



Dermatology Reports

<https://www.pagepress.org/journals/index.php/dr/index>

eISSN 2036-7406



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Please cite this article as:

Ahmed RS, Ali RM, Siddiq SO, et al. Cutaneous myiasis complicating squamous cell carcinoma: a case report with literature review. Dermatol Rep 2024 [Epub Ahead of Print] doi: 10.4081/dr.2024.10167

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Submitted 10/10/24 - Accepted 24/11/24

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Cutaneous myiasis complicating squamous cell carcinoma: a case report with literature review

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Key words: larva; maggots; fly; skin cancer; head and neck malignancy; ivermectin.

Contributions: RSA, SOS, study conception and literature search for related studies; SBA, HAN, FHK, literature review, study design, and manuscript writing; RMA, KAA, AMA, IJH, SMA, literature review, study design, manuscript critical revision, and processing of the figures; FHK, SOK, confirmation of authenticity of all the raw data; AMA, pathologist who performed the histopathological diagnosis. All authors have read and approved the final version of the manuscript.

Conflict of interest: the authors declare that they have no competing interests.

Ethics approval and consent to participate: no ethical committee approval was required for this case report by the Department, because this article does not contain any studies with human

participants or animals. Written informed consent was obtained from the patient for participation in the present study.

Consent for publication: written informed consent was obtained from the patient for the publication of the present case report and any accompanying images.

Availability of data and materials: the datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Abstract

Myiasis is derived from the Greek word “*myia*”, which means “fly”. Zumpt, a German entomologist, defined this condition as the infestation of living humans and vertebrate animals by dipterous larvae that feed on living and dead host tissue, liquid body substances, or ingested food for a certain period. Myiasis is a rare complication that can occur in advanced squamous cell carcinoma (SCC). This report describes a rare cutaneous SCC of the face complicated by myiasis. A 70-year-old male patient presented with cutaneous SCC that involved the left lateral side of the nose, medial canthus, and left lower eyelid. The patient complained of multiple live maggots crawling out from a large wound. The larvae were isolated, examined microscopically, and identified as *Dermatobia spp.* The patient was treated with ivermectin, albendazole, and clindamycin, which were associated with the mechanical removal of the larvae.

In the past decade, several case reports have described instances of cutaneous myiasis in head and neck malignancies. These cases were primarily linked to squamous cell carcinoma and involved patients over the age of 60. Additionally, the majority of the reported cases were from India.

Myiasis can complicate SCC, particularly in patients who refuse treatment. Combining ivermectin, albendazole, and clindamycin may be a practical approach to managing myiasis.

Introduction

Myiasis is derived from the Greek word “*myia*”, meaning “fly”. This term was coined by Hope in 1840 and was first described by Laurence in 1909. Zumpt defined this condition as the infestation of live human and vertebrate animals with dipterous larvae that feed on living and dead host tissue, liquid body substance, or ingested food for a certain period.¹

Human myiasis is a rare condition that can occur globally but is more common in warm and humid climates. Incidents are notably higher in tropical and subtropical regions of Africa, the Americas, and Southeast Asia, where these climatic conditions are prevalent year-round. It is frequently seen in individuals with inadequate personal hygiene who have close contact with domestic pets.¹

Advanced cancers invade and damage tissues, leading to disfigurement, functional impairment, pain, bleeding, and tissue death. Myiasis, although rare, can occur as a complication in advanced squamous cell carcinoma (SCC).²

Myiasis can be caused by three types of larvae: obligate, facultative, and accidental. Obligate parasites live and feed on hosts, whereas facultative parasites feed mainly on decaying matter and

generally do not invade healthy tissue. Incidental parasites are eggs or larvae that are accidentally ingested or inhaled. Clinical infestations are categorized as furuncular, wound, intestinal, or cavitory. Obligate and facultative parasites are the most prevalent in head and neck cases, typically leading to wound infestations.³

Patients with wound myiasis have symptoms including pain, drainage, odor, edema, bleeding, and psychosocial problems. When this infestation occurs in the head and neck region, it can have disastrous consequences such as widespread tissue destruction, blindness, deafness, and even death.⁴

This report describes a rare cutaneous SCC of the face complicated by myiasis. It was prepared according to CaReL guidelines, and the references were assessed for eligibility.^{5,6}

Case Report

Patient information

A 90-year-old male presented with significant facial tissue damage due to a known cutaneous squamous cell carcinoma affecting the left side of the nose, medial canthus, and left lower eyelid. His medical history was otherwise unremarkable, and he had undergone a wide local excision at an external hospital in 2019. Histopathological analysis at that time showed a well-differentiated tumor that had invaded the reticular dermis (anatomical level IV), with positive tumor margins and a maximum thickness of 12 mm.

