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Case Report

Use of the Mustardé flap in facial reconstruction following surgery for cutaneous squamous cell carcinoma: a case report

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ABSTRACT

Basal cell carcinoma (BCC) is the most common cutaneous malignancy, comprising nearly 80% of non-melanoma skin cancers. Despite its typically slow growth and low metastatic potential, BCC demonstrates a locally aggressive behavior capable of causing substantial tissue destruction if not promptly addressed. Lower eyelid is frequent site of involvement, representing a unique therapeutic challenge due to its intricate anatomical architecture and the critical balance between its protective ocular function and aesthetic significance. Surgical management in this region demands precise oncologic excision combined with meticulous reconstructive planning to preserve eyelid function and facial harmony.

Keywords: Cutaneous squamous cell carcinoma, Mustardé flap, Eyelid reconstruction, Periocular oncology, Cervicofacial advancement flap, Facial aesthetic units, Reconstructive surgery, Oncologic resection, Lower eyelid defects, Skin cancer Mexico

INTRODUCTION

Cutaneous squamous cell carcinoma (cSCC) ranks as the second most prevalent form of skin cancer and is characterized by a biologically aggressive course, with a marked tendency for local invasion and potential for regional or distant metastasis-particularly among immunocompromised patients and those with high-risk histopathological features.[1] Although its incidence remains lower than that of BCC, cSCC contributes disproportionately to skin cancer-related morbidity and mortality, underscoring the need for timely, individualized, and multidisciplinary management.

Surgical excision with histologically clear margins remains the cornerstone of curative treatment. However, when cSCC affects anatomically complex and cosmetically sensitive areas-such as the eyelids, nasal dorsum, or auricular structures-reconstructive strategies must be integrated into the treatment plan to ensure both oncological control and functional-aesthetic restoration.[2]

In Mexico, non-melanoma skin cancer has become a growing public health concern, driven by sustained ultraviolet (UV) radiation exposure, cumulative photodamage, and an aging population. The Yucatán Peninsula, with its intense solar climate and predominantly outdoor workforce, presents a particularly high incidence of malignant cutaneous neoplasms, including cSCC.[3,4]

Recent epidemiological data from southeastern Mexico reveal an upward trend in cSCC cases, with a notable predilection for sun-exposed facial regions such as the nasal tip, malar areas, and lower eyelid. Involvement of the lower eyelid poses specific reconstructive challenges due to its critical role in ocular protection and facial expression. These insights emphasize the importance of

advanced surgical approaches that incorporate complete excision, real-time margin evaluation, and immediate, functionally oriented reconstruction that respects facial subunit integrity and eyelid dynamics.[3,4]

Epidemiology

cSCC accounts for approximately 20-25% of all non-melanoma skin cancers globally, with its incidence steadily increasing in regions with high UV radiation exposure. Worldwide, an estimated 1 million new cases of cSCC are diagnosed annually, although underreporting remains a limitation due to variations in cancer registries and data collection standards.[5]

In Latin America, including Mexico, cSCC has shown a rising trend, particularly in coastal and tropical regions where cumulative sun exposure is more intense. The Mexican social security institute (IMSS) has documented an increase in outpatient consultations and surgical interventions for skin cancer, with cSCC being the second most frequent histological subtype after BCC.[3] This trend is amplified in the Yucatán Peninsula, where environmental, occupational, and sociodemographic factors contribute to higher exposure to solar radiation and limited use of photoprotective measures.[4]

Men over the age of 60 are disproportionately affected, and the majority of tumors are located on sun-exposed areas such as the face, scalp, and upper extremities. Among facial sites, the lower eyelid presents a unique epidemiological relevance due to both its exposure and its structural vulnerability. In addition, immunosuppressed individuals, including solid organ transplant recipients, show a 65-100 fold increased risk of developing cSCC, often with more aggressive clinical behavior.[2]

These epidemiological patterns underscore importance of targeted public health strategies, early detection programs and standardized treatment protocols, particularly in high-risk populations and underserved regions.

