

Case of Wound Myiasis in a Squamous Cell Carcinoma Lesion of the Scalp

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Myiasis refers to the infestation of living humans and vertebrate animals by dipterous larvae. Many organs can be infested by fly larvae, but cutaneous and wound myiasis are the most frequently encountered clinical forms. Persistent ulcer or non-healing wound is one of the symptoms of squamous cell carcinoma which is the second most common skin cancer in the world. Here we report a case of an elderly man with a severe wound myiasis in a squamous cell carcinoma lesion of the scalp. The maggots were confirmed to be *Lucilia sericata* which are widespread flies in Japan. Human myiasis is rarely reported in Japan, but patients with necrotic, hemorrhaging, or pus-filled wounds are susceptible to infestation. It is necessary for doctors and nurses to ensure that their patients change their dressings daily and keep their wounds clean.

Key words: cutaneous myiasis, traumatic myiasis, maggots

INTRODUCTION

Flies in our environment are often regarded as pests, or nuisance insects. Many infectious agents are carried by flies, and maggots are occasionally parasitic in the human body. Myiasis refers to the infestation of living humans and vertebrate animals by dipterous larvae [1-3]. The term myiasis is derived from the Greek word, *myia*, meaning fly [1-3]. Although several classification systems have been applied to myiasis, the condition can be generally classified as sanguivorous, or bloodsucking myiasis; cutaneous myiasis, which includes furuncular and migratory myiasis; wound myiasis; and cavitary myiasis [2]. Many organs can be infested by fly larvae, but cutaneous and wound myiasis are the most frequently encountered clinical forms [3]. Wound myiasis occurs when fly larvae infest an open wound on the host [1-3]. Human myiasis has a global distribution [1, 3], but it is rarely reported in Japan [4]. Here we report a case of an elderly man with a severe case of wound myiasis and the treatment thereof.

CASE REPORT

An 82-year-old Japanese male with squamous cell carcinoma (SCC) of the scalp had been treated at our hospital one-and-a-half years previously. He had comorbidities of hypertension, angina pectoris, and cataracts, and a previous history of Bowen's disease of the scalp. He was previously diagnosed as having SCC histopathologically at our hospital, but the tumor was not removed because he was anxious about surgery and had a large scar close to the SCC lesion on the scalp. The scar was attributed to a skin graft after skin excision due to Bowen's disease on the scalp that had been performed more than a decade previously.

It was considered that the skin graft would have been difficult to perform at the time of the operation. While receiving palliative treatment with cryotherapy or Mohs ointment, five days after a regular visit, he presented at our walk-in hospital with bleeding from the SCC lesion on the scalp. Dermatological examination revealed 10 x 10 cm, papilloma-like, ulcerated, red tumor with numerous whitish maggots on his scalp (Figure). Over 100 maggots were removed with a sterile toothbrush and an evacuator with saline irrigation under local anesthesia. Although he continued with self-treatment at home after removal of the maggots, he subsequently agreed to more aggressive medical treatment to treat the pain. Two months later, the SCC lesion was reduced by radiation therapy. He had no record of overseas travel before the myiasis.

We tried to raise several of maggots to the adult stage, but all specimens died at the stage of becoming a pupa. We therefore attempted to identify the maggots by molecular genetic techniques. Some maggots were frozen to extract DNA for both of *cytochrome oxidase subunit I (COI)* gene and *16S ribosomal RNA (rRNA)* gene. Analysis of these genes showed 99% match with *Lucilia (L.) sericata*.

DISCUSSION

SCC is the second most common skin cancer, according for 10% of all cases of skin cancer in the world [5]. The clinical presentation of SCC is extremely variable, ranging from actinic keratosis, which is ubiquitously regarded as premalignant, to invasive SCC [5]. Symptoms of invasive SCC include bleeding, weeping, pain, and tenderness around the lesion with persistent ulcers or non-healing wounds [5]. SCC typically develops on sun-exposed skin [5], and approximately 55%



Figure Numerous whitish maggots were observed in a 10 x 10 cm area, comprising a papilloma-like, ulcerated, red squamous cell carcinoma tumor of the scalp.

of all cases of cutaneous SCC occur on the head and neck [5].

