Jun;5(2):153–70.
2. Seidl-Philipp M, Frischhut N, Höllweger N, Schmuth M, Nguyen VA. Known and new facts on basal cell carcinoma. *J Dtsch Dermatol Ges*. 2021 Jul;19(7):1021–41.
3. McDaniel B, Steele RB. Basal cell carcinoma. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 Jul 5]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK482439/>
4. Fania L, Didona D, Morese R, Campana I, Coco V, Di Pietro FR, et al. Basal cell carcinoma: From pathophysiology to novel therapeutic approaches. *Biomedicines*. 2020 Oct 23;8(11):449.
5. Peris K, Fagnoli MC, Garbe C, Kaufmann R, Bastholt L, Seguin NB, et al. Diagnosis and treatment of basal cell carcinoma: European consensus-based interdisciplinary guidelines. *Eur J Cancer*. 2019 Sep;118:10–34.
6. Dika E, Scarfi F, Ferracin M, Broseghini E, Marcelli E, Bortolani B, et al. Basal cell carcinoma: A comprehensive review. *Int J Mol Sci*. 2020 Aug 4;21(15):5572.
7. Requena C, Serra-Guillén C, Sanmartín O. Histologically aggressive basal cell carcinoma with particular emphasis on galeal infiltration of the scalp. *Actas Dermosifiliogr*. 2022 Jun 1;113(6):T575–82.
8. Firnhaber JM. Basal cell and cutaneous squamous cell carcinomas: Diagnosis and treatment. *Am Fam Physician*. 2020 Sep 15;102(6):339–46.
9. Iurilli M, Cazzato V, Ramella V, Papa G. Exploring the role of surgical margins and reoperation in basal cell carcinoma recurrence: A study of 3036 cases. *Arch Dermatol Res*. 2025 Mar 19;317(1):604.
10. Vornicescu C, Șenilă SC, Bejinariu NI, Vesa Ștefan C, Boșca AB, Chirilă DN, et al. Predictive factors for the recurrence of surgically excised basal cell carcinomas: A retrospective clinical and immunopathological pilot study. *Exp Ther Med*. 2021 Nov;22(5):1336.
11. Ungureanu L, Cosgarea I, Șenilă S, Vasilovici A. Role of dermoscopy in the assessment of basal cell carcinoma. *Front Med (Lausanne)*. 2021 Aug 20;8:718855.
12. Navarrete-Dechent C, Cordova M, Liopyris K, Aleissa S, Rajadhyaksha M, Cohen G, et al. In vivo imaging characterization of basal cell carcinoma cutaneous response to high dose ionizing radiation therapy: A prospective study of reflectance confocal microscopy, dermoscopy, and ultrasound. *J Am Acad Dermatol*. 2021 Jun;84(6):1575–84.
13. Chlebicka I, Jastrzab B, Stefaniak A, Szebietowski J. Basal cell carcinoma secondary to trauma: A 3-year experience of the single center. *Adv Clin Exp Med*. 2021 Jan;30(1):83–6.
14. Otsuka A, Levesque MP, Dummer R, Kabashima K. Hedgehog signaling in basal cell carcinoma. *J Dermatol Sci*. 2015 May;78(2):95–100.
15. Kasper M, Jaks V, Are A, Bergström Å, Schwäger A, Svärd J, et al. Wounding enhances epidermal tumorigenesis by recruiting hair follicle keratinocytes. *Proc Natl Acad Sci U S A*. 2011 Mar 8;108(10):4099–104.