Clinical manifestations

cSCC typically presents as a slowly enlarging lesion arising in sun-exposed areas, most frequently on the head and neck. Clinically, lesions may manifest as erythematous, keratotic plaques, nodules, or ulcerated tumors with irregular, indurated borders. The clinical appearance can vary considerably depending on the anatomic site, tumor differentiation, and host factors such as immune status.[5]

On the lower eyelid, cSCC often presents as a painless, non-healing lesion that may mimic benign conditions such as chalazion, blepharitis, or seborrheic keratosis. Features suggestive of malignancy include rapid growth, ulceration, crusting, persistent bleeding, and progressive tissue distortion. In advanced stages, the lesion may infiltrate the tarsal plate, conjunctiva, or adjacent orbital structures, leading to ectropion, epiphora, restricted eyelid mobility, or even visual impairment.[2]

Perineural invasion, although less common, is associated with more aggressive behavior and increased recurrence rates. Patients may present with dysesthesia, paresthesia, or localized pain, which should raise clinical suspicion for deeper invasion. Regional lymphadenopathy, although rare at initial presentation, may suggest nodal metastasis in high-risk cases.

The differential diagnosis of cSCC in the periocular region includes basal cell carcinoma, sebaceous gland carcinoma, actinic keratosis, and chronic inflammatory eyelid disorders. Histopathological confirmation remains essential for definitive diagnosis and therapeutic planning.

CASE REPORT

A 62-year-old female patient from the state of Yucatán presented with a gradually enlarging lesion on the right lower eyelid, first noticed approximately 6 months prior to consultation. Her medical history was unremarkable, although she reported chronic occupational sun exposure due to outdoor work.

The patient described the lesion as initially papular, progressively increasing in size without associated pain, but with intermittent episodes of spontaneous bleeding and recurrent crusting. Clinical examination revealed an ulcerated, erythematous lesion with irregular borders and a slightly indurated base, measuring approximately 0.8 cm in its greatest dimension. The lesion was located at the junction of the right lower eyelid and medial canthus.

Given the clinical suspicion of a malignant cutaneous neoplasm, an excisional biopsy was performed under local anesthesia. Histopathological analysis confirmed a diagnosis of well-differentiated cSCC confined to the superficial dermis, without evidence of perineural or lymphovascular invasion.

Figure 1: Preoperative clinical view showing a nodular, ulcerated lesion with crusting and irregular borders on the right lower eyelid, adjacent to the medial canthus, suggestive of cSCC.

Based on these findings, a surgical plan was developed consisting of wide local excision with oncologically safe margins, followed by immediate reconstruction using a local flap technique. This approach aimed to achieve complete tumor removal while preserving eyelid function and maintaining facial aesthetic integrity.

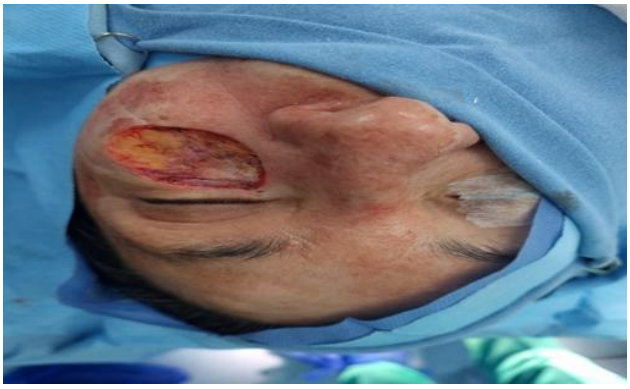

Figure 2: Intraop image after complete surgical excision of lesion. Resulting defect involves lower eyelid and medial canthal area, revealing full-thickness skin loss with exposure of the orbicularis oculi muscle.

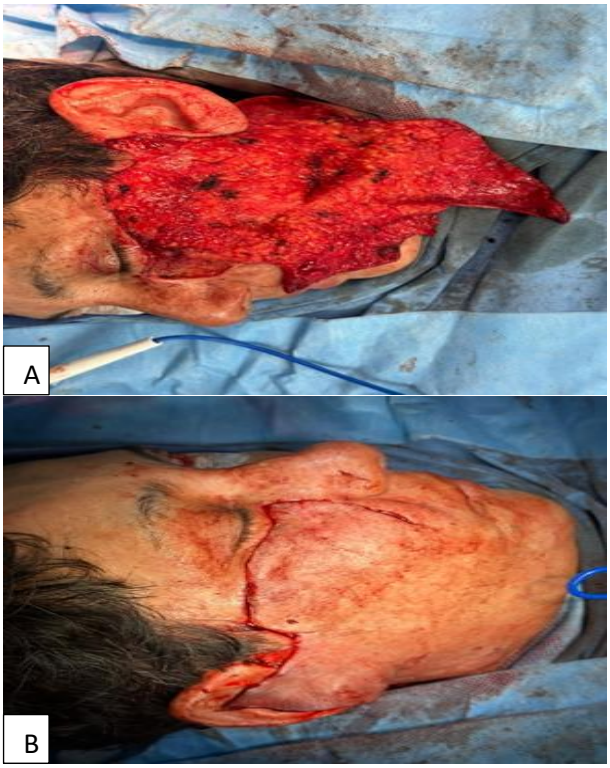

Figure 3 (A and B): Elevation of a cervicofacial advancement flap. Flap design allows for adequate mobilization of adjacent tissue while preserving vascular supply and enabling tension-free closure. Flap inset demonstrating appropriate alignment of latera cantall region and reconstruction of lower eyelid defect. Careful positioning ensures maintenance of palpebral contour and function.

