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Expert Opinion Article

Malignant Conjunctival Melanoma: A Case Report Study

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ABSTRACT

Context: Melanocytic lesions are the most common tumors of the conjunctiva and are known for their recurrent potential. The aim of our study was to present the clinical and therapeutic evolution of a case of conjunctival melanoma managed in our healthcare facility.

Case Presentation: We report the case of a 28-year-old male businessman who presented with a large, lobulated, and heavily pigmented lesion located in the superior and inferior fornices, initially suspected to be a recurrent nevus. Clinical and radiological assessments led to the diagnosis of conjunctival melanoma. Despite orbital exenteration and adjuvant chemotherapy, a recurrence of the tumor was observed five months after treatment.

Discussion: This case highlights the therapeutic challenges and the lack of understanding regarding the molecular mechanisms underlying the recurrent nature of conjunctival melanoma, despite surgical and chemotherapeutic interventions. A deeper exploration of poor prognostic factors may enhance our understanding of these recurrence and guide us toward new therapeutic strategies.

Conclusion: Conjunctival melanoma remains a malignant tumor with complex therapeutic management, and its recurrent mechanisms are yet to be fully understood.

Keywords : Conjunctival melanoma, Pigmented tumors, Orbital exenteration, Recurrence, Cameroon.

Introduction

Conjunctival melanoma is a malignant tumor of the ocular surface resulting from the abnormal proliferation of melanocytes located within the conjunctival epithelium [1]. Epidemiologically, it is a rare and a potentially fatal tumor, accounting for 2 to 7% of ocular melanomas [2]. Its incidence is steadily increasing and is estimated to range between 0.24 and 0.8 cases per million inhabitants [2]. Known risk factors include the presence of primary acquired melanosis (PAM), a pre-existing conjunctival nevus, and the development of the tumor de novo [3].

Other factors such as ultraviolet radiation exposure or immunosuppression may also contribute to the onset of this melanoma [4]. Its recurrent nature [5] raises concerns regarding the variability in clinical manifestations and therapeutic follow-up. The objective of our report was therefore to describe the clinical and therapeutic evolution of a case of conjunctival melanoma managed in our healthcare facility.

Methodology

Case Presentation

We report the case of a 28-year-old male businessman who presented with a large, lobulated, and intensely pigmented lesion located in the superior and inferior fornices, extending to the medial canthus. Clinically, the lesion appeared heterogeneous, with areas of necrosis and spontaneous bleeding upon manipulation. The patient reported a progressively enlarging mass in the right eye over the past year, painless in nature, with a recent episode of spontaneous bleeding occurring the day before presentation to our facility. A similar lesion had been excised six years earlier, but no histopathological analysis had been performed at the time. Additionally, the patient reported no significant medical history (Figure 1).

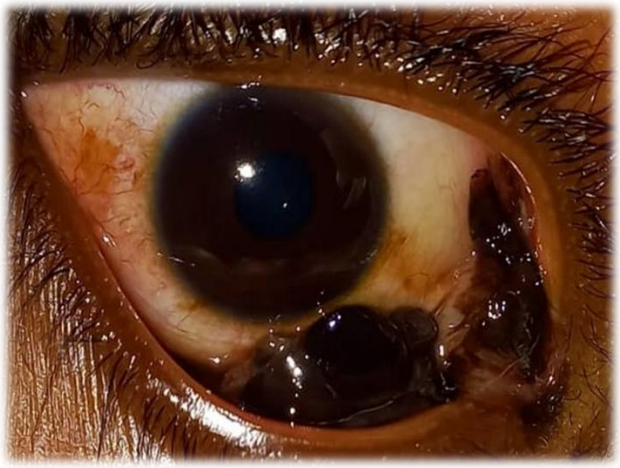

Figure 1 : Case presentation

Clinical Findings

Despite the size of the lesion, central visual acuity remained preserved, with corrected values of 6/6 in both eyes. Examination of the anterior segment revealed a large, lobulated, pigmented lesion involving the superior and inferior fornices as well as the medial canthus. The conjunctival vessels were obscured beneath the mass, and bleeding was easily triggered during manipulation. The eye also showed lobulated, heavily pigmented necrotic areas. Apart from this conjunctival lesion, the cornea, anterior chamber, and iris appeared normal. The fundus examination revealed no abnormalities, suggesting that the process was confined to the ocular surface. The bulky and heterogeneous appearance of the mass led us to establish a differential diagnosis of conjunctival melanoma, with no evidence of involvement of adjacent structures (Figure 2).

