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Case Report: Non-Surgical Treatment of Medial Canthus Basal Cell Carcinoma Using Dual-Wavelength Fractional Ablative Laser Therapy

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Abstract

Basal cell carcinoma (BCC) is the most common cutaneous malignancy and is typically managed with surgical excision or Mohs micrographic surgery. However, treatment in anatomically sensitive areas such as the medial canthus may present reconstructive challenges, and alternative approaches may be considered in select patients. We report the case of a 97 year old female with a biopsy confirmed BCC of the left medial canthus treated with combined fractional 1550 nm erbium glass and 1927 nm thulium laser following tumor debulking. The procedure was utilized as a drug delivery enhancing modality with adjunctive topical 5% fluorouracil applied twice daily for 2 weeks. A follow up shave biopsy performed one month after treatment demonstrated complete histologic clearance with no residual tumor. This case highlights the potential role of dual wavelength fractional laser therapy as a non surgical treatment option for BCC in anatomically sensitive regions.

Keywords: Basal cell carcinoma; fractional laser; erbium glass laser; thulium laser; periocular tumors; laser dermatologic surgery; non melanoma skin cancer; medial canthus

1. Introduction

Basal cell carcinoma (BCC) is the most common malignancy worldwide, with a rising incidence and significant healthcare burden.[1] Surgical excision, particularly Mohs micrographic surgery, remains the gold standard due to high cure rates and precise histologic margin control.[2] However, tumors in cosmetically and functionally sensitive areas such as the periocular region may present reconstructive challenges.

In select cases, including patients with comorbidities or high-risk locations, nonsurgical approaches such as fluorouracil, cryotherapy, and laser-based modalities may be considered. Fractional nonablative lasers create controlled microthermal zones that preserve surrounding tissue while enabling enhanced transdermal drug delivery.[3]

Emerging evidence supports this approach, with Benson et al. demonstrating reduced incidence of keratinocyte carcinomas following 1550 nm and 1927 nm laser treatment,[4] and Robinson et al. reporting successful treatment of select non melanoma skin cancers (NMSC).[5]

Here, we present a case of infiltrative BCC of the medial canthus treated with combined fractional 1550 nm erbium glass and 1927 nm thulium laser therapy following tumor debulking, utilized as a drug delivery enhancing procedure to augment topical fluorouracil efficacy.

2. Case Presentation

A 97 year old female presented with a pigmented papule of the left medial canthus measuring approximately 5 mm by 4 mm. Dermoscopic evaluation demonstrated pigment globules and very minimal arborizing vessels, consistent with basal cell carcinoma (Figure 1a).

After local anesthesia with 2% lidocaine with epinephrine 1:100,000, a shave biopsy with frozen section analysis was performed, confirming the diagnosis of BCC (Figure 2a). Following histologic confirmation, a thin saucerization was performed to debulk the tumor.

Fractional laser treatment was then performed using a dual wavelength 1550 nm erbium glass and 1927 nm thulium system. Given the periocular location, metal ocular shields were placed for protection. Treatment parameters are summarized in Table 1. The 1550 nm wavelength was applied first, followed by the 1927 nm wavelength using identical settings. The treatment endpoint consisted of tissue desiccation and erythema extending approximately 5 mm beyond the biopsy site.

The fractional laser was utilized as a drug delivery enhancing modality, and adjunctive topical 5% fluorouracil was prescribed twice daily for 2 weeks following the procedure. Standard wound care with petrolatum was initiated post treatment.

The procedure was well tolerated without complications. Early post treatment appearance demonstrated expected erythema and desiccation at 4 days following therapy. The treated site subsequently healed with progressive re-epithelialization. At one month follow-up, the site appeared clinically resolved with no visible residual lesion (Figure 1b).

A repeat shave biopsy was performed to assess for tumor persistence. Histopathologic examination demonstrated no residual basal cell carcinoma (Figure 2b and 2c), confirming complete histologic clearance after a single treatment session. The patient remains under routine clinical surveillance.

Device	Duovive fractional laser (Apolomed Lasers; Bethpage, NY)
Wavelengths	1550 nm erbium glass fiber and 1927 nm thulium fiber
Treatment area	Left medial canthus
Spot size and shape	5 mm × 5 mm, round
Fluence	25 mJ
Pulse duration	5 ms
Passes	4 passes per wavelength
Density	100 microthermal zones per cm^2

Table 1. Laser treatment parameters used for initial treatment. Both mediums utilized the same fluence and settings.

