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Case Report

A case report on use of ivermectin as nasal drop in a case of nasal myiasis

Vartika Paliwal[1], Sudhakar Vaidya[1]*

[1] *Dept. of ENT, R.D. Gardi Medical College & C.R. Gardi Hospital, Ujjain, Madhya Pradesh, India*

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ABSTRACT

We describe a case of nasal myiasis due to in a 52-year-old Hindu priest with a previously known case of right sided hemiparesis with diabetes mellitus. Initial attempts to remove the fly larvae using manual extraction with a toothed forceps and normal saline irrigation were unsuccessful. On subsequent nasal irrigation after instillation of ivermectin tabs crushed in normal saline as nasal drops, the patient self-expulsed some larvae, and rest larvae were cleared on subsequent nasal suction and clearance. He also received a course of oral ivermectin. Here, we propose that the antiparasitic oral tablet ivermectin can be used in a nasal drop formulation for the aid of nasal myiasis.

1. Background

Myiasis presents commonly in tropical regions, characterized by tissue infestation by fly larvae, known as maggots. Flies typically deposit their eggs in open wounds or near inflamed skin, often caused by moisture. These eggs hatch within 8 to 24 hours, with the larvae penetrating damaged skin, creating deep lesions prone to bacterial infection. Without treatment, these chronic wounds progress, leading to septicaemia and potentially death.

Conventional treatment involves manual removal of larvae, wound cleaning, surgical removal of dead tissue, and dressing application. Larvae removal is challenging and painful, often necessitating the use of topical parasiticides like ivermectin. Ivermectin, applied topically, selectively binds to chloride ion channels, increasing cell permeability and causing nerve or muscle cell hyperpolarization, ultimately leading to parasite death.

2. Case Report

A 52 year old male came in ENT OPD with the complain of nasal bleeding and recurrent sneezing since 1 day. He was a known case of right sided hemiparesis, with history of covid infection complicated with rhinocerebral mucormycosis- operated in 2022. He had history of diabetes mellitus during covid infection for which he was on medication in 2022, then stopped medication as his sugar levels came to normal. On General Examination he was average built, well oriented, Cooperative B Pmmhg Pulse74/ minutesnormovolumic with regular rhythm, afebrile, all point of examination like piccwere absentdetected.Local Examination of nose was done. There was side. Crusting was found on mucous membrane, and septum was found deviated towards right with mid septal tear in right nasal cavity. Live Maggots were found in septal tear, ethmoid and maxillary sinus opening. On Post Rhinoscopy examination there was no Post Nasal Tricklinginvestigations which are necessary in the preop period. The patient was then planned for debridement and suction clearance of maggots.

* *Corresponding author*.
E-mail address: vartikapaliwal10@gmail.com (S. Vaidya).

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2.1. Investigations

1. ENT profile- CBC, Urine R/M, Blood sugar, RFT, LFT was done.
   Blood sugar: Random – 220mg/dl and Fasting – 120mg/dl TLC count- 14000/microliters rest everything was within normal limits.
2. CT PNS was suggestive of nasal mucosa atrophy with multiple maggots present extending to ethmoid sinus, maxillary sinus, frontal sinus and base of skull.
3. Direct nasal endoscopy shown multiple live maggots moving out of sinuses and in nasal cavity.

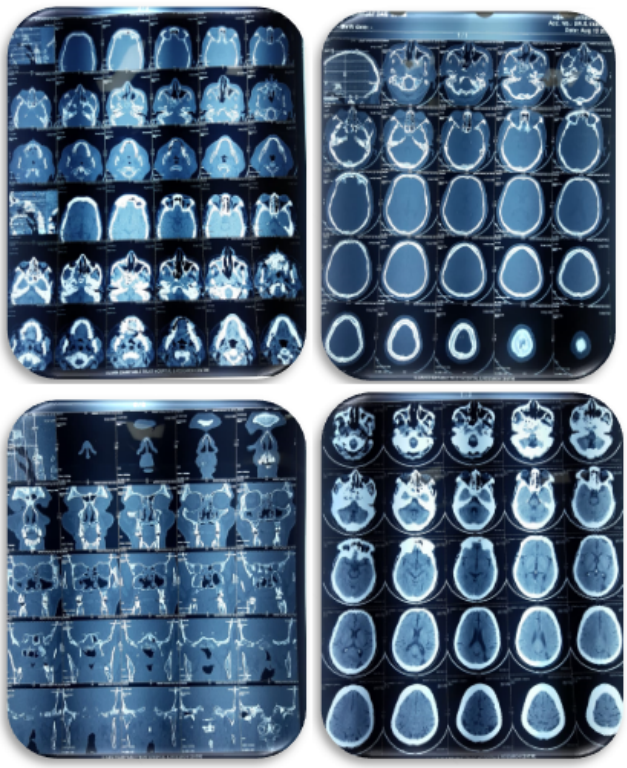

Figure 1:

2.2. Management

Patient was started with injectable antibiotics, ceftriaxone 1gm I/V BD and the patient was also given oral antiparasitic medication i.e. 12 mg tab ivermectin daily for 3 days. Normal Saline drops mixed with crushed 2 tabs of ivermectin 12mg were also instilled in patient with frequency of 2 drops QID. Multiple sitting of Nasal endoscopy suction and clearance was done under LA with sedation and under local anesthesia. Multiple washes were given and Dead Maggots were removed from ethmoid sinus, maxillary sinus, sphenoid sinus and base of skull and septum followed by continued nasal washing with ivermectin saline solution.

