

Endoscopic Management of Nasal Myiasis – An Unusual Presentation
with Secondary Sino-Nasal Complications

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Abstract

Myiasis is a zoonotic disease characterized by infestation of dipterous larvae of certain fly species. Mainly reported from tropical areas, the reported cases are dwindling owing to the increased level of public awareness and improved healthcare access. The larvae maybe obligate or facultative parasites depending on the species infesting.

Our case is a 47-year-old lady with no co-morbidities, presented with chief complaints of headache and left hemi-facial pain of 2 weeks duration with nasal blockage and occasional bloodstained discharge from left nostril. Investigations and work up, including nasal endoscopy revealed maggot infestation in the left nostril with extensive soft tissue destruction, necrosis and sloughing.

She was diagnosed as a case of nasal myiasis and was treated by meticulous endoscopic removal of the maggots, surgical debridement and antibiotic coverage for secondary bacterial infection. The symptoms resolved over a period of 2 weeks with successful removal of all larvae. We were able to avert serious orbital and intracranial complications and the patient was discharged with a healing nasal cavity.

However, on subsequent follow-ups it was noted that the mucosa healed well but, she had developed significant persistent synechiae which ultimately required- endoscopic endonasal Draf-3 procedure to establish patency of the frontal sinus subsequently. Myiasis of nasal cavity is a rare condition mainly reported from the tropics, there are only few case reports and no consensus on best treatment strategy. We propose a treatment approach with meticulous endoscopic maggot extraction and mucosal debridement, along with saline nasal douching and good personal hygiene. Antibiotics maybe added in cases suspected of secondary bacterial infection or intracranial extension, with meticulous follow-up by Diagnostic nasal endoscopy (DNE) for synechiae and Osteo-meatal complex (OMC) blockage.

Keywords: Myiasis; Maggots; Nasal Infestation; Larvae; Parasitic Infection; Para Nasal Complications; *Chrysomya Bezziana*; Screw Worm; Ether; Nasal Discharge; Nasal Blockage; Nasal Toilet; Draf-3; Nasal Toilet; Nasal Debridement

Introduction

Myiasis is a zoonotic disease characterized by infestation with dipterous larvae [1]. In primary myiasis the larvae feed on living tissue, in secondary myiasis it is mainly the necrophagous larvae feeding on devitalized tissue [2]. Usually is transmitted directly by deposition of eggs or larvae onto non-intact skin or mucous membrane of host. It can also be transmitted by a process called phoresis- the female fly deposits eggs on arthropods that are mammalian parasites. When these arthropods feed, the hatched larvae burrow into the skin defect created by the carrier [3]. *Chrysomya bezziana* (Screw worm), is an obligate parasite infesting primarily mammals and dependent on a host organism to mature and continue the cycle. It has a wide geographic distribution mainly in the tropics with warm humid conditions of Asian, and African continents and some Latin American regions. The adult male fly

has a metallic green or blue body with a yellowish head, but the larvae are smooth, lacking any obvious body processes except for the terminal segment (Figure 1).

Figure 1: Adult *Chrysomya bezziana* fly (male).

Lifecycle

C. bezziana is an obligate myiasis parasite. The female adult fly deposits eggs in fresh wounds or mucosal orifices. After hatching the larvae penetrate the skin and mature, pupate, and transform into fully reproductive adults within the host tissue. The life cycle from egg to adult takes 2-3 weeks to complete on average. Its diet mainly relies on degrading or necrotic animal tissue, but the larvae feed on the living tissue of warm-blooded mammals in contrast to necrotic tissue that many other fly larvae feed on. The larvae cause permanent tissue damage and mutilation, with necrosis and destruction of both osseous and soft tissues, hence *C. bezziana* has amassed a lot of public health concern. Myiasis can be further sub-classified as facultative or obligatory. In obligatory myiasis, the larvae need to be in a live and healthy tissue for nutrition in order to complete the lifecycle. In contrast, larvae in facultative myiasis complete their lifecycle in the environment or on necrotic tissue from mammalian hosts [5]. *C. bezziana* is different from rest of the infesting fly species as tissue infestation and maturation occurs even in the absence of necrotic tissue, i.e. the larvae feed on viable tissue as well. The maggots can cause serious and permanent mutilation and tissue destruction [6]. Humans in farming, animal husbandry, who are in close contact with cows, sheep, horses are at a much higher risk of infestation.