In 2020, the tumor recurred, and CT scans of the head, neck, chest, and abdomen showed no metastasis but identified a small enhancing lesion in the medial part of the left orbit extending to the left maxillary sinus, suggesting a residual tumor. The patient then had a second surgical procedure, which included the enucleation of the left eye and subsequent radiotherapy (4000 cGy in 10 fractions). However, the patient did not adhere to the prescribed treatment plan and refused further therapy.

Clinical findings

On inspection, there was an extensive destructive lesion on the central and left side of the face involving the orbit, nose, maxillary region, and upper lip with necrotic tissues and multiple freely crawling maggots (Figure 1, Video 1).

Diagnostic approach

The white blood cell (WBC) count was within the normal range (normal range: 4.5 to $11.0 \times 10^9/L$), but the hemoglobin level was 9.2 g/dL (normal range: 14 to 18 g/dL), indicating anemia. The C-reactive protein (CRP) level was elevated at 66 mg/L (normal value: <5 mg/L). A CT scan of the head and neck revealed a locally invasive tumor classified as Stage III (T3N0M0), with no evidence of regional or distant metastasis.

Therapeutic intervention

Initially, more than 15 larvae were manually removed, and necrotic tissue was debrided under local anesthesia (Figure 2, Video 2). Then, the patient received oral ivermectin 12 mg daily for three days, albendazole 400 mg twice daily, and clindamycin 300 mg thrice daily for five days. Larvae were examined microscopically and were identified as *Dermatobia spp.*

Follow-up and outcome

During follow-up, the wound was completely cleared of the infestation, and the patient was referred to a plastic surgeon for reconstruction.

Discussion

A literature review of cutaneous malignancies associated with myiasis identified several cases reported over the last decade (Table 1).^{1,2,4,7-20} Human myiasis is a parasitosis caused by dipterous flies.²¹ Clinically, myiasis is classified as primary myiasis and secondary myiasis. Primary myiasis is caused by larvae that feed on living tissue (biophagous), which is common in cattle and rare in humans. Secondary myiasis is caused by larvae (necrobiophagous) that feed on dead or necrotic tissue. These larvae invade preexisting lesions such as post-traumatic and ulcerated or necrotic wounds of certain cutaneous neoplasms.²²

The life cycle of a fly can be divided into four stages. First, it starts with the egg stage, then the larval stage, the pupal stage, and finally, the adult fly. The larval stage lasts 6-8 days, during which the larvae infest human beings.¹ These larvae are photophobic and prefer to hide in the tissues for suitable niches to develop into pupae and release toxins to destroy the host tissue. The surrounding bacteria release proteolytic enzymes that decompose the tissue, and the larvae feed on this necrotized tissue. The infected tissue usually releases a foul-smelling discharge.¹

The eyes, ears, nose, oral cavity, paranasal sinuses, lymph nodes, mastoidectomy, and tracheostomy sites are reported locations of myiasis in the head and neck.² Skin myiasis is the most common type, in which flies lay eggs in necrotic, hemorrhagic, and abscess-like lesions.¹⁷ Similarly to the current case, in reviewing myiasis in head and neck malignancies over the past decade, the most frequently reported instances were cutaneous myiasis, which accounted for 47.05%.