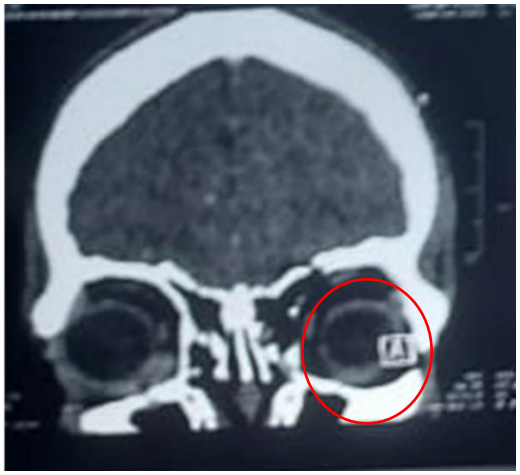

Figure 2 : ***An inferomedial mass in the anterior orbit, with no bone involvement***

Initial Treatment

We first performed a surgical excision of the conjunctival mass, combined with cryotherapy of the margins to reduce the risk of local recurrence. In addition, a postoperative regimen consisting of topical steroids, antibiotics, and 5-fluorouracil (5-FU) was initiated to prevent inflammation, secondary infections, and to control any residual cellular proliferation.

One-Month Postoperative Evaluation

Histopathological analysis performed one month after the surgery confirmed the diagnosis of malignant conjunctival melanoma. Given this confirmation, the patient was referred to an oncology unit for specialized management.

Six-Month Postoperative Evaluation

A follow-up evaluation conducted six months after the surgical intervention, including a control CT scan, revealed diffuse tumor infiltration involving both the intra- and extraconal compartments of the orbit, indicating signs of aggressive local progression (Figures 3a and 3b). Due to this extension, the patient was transferred to another healthcare facility for specialized care. An orbital exenteration was performed to control the tumor spread (Figure 3c). This disfiguring surgery was followed by adjuvant chemotherapy

Figure 3a: Evaluation six months after the surgery

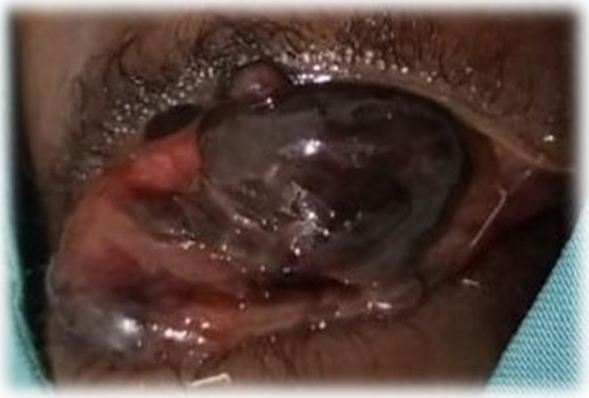

Figure 3b: Advanced conjunctival melanoma

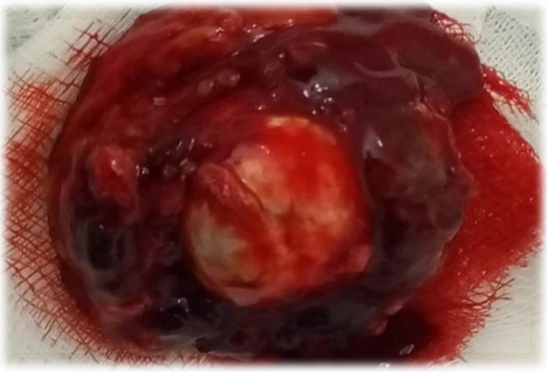

Figure 3c: Orbital exenteration

Five-Month Evaluation After Exenteration

Five months after the exenteration, the patient presented with a tumor recurrence, indicating either persistent disease or progressive relapse. Histopathological analysis performed one month later confirmed the presence of a malignant melanoma, with extensive involvement of both the residual conjunctiva and the periocular soft tissues. This local recurrence, occurring despite surgery and adjuvant chemotherapy, highlights the particularly aggressive and recurrent nature of this tumor (Figure 4).

