



## Case report

# Management of nasal myiasis and type 2 diabetes mellitus: A rare case and review article

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## ABSTRACT

**Background:** Nasal myiasis is a nasal infestation caused by house fly larvae (maggot). It's a rare condition with only a few reported cases and no treatment consensus.

**Case presentation:** A 54-year-old woman was admitted to the emergency unit with a complaint of larvae found in the left nasal cavity and bloody nasal discharge for 2 days. Anterior rhinoscopy found some living larvae in a narrowed left nasal cavity. Patient's management included larvae removal manually with forceps, nasal saline irrigation, a systemic broad-spectrum antibiotic, and insulin to controlled blood sugar.

**Discussion:** Removal of larvae in the nasal cavity using irrigation saline and systemic broad-spectrum antibiotics is effective in the absence of bone destruction.

**Conclusion:** manual extraction combined with nasal saline irrigation and systemic broad-spectrum antibiotic was effective to manage nasal myiasis.

## 1. Introduction

Nasal myiasis is one type of cavitary myiasis, besides cerebral myiasis, aural myiasis, and ophthalmomyiasis [1]. It is an opportunistic parasitic infestation in humans as well as in animals caused by house fly larvae and commonly found in tropical and subtropical areas of the world [2,3]. The risk factors for myiasis are open wounds, suppurative lesions, scabs, traumatic wounds, and ulcers contaminated with discharges and blood remnants. The risk increases with debilitation, mental or physical disability, and poverty [4]. Immunocompromised state, diabetes mellitus, nutritional deficiencies, poor hygiene, sinonasal diseases such as atrophic rhinitis, the leprosy of the nose, midline granuloma, and malignancy are the other predisposing factors for myiasis infestation [5,6].

Diagnosis of nasal myiasis is based on history taking and physical examination. Patients with nasal myiasis usually present with epistaxis, thick mucus nasal discharge, nasal obstruction and malodorous, facial pain, headache, and a sensation of a foreign body moving within the nose [7]. Nasal myiasis therapy aims to remove larvae from the nasal cavity, manually or endoscopically [7,8]. The study aimed to report the appropriate and effective management of nasal myiasis and type 2 diabetes mellitus patients in low resource settings, based on Surgery

Case Report (SCARE) 2020 guideline [9].

## 2. Case presentation

A 54-year-old woman was admitted to the emergency unit with a complaint of larvae and bloody discharge from the left nasal cavity for two days. An additional complaint was left nasal obstruction, thick nasal discharge, left facial pain, and headache. The patient, a farmer from the rural area, were noticed that a fly was accidentally entered her nose when she was working at her field a week before. There was no history of trauma to the nose. The patient had a history of uncontrolled type 2 diabetes mellitus for 2 years. When the random blood sugar value was 431 mg/dl and HbA1c was 12.4%. General examination found that the patient's visual analog scale (VAS) was 6, the mental state was normal, vital signs and otoscopy of both ears were normal. Anterior rhinoscopy showed narrowed left nasal cavity and hyperemic nasal septum. There was thick and excessive yellowish nasal discharge with multiple living larvae crawling actively.

Fifty-nine larvae were extracted manually by forceps in the emergency room. Debridement of necrotic tissue was performed during larva extraction. All of the larvae could not be removed in a single sitting since larvae invaded into nasal mucosa or hidden between necrotic tissue. The

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patient was treated with ceftriaxone 1 g every 12 h intravenous, combined with nasal saline irrigation. The patient also had insulin therapy; Novorapid 4 IU every 8 h before meals and Levemir 10 IU at night. Twenty-one larvae were found on the first day of treatment, some of them were obtained through nasal irrigation and a few larvae came out on their own at night. During the second day of treatment six larvae were found. Same as the day before, it was obtained through nasal irrigation and came out on its own at night. On entomological examination, the larva was identified as *Calliphoridae cochliomya* (Fig. 1).