As nasal myiasis is a rare condition, mainly limited to the tropics. There are only a few reported cases and no treatment consensus whatsoever has been reached so far regarding the best line of management. We are presenting a case of nasal myiasis in an adult patient from the Indian sub-continent who developed intractable synechiae leading o secondary sinusitis, necessitating extensive surgery to open the sinus drainage pathways.

Case Report

47-year-old female, homemaker with no significant medical history, presented with chief complaints of dull headache- 2weeks, nasal blockage and occasional bloodstained discharge from left nose. A constant dull aching pain was present on the left side of the nose, spreading over the maxillary and frontal sinus region, and over the infra-orbital margin on the same side. The pain gradually increased in intensity. The patient had difficulty breathing through the left nostril which was also progressive only involving left nostril and complained of occasional foul-smelling discharge. A few days before reporting to this center she started having occasional blood-stained discharge on blowing/clearing of nose. However, no history of movement sensation within the nasal cavity or worms emerging from nostril was given by the patient. No history of allergy or atopy present.

She belongs to low-socio economic status with limited access to medical facility. Belonged to an agrarian household with livestock and cattle at home and she used to tend for the same on a regular basis. No significant medical and family history present.

General examination revealed that the patient was conscious and co-operative, with a normal IQ. External-examination revealed puffiness on left side of eyes and face with erythema. Tenderness over the Left Frontal sinus region was present. Crusting with clots were present in the vestibule region on the left nostril. No palpable cervical lymphadenopathy was noted.

Nasal endoscopy revealed Right nostril with healthy mucosa and patent sinus drainage pathways. Left side showed extensive mucopurulent sanguineous discharge, crusting and necrotic mucosa. Nasal toileting and suction clearance revealed extensive infestation by maggots mainly in- Inferior meatus (under the Inferior turbinate). Medial and lateral to the Middle turbinate with maggots filling the OMC region and extensive soft tissue destruction and necrosis (Figure 2).

Figure 2: Maggots underneath the inferior turbinate on initial DNE. (Blue arrow).

Rest of ENT examination - Unremarkable.

Diagnosed as - Nasal myiasis and the patient was admitted for further management.

Investigations

On admission the total leukocyte count was elevated with neutrophilia. Immunological work-up including Fating and Post prandial blood sugar- WNL, HIV- Negative. Rest of biochemical parameters- WNL. The maggots both dead and alive were collected separately and send for analysis, were reported to be of *Chrysomia bezziana* (Screw worm).

Figure 3: Live maggots.

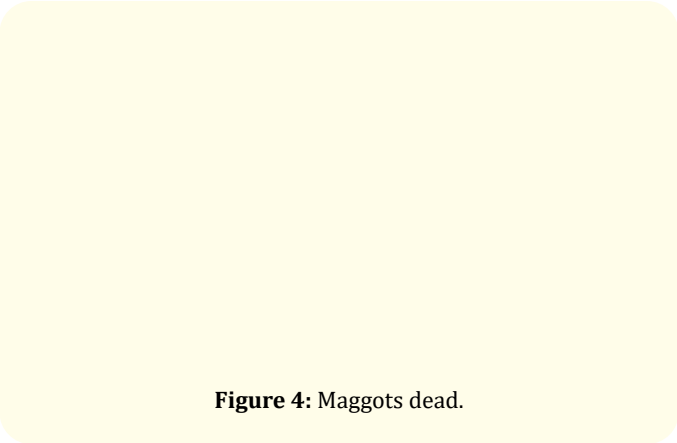


Figure 4: Maggots dead.

Treatment

Endoscopic guided extraction of maggots was decided, along with broad spectrum antibiotic coverage to control secondary bacterial infection, analgesics for pain relief and nasal self-douching with normal saline thrice a day. The patient was advised on maintenance of personal and oral hygiene with detailed instructions. An ether-soaked pack was placed in the left nostril for approximately 10mins, following which the maggots were removed meticulously under endoscopic visualization (Figure 5). The same procedure was repeated over alternate days for a week till entire maggots and necrotic tissue was debrided and cleared (Figure 6). Bleeding was controlled using xylometazoline nasal drops.