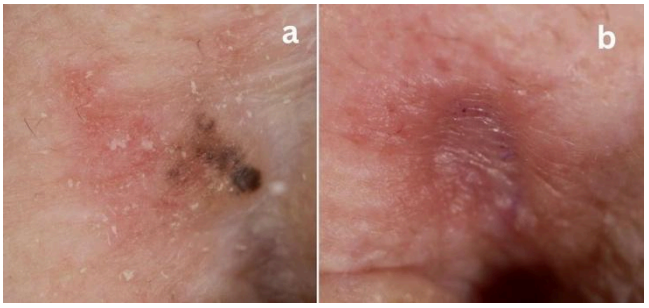

Figure 1. Clinical photograph of the basal cell carcinoma at the left medial canthus prior to treatment (a) Pink papule with arborizing telangiectasias and pigmeted, but nonmelanocytic, basal cell carcinoma (b) Clinical appearance of the treatment site at one month follow up prior to repeat biopsy.

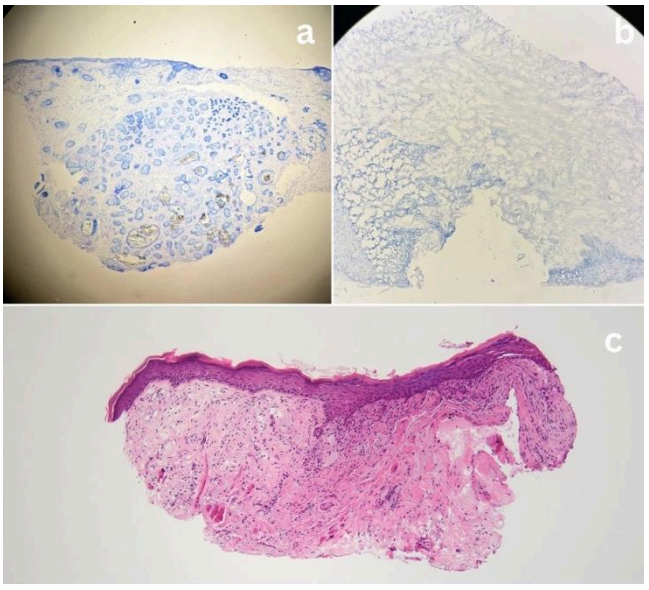

Figure 2. Histologic images. (a) Image at 10x magnification demonstrating micronodular and mactronoduloinfiltrative atypical basaloid cell colonies, consistent with basal cell carcinoma. (b)Histopathology image of the follow-up biopsy at 10x magnification demonstrating absence of residual basal cell carcinoma using Toluene Blue stain. (c) Hematoxylin and eosin staining demonstrating the corresponding tissue plane, highlighting overall histoarchitectural features and confirming the absence of residual basal cell carcinoma.

3. Discussion

BCC of the medial canthus presents unique management challenges due to the functional importance and cosmetic sensitivity of the periocular region. Surgical excision in this area often requires complex reconstruction and may carry increased morbidity.[2]

Fractional laser therapy offers a minimally invasive alternative by creating microthermal treatment zones that induce controlled dermal injury while sparing surrounding tissue.[3] In addition to direct tumor destruction, these channels enhance transdermal delivery of topical agents. This drug delivery effect is particularly relevant when combined with chemotherapeutic agents such as

fluorouracil, which may penetrate more effectively into the tumor bed following laser treatment.[6]

The dual wavelength approach used in this case provides complementary depth penetration. The 1550 nm erbium glass wavelength targets deeper dermal structures, while the 1927 nm thulium wavelength acts more superficially, allowing broader treatment coverage across tumor depths.

Prior studies have demonstrated the utility of laser based therapies in NMSC with encouraging results.[7,8] This case demonstrates complete histologic clearance following a single treatment session, supporting the potential role of fractional laser assisted therapy in carefully selected patients.

Limitations include the single patient design and short follow up period. Long term surveillance is necessary to evaluate recurrence risk.

4. Conclusion

This case demonstrates successful treatment of medial canthus BCC using combined fractional erbium glass and thulium laser therapy following tumor debulking, utilized as a drug delivery enhancing procedure with adjunctive fluorouracil. Complete histologic clearance was confirmed in one month. Fractional laser therapy may represent a promising non surgical option for select patients with BCC in anatomically sensitive locations.

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Artificial Intelligence Disclosure

Authors of this paper ensure that the manuscript complies with the Journal's strict prohibition on generative artificial intelligence in both text and clinical imagery.

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