Nasal endoscopy (NE) was performed on the second day of treatment to evaluate the nasal cavity and to continue larva extraction. It showed some lesion and necrotic tissues covering the nasal floor and lateral wall of the left nasal cavity (Fig. 2). The therapeutic procedure was continued and endoscopic re-evaluation of the nasal cavity was planned in the next 2 days. The result of endoscopic re-evaluation showed there were thick secrets and a lot of crusts. No larvae were found and mucosal re-epithelialization was seen in inferior turbinate. CT scan of paranasal sinuses was performed to ensure there were no complications of invaded larvae to the surrounding organs (Fig. 3). CT showed mucosal thickening (20–41 HU) on right and left maxillary sinuses, right and left ethmoid sinuses, right and left sphenoid sinuses, and right and left frontal sinuses, dominant on the left side. There was no bone destruction in a visible visualization. The patient was discharged after six days of treatment and suggested visiting the outpatient clinic within a week.

On her visiting to the outpatient clinic, she did not have any complaint about larvae discharge from the nasal cavity but she complained about yellowish nasal discharge from both the right and left nasal cavity that just appeared in the last two days after she stop performed nasal irrigation. Another complaint was left facial pain, particularly around the left eye. There were no complaints of nasal obstruction. Her complaints are by acute rhinosinusitis and treated with nasal saline irrigation, intranasal steroids.

### 3. Discussion

Nasal myiasis is cavitory myiasis which is an infestation of insects larva in the natural cavity of the body [1]. The disease, which is considered accidental nasal infestation, occurs equally in both genders and is usually seen in those over 50 years of age [5,6]. Calliphoridae is an ordo of Diptera besides Oetridae and Sarcophagidae which commonly cause myiasis [10,11]. The history of the patient's occupation and dwelling were by the literature which suggested that rural farmers often suffered from larval infestation since they had contact with livestock closely [11]. The elderly might experience some degree of sensory loss of nasal mucosa, which facilitating fly to lay eggs [12]. Lack of control of diabetes might be another predisposing factor to this patient to larval habitation owing to diabetic neuropathy. It might begin that larvae first infested the patient's nasal cavity then the nasal lining while the patient was not alert [4].

Nasal myiasis occurred when flies lay their eggs on injured nasal



Fig. 1. Larvae were extracted manually from the left nasal cavity.

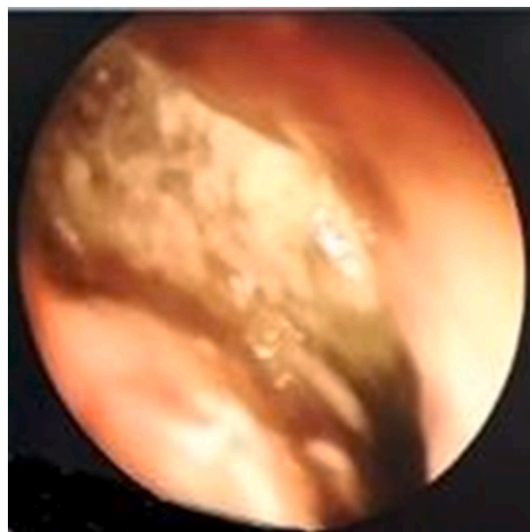


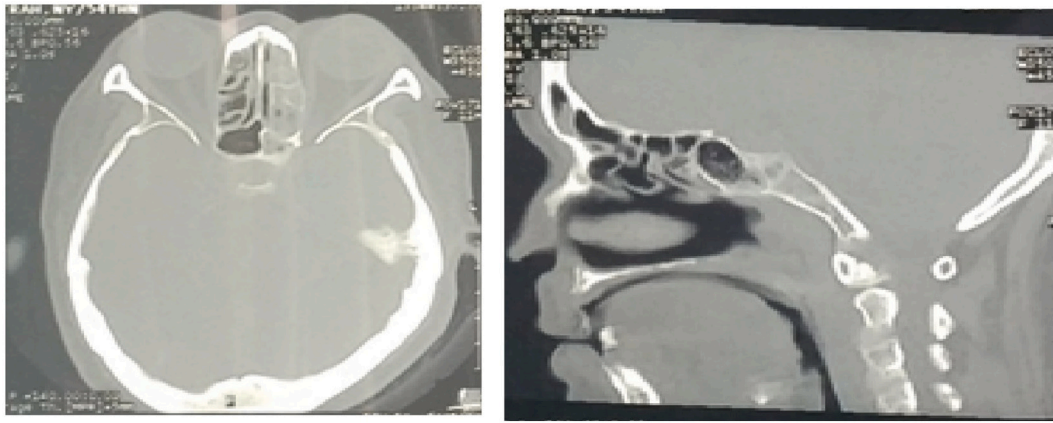
Fig. 2. The left nasal cavity is covered with necrotic tissue.