Factors that increase the risk of myiasis include advanced age (older than 60 years), low socioeconomic status, and medical comorbidities like vascular or respiratory compromise. Head- and neck-specific risks include open-mouthed breathing, a history of tooth extraction, a history of maxillofacial trauma, an open bite, and head and neck cancer.¹⁸ One of the symptoms of skin cancer, such as SCC, is a non-healing wound, which is a suitable substrate for myiasis.²⁰ In the current report, the non-healing SCC ulcer, increased age, and low socioeconomic status were among the main predisposing factors for this infestation. Among the 17 cases found in the literature, SCC was the most common type of cancer associated with cutaneous myiasis (64.70%), and 58.82% of the patients were over 60 years old.

The three prominent families of flies that cause myiasis are the *Calliphoridae* (tumbu flies, screwworms, greenbottles, and bluebottles), *Sarcophagidae* (flesh flies), and *Oestridae* (warble flies and botflies).¹ In the literature review for the current report, 58.82% of the studies did not specify the type of fly (Table 1). Azarmi *et al.*²⁰ reported that most cases of wound myiasis over the past thirteen years had been caused by flies of the *Sarcophagidae* and *Calliphoridae* families. However, in the present case report, larvae were identified as *Dermatobia spp.*, which belongs to the *Oestridae* family.

Myiasis presents several therapeutic options. The simplest one is the manual removal of larvae under local anesthesia or surgical debridement. The literature also successfully reports using ivermectin, a broad-spectrum semi-synthetic macrolide antibiotic.¹⁴ Ivermectin is an anti-helminthic medication used against many parasitic diseases, including myiasis. It creates a prolonged period of hyperpolarization and decreases the number of action potentials in the parasite. This paralyzes the larvae, which can then be removed manually.³

In the cases reviewed, ivermectin was used in eight out of seventeen instances. For this particular case, larvae were manually removed, necrotic tissue was debrided, and the patient was treated with

oral ivermectin 12 mg daily for three days, albendazole 400 mg twice daily, and clindamycin 300 mg three times daily for five days. At the follow-up visit, the patient was free of maggots. The limitation of this report is the absence of radiological and histopathological images.

Conclusions

Myiasis can complicate SCC, particularly in patients who refuse treatment. Combining ivermectin, albendazole, and clindamycin may be a practical approach to managing myiasis.

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Figure 1. An extensive, destructive lesion on the central and left side of the face involving the orbit, nose, maxillary region, and upper lip, with necrotic tissue and multiple freely crawling maggots.

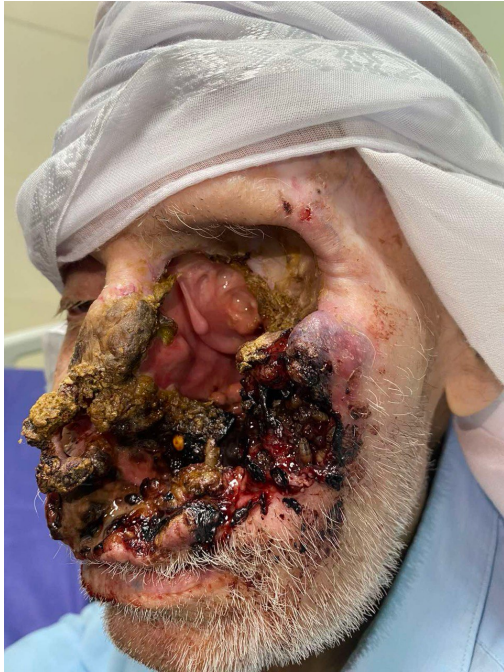


Figure 2. Larva manually extracted from the patient's wound.



Table 1. Literature review of head and neck malignancies complicated with myiasis from 2015 to 2024.