Figure 4: Final intraoperative view of the flap fully positioned and sutured. Note the precise coaptation of tissue layers and restoration of facial subunits.

Figure 5: Early postoperative follow-up showing adequate flap integration, viable tissue without signs of ischemia, and appropriate alignment of the reconstructed lower eyelid and midface. Mild periorbital edema is present, consistent with early healing phase.

Due to the location and extent of the defect on the right lower eyelid and medial canthal area, we opted for immediate reconstruction using a Mustardé cervicofacial flap. This flap was chosen for its reliable vascular supply, excellent tissue match, and ability to provide wide coverage while respecting the natural aesthetic subunits of the face.

After performing the oncologic resection with adequate clinical margins, we designed and elevated a classic

cervicofacial flap through a preauricular incision, extending along relaxed skin tension lines. The flap was carefully mobilized and advanced into the defect without tension. Particular attention was given to reestablishing the lower eyelid contour and achieving a symmetric, functional closure.

The patient tolerated the procedure well and had an excellent postoperative course. The flap remained fully viable, eyelid function was preserved, and the aesthetic outcome was both natural and harmonious. Follow-up showed a high level of patient satisfaction and a complication-free recovery.

DISCUSSION

cSCC of the lower eyelid presents a unique therapeutic challenge, particularly when the lesion extends into the medial canthal region. This area demands not only oncologic precision but also meticulous reconstructive planning to preserve eyelid function, ocular protection, and facial symmetry. In our case, the choice of the Mustardé cervicofacial flap proved to be a decisive factor in achieving both curative and reconstructive success.[7]

The Mustardé flap remains one of the most versatile and dependable reconstructive options for large midfacial defects. Its robust vascularity, broad arc of rotation, and ability to redistribute tension across the cheek and temporal regions make it ideal for lower eyelid reconstruction, especially when direct closure or small local flaps are not feasible. Unlike skin grafts, which often yield suboptimal aesthetic results in the periorbital region, cervicofacial flaps provide superior color and texture match, and minimize the risk of cicatricial ectropion.[8]

Literature supports the use of cervicofacial flaps in managing complex facial defects. Numerous studies have demonstrated low complication rates, high patient satisfaction, and favorable long-term aesthetic outcomes.[9] Moreover, this technique aligns with the principles of facial reconstructive surgery: replacing "like with like," preserving function, and respecting aesthetic subunits.[10]

In our patient, a well-executed oncologic excision followed by immediate reconstruction resulted in full functional restoration without complications. Eyelid mobility was preserved, there was no lagophthalmos or scleral show, and the contour was restored with natural integration of the flap into the surrounding facial topography. The psychological benefit to the patient-being able to return to social life without visible deformity-underscores the value of comprehensive surgical planning that considers both the disease and the human behind it.[11]

Ultimately, this case highlights not only the technical advantages of the Mustardé flap but also the importance of tailoring surgical strategies to the patient's specific anatomical, functional, and aesthetic needs. In the hands of an experienced surgical team, this approach provides outstanding results in complex periorbital reconstruction and should remain a key tool in the facial reconstructive surgeon's repertoire.[9]

CONCLUSION

The management of cSCC involving the lower eyelid requires more than tumor eradication-it demands surgical excellence, strategic foresight, and an unwavering commitment to restoring both function and identity. In this case, the Mustardé cervicofacial flap demonstrated its enduring value as a powerful reconstructive option, enabling precise defect coverage while maintaining eyelid competence and facial aesthetics.

Beyond technical execution, this case reflects the essence of modern reconstructive surgery: integrating oncologic safety with tailored, patient-centered care. The result was not only a successful oncological outcome but also the preservation of the patient's dignity, confidence, and quality of life.

In the ever-evolving landscape of facial reconstruction, the Mustardé flap remains a gold standard for complex periorbital defects-an elegant blend of surgical reliability and aesthetic finesse. When thoughtfully applied, such techniques remind us that in surgery, as in life, precision and empathy go hand in hand.

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