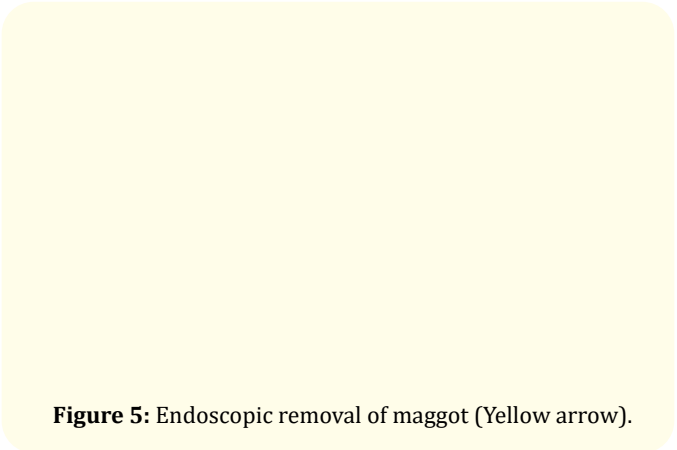


Figure 5: Endoscopic removal of maggot (Yellow arrow).

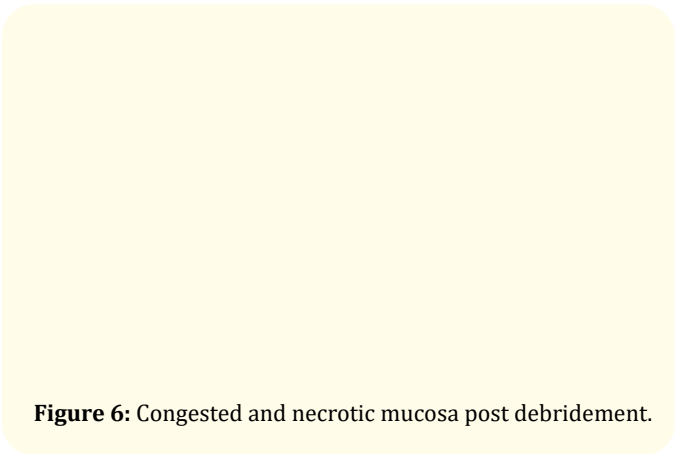


Figure 6: Congested and necrotic mucosa post debridement.

Ether when kept in the nasal cavity acts as a strong irritant which forces the maggots to emerge from the mucosal burrows. Initial scoping about 80 maggots were removed, which reduced over the subsequent days and a total of around 150 maggots were extracted over a period of 7days. Surgical exploration of the site and removal of maggots relieved the discomfort and edema. Saline nasal douching ensured maintenance of hygiene by flushing out of necrotic tissue and prevention of crusting. The patient was discharged after 7days of hospitalization.

Outcome and follow-up

Follow-up on further visits showed reduced facial puffiness and symptomatic relief with healing mucosa, but with extensive synechiae formation. The synechiae had caused the remnant of middle turbinate to be plastered on to lateral nasal wall with extensive fibrosis resulting in total blockage of OMC on left side (Figure 7). This subsequently led to the development of Frontal mucocoele, which was detected in 2nd post-op visit, and underwent ESS and frontal mucocoele drainage (Lt). However, the results were short lived, and patient developed restenosis of the frontal sinus drainage pathway (FSDP) 2 months Post-op. She was taken up for endoscopic Draft (type-3) to prevent restenosis, following which patient has been asymptomatic with patent FSDP and other sinus drainage pathways.

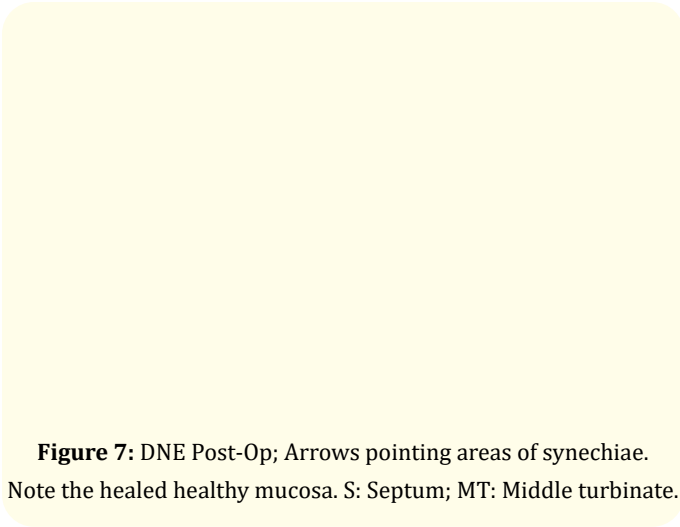


Figure 7: DNE Post-Op; Arrows pointing areas of synechiae. Note the healed healthy mucosa. S: Septum; MT: Middle turbinate.