Author	Year	Country	No. of cases	Age	Gender	Localization	Cancer histology	Fly species	Treatment of Myiasis
Biradar <i>et al.</i> ¹	2015	India	2	50	Male	Oral; buccal mucosa	SCC	Unknown	Mechanical removal of larvae, turpentine oil, repeated surgical debridement, Systematic ABs (Augmentin and metronidazole), and 0.2% chlorhexidine antiseptic mouthwash
				55	Male	Oral; buccal mucosa	SCC	Unknown	Mechanical removal of larvae, turpentine oil, repeated surgical debridement, Systematic ABs (Augmentin and metronidazole), and 0.2% chlorhexidine antiseptic mouthwash
Rathore <i>et al.</i> ⁷	2015	India	1	14	Male	Skin: eyelid and cheek	BCC	Chrysomya bezziana	Manual removal of larvae, turpentine oil, oral ABs, and oral ivermectin
Pandey <i>et al.</i> ⁸	2016	Nepal	1	73	Male	Skin: eyelid with invasion into the orbit	BCC	Unknown	Manual removal of maggots, debridement, oral ABs, and oral Ivermectin
Demirel-Kaya <i>et al.</i> ⁹	2016	Turkey	1	58	Male	Maxillary sinus	SCC	Lucilia sericata	Mechanical removal of larvae and wound irrigated by H ₂ O ₂ solutions
Mansukhani <i>et al.</i> ¹⁰	2017	India	1	84	Female	Orbital	SCC	Unknown	Manual removal of maggots, irrigation with normal saline, turpentine, betadine, H ₂ O ₂ solution, ABs (IV piperacillin-tazobactam and amikacin), and oral Ivermectin
Khardenavis <i>et al.</i> ¹¹	2018	India	1	74	Female	Skin: Eyelid invaded the orbit	BCC	Cochliomyia hominivorax	Manual removal, turpentine ointment, debridement, intravenous ampicillin-sulbactam and oral Ivermectin
Karkhanawala <i>et al.</i> ¹²	2018	India	1	2	Not mentioned	Orbital	Retinoblastoma	Unknown	Manual removal of maggots, turpentine oil, AB ointment, systemic ABs and antifungals
Gupta <i>et al.</i> ²	2018	India	1	50	Female	Oral; buccal mucosa	SCC	Unknown	Manual removal of larvae, turpentine oil (12%), irrigated with H ₂ O ₂ and normal saline, and oral Ivermectin

Demaj <i>et al.</i> ¹³	2019	Albania	1	48	Male	Skin: Scalp	BCC	Lucilia sericata	Removal of a single larva
Lazaro <i>et al.</i> ¹⁴	2020	Brazil	1	60	Male	Oral	SCC	Unknown	Surgical removal of larvae and oral ivermectin
Ayalon <i>et al.</i> ¹⁵	2020	Israel	1	98	Male	Skin; eyelid with invasion into the orbit	SCC	Sarcophaga argyrostoma	Manual removal of larvae
Jamshidian-Tehrani <i>et al.</i> ¹⁶	2021	Iran	1	89	Male	Orbital	Undifferentiated	Unknown	Mechanical removal of larvae
Yucesan <i>et al.</i> ¹⁷	2021	Turkey	1	82	Female	Oral	SCC	Diptera: Sarcophagidae	Physical removal of larvae and ABs
Kondoh <i>et al.</i> ¹⁸	2022	Japan	1	82	Male	Skin: Scalp	SCC	Lucilia sericata	Manual removal of larvae and irrigation with normal saline
de Assis <i>et al.</i> ¹⁹	2023	Brazil	1	68	Female	Skin: extending from the middle third of the face to the submandibular trigone region	SCC	Unknown	Mechanical removal of larvae, debridement of devitalized tissues, irrigation with ether solution asphyxiating substance, systemic intravenous ABs (ceftriaxone and clindamycin) and ivermectin
Khan <i>et al.</i> ⁴	2024	Pakistan	1	62	Female	Oral: lower alveolus extended into the soft tissue of the submental and submandibular regions.	SCC	Unknown	Manual removal of larvae, turpentine-soaked dressings, irrigation with saline, dressed with 10% povidone-iodine, and ivermectin
Azarmi <i>et al.</i> ²⁰	2024	Iran	1	43	Male	Skin: Scalp	Soft tissue sarcoma	Diptera: Sarcophidae	Manual removal of larvae and wound irrigation with normal saline

BCC, basal cell carcinoma; SCC, squamous cell carcinoma; Abs, antibiotics.

Online Supplementary Material:

Video 1. An extensive, destructive lesion on the central and left side of the face involving the orbit, nose, maxillary region, and upper lip, with necrotic tissue and multiple freely crawling maggots.

Video 2. Larva manually extracted from the patient's wound.