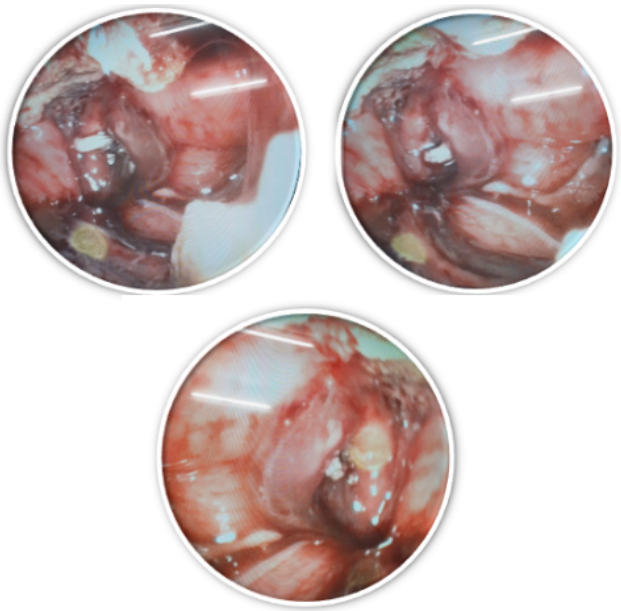

Figure 2:

3. Discussion

Myiasis is a condition in humans caused by the infestation of fly larvae belonging to the Diptera order.[1,2] Fly larvae from various families including Muscoidea (such as Musca domestica, the common house fly), Oestridae (for instance, Oestrus ovis, the Sheep Nasal fly), Calliphoridae (like Cochliomyia hominivorax, the New World Screwworm fly), and Sarcophagidae (such as Wohlfahrtia magnifica, the Spotted flesh fly) are commonly associated with myiasis.[3] These larvae can be categorized as obligatory, facultative, or accidental parasites. In obligatory myiasis, maggots develop in and feed on non-necrotic tissue of living hosts, while facultative myiasis involves maggots feeding on necrotic tissues or decaying materials but not necessarily requiring a living host. Accidental myiasis occurs when larvae are inadvertently ingested or deposited in tissues, becoming accidental parasites.

Myiasis can also be classified based on the affected area. Nasal myiasis, unlike most forms, can lead to potentially fatal outcomes, often involving destruction of nasal soft tissue and bone. Complications such as pneumocephalus, secondary meningitis, and bacterial sepsis have been documented.[4–8] Risk factors identified in an Indian study include atrophic rhinitis, leprosy, poor nutritional status, and low socioeconomic status.[4] Similar to leprosy, mucocutaneous leishmaniasis ulcerations may predispose individuals to nasal myiasis, especially in those with low socioeconomic status and living in rural areas.

Although rare, cases of nasal myiasis have been reported in resource-rich countries, including among previously healthy travellers.[9–11] Additionally, locally

acquired cases have been observed in immunocompromised individuals,[12–14] and nosocomial nasal myiasis outbreaks have been documented in intensive care units in intubated and semi-conscious patients in USA,[15–18] Korea,[19] and Taiwan.[20]

Successful treatment involves complete removal of larvae to prevent secondary infections.[3] While extreme surgical interventions are avoided, topical agents like turpentine, mineral oil and chloroform and manual extraction remain common treatment modalities.[3,7,21] Endoscopic removal has emerged as the preferred treatment,[12,22,23] although multiple procedures may be necessary due to the high number of larvae sometimes present.[24]

Ivermectin, a semi-synthetic derivative of avermectin, has gained attention for its efficacy against various parasites, including those causing myiasis. It acts by disrupting neurotransmission through ligand-gated chloride channels in invertebrates, leading to paralysis and death.[25] Ivermectin's low affinity for mammalian central nervous system and inability to penetrate the blood-brain barrier make it safe for use. Recent research suggests additional immunomodulatory effects, further expanding its potential applications.[26,27] Successful use of oral ivermectin alongside manual extraction has been reported in treating nasal and rhino-orbital myiasis cases.[7,9,28–30] Dosages typically range from 2 mg to 0.2 mg/kg, with repeated courses possibly necessary.[9] Ivermectin is readily available in many resource-poor countries, often in liquid formulations.

4. Conclusion

With this, the conclusion drawn from the case study was that the most effective tool found in the complete clearance of maggots was the solution made by combining crushed ivermectin tablet and saline. The vigorous routinely done nasal irrigation with this solution benefited the patient to a larger extent and resulted in complete clearance in approximately three to four settings. Thus the antiparasitic oral tablet IVERMECTIN can be used in a nasal drop formulation for the aid of nasal myiasis. It is important to note that the liquid formulation of ivermectin, which was used in our case, has twice the bioavailability of oral tablet.

5. Source of Funding

None.

6. Conflict of Interest

None.

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Author biography

Vartika Paliwal, Junior Resident

Sudhakar Vaidya, HOD

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