Discussion

Nasal infestation by fly larvae is extremely morbid condition and can be fatal due to the proximity to vital spaces. Superiorly is the skull base with easy penetration especially in thin cribriform region leading to intracranial spread. The maggots may spread laterally and posteriorly to the orbit and paranasal sinuses and in a few instances, may spread inferiorly and perforate the palate. Nasal myiasis may lead to ocular infestation with orbital complications by spreading through the papery thin lamina papyracea, and the infra-orbital canals, which are the weak areas in the orbits. There can be complications due to secondary bacterial infection as well, resulting in cellulitis and septicemia.

Myiasis affects individuals at any age but is more common in middle-aged and older patients; both sexes are equally affected [2]. The larvae tunnel deep into soft tissue, separating the epithelium and muco-periosteum from bone and deriving nutrition from feeding on surrounding tissues. The larvae are readily visible in wounds. A definitive diagnosis of the exact species of fly responsible cannot be made based on the fly's larval stage. Larvae obtained from a patient must be reared on meat or a synthetic medium until they pupate and eventually emerge as adult flies.

Myiasis is usually initiated when flies are attracted by a wound and lay their eggs in necrotic, hemorrhagic or pus-filled lesions [3]. Secondary bacterial infections are common. All conditions compromising bodily integrity predispose to infestation [4]. However, larvae of *C. bezziana* is different from other fly species because tissue infestation can occur in the absence of necrotic tissue as they feed on healthy tissue. The parasites are quite mobile, with sudden onset signs and symptoms. The main symptoms are nasal block, headache/facial pain followed by sneezing and other respiratory and nasal manifestations such as nasal discharge, maggots emerging from nose/throat, foul smell, epistaxis, dyspnea and stridor [5]. Our patient presented with similar complaints, but the classical poor hygiene, psychological disorder or chronic illness backdrop was absent. Healthy immunocompetent host with no-comorbidities and history of cattle exposure points towards an accidental infestation by the fly, larvae of which can flourish in healthy tissue.

The larvae release proteolytic enzymes that destroy the host tissue [6]. The continuous nasal bleeding, necrosis and foul smell seen in the present case are suggestive of similar mechanism with super added bacterial infection. Progressive destruction and cavitation occur as the larvae grow. The host also responds by creating a fibrous capsule to which the larvae can become tightly attached [7]. In severe infestation with heavy load of maggots, as in this case, turpentine/ether is used as it irritates and forces the larvae to crawl out into the nasal cavity making removal easy and less traumatic. Treatment consists of endoscopic removal of maggots, broad-spectrum antibiotics [1].

A review of the literature yielded very few publications with complications of nasal myiasis on follow-up, with para nasal sinus (PNS) complications that was managed successfully.

Conclusion

- A high index of suspicion should be kept for nasal myiasis in patients presenting with nasal block, epistaxis, facial puffiness with exposure to livestock. Even in the absence of immunocompromising, debilitating or mental disorders and extremes of age.
- Diagnostic nasal endoscopy is excellent in identifying the larvae and confirming diagnosis. Radiological evaluation to rule out complications is routinely undertaken.

- Rapid extension into surrounding tissues with tissue destruction and morbidity can occur. Hence, admission with endoscopic clearance of larvae and antibiotic coverage should be undertaken to avoid major complications.
- Saline nasal douching goes a long way in ensuring adequate hygiene and clearance of necrotic tissue and dead maggots.
- Myiasis of nasal cavity is a rare condition mainly reported from the tropics, there are only few case reports and no consensus on best treatment strategy. We propose a treatment approach with meticulous endoscopic maggot extraction and mucosal debridement, along with saline nasal douching and good personal hygiene. Antibiotics maybe added in cases suspected of secondary bacterial infection or intracranial extension.

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