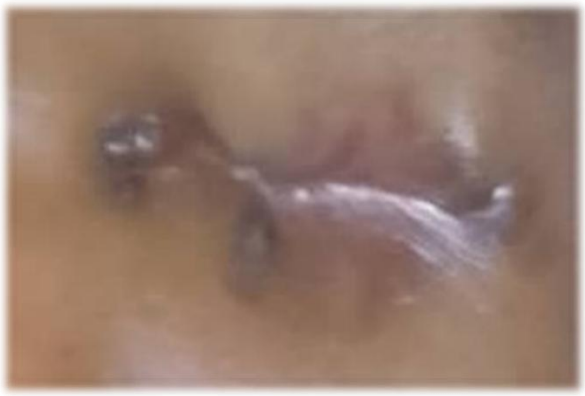

Figure 4: Recurrence five months after exenteration.

Discussion

The morphology of our patient's tumor, described as large, lobulated, and heavily pigmented, with heterogeneity and areas of necrosis, suggests a rapidly progressing and aggressive evolution [6]. The fact that the lesion bled spontaneously and infiltrated both intra- and extraconal orbital compartments within a short period reflects the tendency of this type of melanoma to specifically spread to the orbit and disseminate through lymphatic pathways [7]. In our observation, the orbital extension revealed on imaging and the subsequent need for orbital exenteration demonstrate the progressive nature of this tumor, despite the treatments administered (local excision, cryotherapy, postoperative 5-FU, and adjuvant chemotherapy).

The recurrence observed in our case is a frequently reported feature of conjunctival melanoma. According to Magdalena et al. (2021), the recurrence rate for conjunctival melanoma ranges between 19% and 45% within the first five years after initial treatment and may reach up to 65% after fifteen years [8]. This is a significantly high rate. At the molecular level, one of the main pathways that may explain such recurrences is the MAPK (Mitogen-Activated Protein Kinase) pathway, which is activated by oncogenic mutations in genes such as BRAF, NRAS, or NF1. These mutations, commonly found in cutaneous melanomas and occasionally in conjunctival melanomas, lead to increased cellular proliferation, resistance to apoptosis, and greater invasive potential [9]. The persistence of residual tumor clones expressing these mutations can contribute to local recurrence even after macroscopically complete excision.

Additionally, alterations in the PI3K/AKT/mTOR signaling pathway have been reported, promoting tumor cell survival and resistance to therapy, particularly to conventional chemotherapies and cytotoxic agents [10]. These pathways may act synergistically with MAPK signaling, enhancing tumor aggressiveness.

Furthermore, the tumor microenvironment plays a critical role. Tumor cells can escape immune surveillance by expressing immunosuppressive molecules (such as PD-L1) or by recruiting immunosuppressive cells like regulatory T cells (Tregs) and M2 macrophages, which suppress local immune responses [11]. This immune evasion supports the survival of residual tumor cells and facilitates recurrence.

Finally, the rich and irregular vascularization of the conjunctiva, along with the possibility of subclinical dissemination along the ocular surface or into regional lymphatic pathways, makes local disease control particularly challenging, even after aggressive surgical management [12].

Despite what was considered adequate initial management (wide excision, cryotherapy of the margins, and adjuvant topical therapies), the tumor recurred within a few months and then progressed to a second recurrence after orbital exenteration. This pattern highlights the need for early detection, systematic histopathological analysis of any suspicious lesion, and long-term follow-up to detect early signs of tumor recurrence. Moreover, prompt referral to a multidisciplinary oncology team is crucial for considering more targeted or combined therapeutic approaches.

Conclusion

This case illustrates the complexity of managing advanced malignant conjunctival melanoma and reinforces the importance of multiple therapeutic strategies (exenteration, chemotherapy, potential immunotherapy) in attempting to control a locally invasive disease prone to frequent recurrence.

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