cavity mucosa. Adult female flies can lay about 200 eggs every 2 or 3 days, but only a few eggs become larvae due to some eggs expelled from the nasal cavity through sneezing and mucociliary clearance process [7,12]. Eggs turned to larvae within 7 to 9 h in tropical regions and longer in colder regions. Larvae had three stages of development called an instar. Each stage of development is distinguished by examining the posterior spiracle. Larvae used proteolytic enzymes found in their feces and their mouths to break the soft tissue they occupied [6].

Diagnosis of nasal myiasis is clinical, based on clinical symptoms and larval findings in the nasal cavity [10]. Patient with nasal myiasis commonly presents with epistaxis, nasal discharge, foul smell, facial pain, nasal obstruction, headache, and foreign body sensation in the nose [7,8]. An oedematous nasal cavity, ulcerated mucous membrane filled with necrotic tissue, and crawling larva may be seen during nasal endoscopy. Nasal myiasis may cause severe pain, depending on the location of the infestation, lesions, and tissue inflammation. The larvae may cause extensive necrosis and intranasal destruction. It also can reach deeper tissue of the nose and paranasal sinuses [13].

This patient presented almost all symptoms of myiasis infestation in the nasal. Multiple living larvae, thick and excessive yellowish nasal discharge, and hyperemic nasal septum were seen during anterior rhinoscopy. Treatment of nasal myiasis consisted of mechanical removal of the larvae, surgical debridement, and the administration of broad-spectrum antibiotics [10]. There is no consensus regarding a treatment standard for nasal myiasis but the aim of the treatment is to remove the invading parasites completely [14]. The patient with nasal myiasis needs immediate hospitalization since the larva cannot be removed in a single sitting. In a particular case, even surgical removal of the larvae might need [15]. Treatment of nasal myiasis includes local and systemic, that ones is complementary to another [10,16]. Systemic treatment includes broad-spectrum antibiotics while local treatment includes application of turpentine oil, ether, chloroform, mineral oil, ethyl chloride, mercuric chloride, creosote, saline, systemic butazolidine, or thiabendazole to remove larvae [11]. Ivermectin or other anthelmintics also may be used in conjunction with endoscopic removal and saline irrigation [14,16].

CT finding was fitted to literature that reported that inflammation or mucosal dim of the nasal cavity was the most often seen in CT following nasal myiasis infestation. It could lead to a serious condition if not managed properly [17]. The other complication due to nasal myiasis infestation is a nasal deformity, perforation of nasal septal and palate, orbital inflammation, facial cellulitis, ulceration of tonsils and posterior pharyngeal wall, and intracranial expansion that caused meningitis and



**Fig. 3.** Computed tomography of sinus paranasal showed a thickening of nasal cavity mucosa and paranasal sinuses (blue arrow). No bone destruction was seen on the CT. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

death [1,17]. The patient was discharged after 6 days of treatment and no larvae were found in the nasal cavity. The patient was scheduled for follow-up one week after hospital discharge. This was by the literature stated the disease should be followed up in a shorter time and couple of sittings. Thus, quick and complete eradication of the remaining larvae was possible before it causes irreparable damage to the intranasal tissues [14,16].

#### 4. Conclusion

Manual extraction of larvae combined with nasal saline irrigation and systemic broad-spectrum antibiotic was considered appropriate and effective management of nasal myiasis. This management of nasal myiasis can be an alternative therapy in a low-resource setting.

#### CRediT authorship contribution statement

All authors contributed toward data analysis, drafting and revising the paper, gave final approval of the version to be published and agree to be accountable for all aspects of the work.

#### Declaration of competing interest

The authors declares that they have no conflict of interest.

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#### Consent

We have requested the patient's consent to publish this case report for educational purposes. The guardian and patient are willing to have their case reports published.

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#### Ethical approval

We have conducted an ethical approval base on the Declaration of Helsinki at Ethical Committee in Dr. Soetomo General Academic Hospital, Surabaya, Indonesia.

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