Wounds with alkaline discharge (pH 7.1 to 7.5) and the presence of necrosis are important indicators of wound myiasis [2]. When flies oviposit in necrotic, hemorrhaging, or pus-filled lesions, wound myiasis frequently occurs [2]. Dermatological symptom of wound myiasis most commonly manifest as ulcers, and hyperkeratosis to a lesser extent [2]. Many dermatologic conditions, including neuropathic ulcers, psoriasis, seborrheic keratosis, onychomycosis, vascular insufficiency ulcers, cutaneous B cell lymphoma, basal cell carcinoma, lipedema, herpes zoster, noma, filarial lymphoedema, condyloma acuminatum, hemorrhoid, leprosy, pediculosis, and impetigo have all been reported to be associated with myiasis [2]. However, an association between myiasis and advanced SCC is rare, with only 15 cases reported in the literature [6]. Of the reported cases (n = 15), 11 were males and 4 were females, with ages ranging between 21 and 101 years. In almost all cases (n = 13), myiasis was observed on the head and neck regions, including the scalp, face, and orbita. More than 50% of all cases (n = 9) were classified as wound myiasis. Patients with myiasis in SCC lesions were characterized by the presence of advanced, giant, and neglected SCC skin lesions, poor social status, and comorbidities. Our case was similar to previous case reports, in that our patient presented with a giant SCC with an ulcer, necrotic tissue, and crust, and could not irrigate the SCC sufficiently by himself due to pain.

A lack of adequate medical and nursery care of the elderly, psychiatric patients, alcoholics, and other helpless patients makes humans prone to wound myiasis [2]. Our case was neither psychiatric nor demented patient. However, he was elderly, single, and stubborn person who did not accept not only our medical suggestions and home-visit nursery cares but also his daughter's

helps.

Treatment requires the removal of all visible maggots, followed by debridement in cases where necrotic tissue still remains [2]. A review article stated that a 15% chloroform or ether in olive oil or another oil can be used to immobilize the larvae and facilitate maggot removal [2]. Changing dressings consistently and on a daily basis is also required [2]. In our case, all of the maggots were removed at the first treatment, and there was no recidivation thereafter.

The maggots in our case were confirmed to be *L. sericata*. *Lucilia* species or green bottle flies, are widespread in Japan. A case series reported that the most common cause of wound myiasis in USA was *L. sericata* (30 out of 42 cases, 71%) [7]. The most common species in Japan are also found in the USA [4], and a case of myiasis on vulvar SCC caused by *L. sericata* was reported from Japan [4]. Previous studies reported that *L. sericata* lays numerous eggs in exposed wounds and that the abundant larvae then behave in a manner similar to a superorganism, which benefits individual maggots [6]. Maggots can be generally separated into two types; those that feed on necrotic tissue only (necrophagic group), such as *L. sericata*, and those that feed on vital tissue [6]. Wound myiasis can be used iatrogenically for treating superficial necrotic wounds in humans [1]. This benign wound myiasis is known as maggot therapy. *L. sericata* has a strong preference for necrotic tissue and may even starve on clean tissues, thus, is the most widely used fly species in maggot therapy [1], even in Japan.

In conclusion, human myiasis is rarely reported in Japan, but patients with necrotic, hemorrhaging, or pus-filled wounds are susceptible to infestation, even during treatment. It is therefore necessary for doctors and nurses to ensure, where possible, that their patients' change their dressings daily and keep their

wounds clean.

CONFLICT OF INTEREST

none.

REFERENCES

- 1) Solomon M, Lachish T, Schwartz E. Cutaneous Myiasis. *Curr Infect Dis Rep.* 2016; 18: 28.
- 2) Francesconi F, Lupi O. Myiasis. *Clin Microbiol Rev.* 2012; 25: 79-105.
- 3) Robbins K, Khachemoune A. Cutaneous myiasis: a review of the common types of myiasis. *Int J Dermatol.* 2010; 49: 1092-8.
- 4) Hiraoka H, Ozawa T, Sowa-Osako J, Ichimura T, Kimata-Teramoto I, Isozumi R, *et al.* Reported myiasis in a female vulvar squamous cell carcinoma caused by *Lucilia sericata* and *Sarcophaga crassipalpis*. *J Dermatol.* 2015; 42: 840-1.
- 5) Kallini RJ, Hamed N, Khachemoune A. Squamous cell carcinoma of the skin: epidemiology, classification, management, and novel trends. *Int J Dermatol.* 2015; 54: 130-40.
- 6) Wollina U. Myiasis on squamous cell carcinoma of skin. *Wien Med Wochenschr.* 2015; 165: 79-82.
- 7) Sherman RA, Hall MJ, Thomas S. Medicinal maggots: an ancient remedy for some contemporary afflictions. *Annu Rev Entomol.* 2000; 45: 55-81.