Annals of Clinical Otolaryngology

Case Report
Published: 16 Jan, 2020

Nasal Myiasis in Pediatric Age Group: Case Report and Review of the Literature

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Abstract

Nasal myiasis, defined as the infestation of tissue by larvae is an uncommon occurrence that has been described in a few case reports, mainly in elderly or debilitated individuals. An *Oestrus ovis* larvae is one of the common parasite to affect the nose in the human host. The authors describe a case of nasal myiasis caused by *Oestrus ovis* in a pediatric immunocompromised patient, managed by endoscopic extraction of the larvae.

Introduction

Traced backed to Hindu mythology, whereby it was believed to be a punishment for people's sins, nasal myiasis is still present now a days and is defined as the infestation of human or animal tissues by the maggots or feeding larvae of non biting flies [1-3]. The latin words Muia (fly), and iasis (disease) were coined together to form the term myiasis, initially described by Hope [4].

Myiasis can be subdivided into two main categories based on the life cycle of the species and its dependence on the host it invades. Obligatory myiasis is completely dependent on their host for reproduction and survival, and usually invades healthy tissue. On the other hand, accidental or facultative myiasis incidentally invade a host but do not depend on it for reproduction, and they can thereby invade either necrotic or healthy tissues [1,4].

It is a very common pathogen in sheep its natural host with occasional accidental infections in human hosts [3,5,6]. We present a case report of nasal myiasis in an immunocompromised pediatric patient with no prior exposure to sheep, which resolved with manual larvae extraction.

Case Presentation

A 6 year-old previously healthy girl presented to our institution for generalized fatigue and fever 1 week prior to presentation, refractory to antibiotics. She was found to have laboratory tests in keeping with tumor lysis syndrome and was later diagnosed with hemophagocytic lymphohistiocytosis caused by Epstein-Barr virus.

The patient was intubated, had multiorgan system failure, was compromised and was being treated supportively and with intravenous antibiotics. One week after admission to the hospital, the patient was found to have a maggot coming out upon suctioning the oral cavity.

Flexible fiber optic laryngoscopy was performed through the oral cavity and was negative. It was then performed through the nose and she was found to have 2 maggots in the right nasal cavity, at the level of the right middle turbinate. The left nasal cavity was clear.

CT scan of sinuses was done and showed a heterogeneous collection in the right posterior nasal cavity with air loculus and secretions as well as mucosal thickening in the paranasal sinuses. Decision was made to take the patient to the operating room for endoscopic removal of the larvae and inspection of the cavities looking for the nest.

Intraoperatively, the left nasal cavity was found to be clear. Two maggots were found in the right nasal cavity (Figure 1) and a maxillary antrostomy was performed. The right maxillary sinus was clear of maggots. The nasopharynx was examined and found to be free of disease.

The oral cavity and bilateral ears were also carefully examined in the operating room and found to be free of disease.

Finally, a flexible endoscopy was performed through the endotracheal tube and bilateral bronchi

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Received Date: *10 Dec 2019*
Accepted Date: *10 Jan 2020*
Published Date: *16 Jan 2020*

Citation:
Barazi R, Dabbous H. Nasal Myiasis in Pediatric Age Group: Case Report and Review of the Literature. Ann Clin Otolaryngol. 2020; 5(1): 1040.

Figure 1: Oestris Ovis larvae at the level of the middle turbinate being removed endoscopically.

were explored with no findings significant for myiasis. Saline washes were administered postoperatively. Flexible fiber optic laryngoscopy was performed at postoperative day 1 at the patient's bedside. One small larva was seen at the level of the nasopharynx and was suctioned out. The nasal cavities were otherwise free of disease. The larva was sent to pathology and parasitology and was found to be *Oestrus ovis*.

At postoperative day three, the patient was taken to the operating room for a second look procedure, with the presence of the orthodontic and ophthalmology teams.

The nasal cavities were decongested and found to be free of larvae. The oropharynx was examined by the orthodontic team, and the eyes were examined by the ophthalmology team. No larvae were identified.

The patient was prescribed nasal saline washes and she was seen again at postoperative day ten with no evidence of recurrence.

Discussion

Oestrus ovis is one of the most common culprits in nasal myiasis [5]. It belongs to the *Oestroidae* Family and commonly affects the nose and nasopharynx of patients, in addition to internal organs, with the exception of the digestive system [6]. Furthermore, this organism is almost never a culprit in skin and subdermal infections [6].

This organism is more commonly found in humid or warm climates and is commonly seen in individuals who are involved in livestock farming, particularly sheep [5,7].

In sheep the natural host of *Oestrus ovis* the nose is commonly affected due to its easy accessibility and the availability of space for the organism to grow and reproduce [1]. The larvae reproduce inside the nose and paranasal sinuses of sheep and are eventually expelled by inducing sneezing of the host [5].

Once *Oestrus ovis* releases its progeny into the sheep host, the first instar larvae (L1) attach to the nasal mucosa strongly with the help of hooks and spines, and later move to the paranasal sinuses where they become second-instar larvae (L2) [8,9]. At this point, the hooks and spines are reduced, allowing the larvae to be expelled by sneezing of the host, and later become third-instar larvae (L3) with well-developed spines and hooks for survival outside of the host [9].

Although infections of humans usually affect the host conjunctivae, cases of nasal myiasis have been reported in the literature [6].

Nasal myiasis can either develops as a primary infection, or as a complication of ocular myiasis, whereby there is spread of infection through the orbital wall to reach the paranasal sinuses and subsequently the nasal cavity [5].

Nasal myiasis with *Oestris ovis* in humans has been considered a self-limiting infection because of the inability of the larvae to survive and mature beyond the first instar stage [3,10], however few cases reported the retrieval of second [11,12] or third instar larvae [3,13,14].

Larvae of the Family *Oestroidae* and Genus *Cephenemyia* and *Cephalopina* can cause burrowing into the mucous membrane of the oral cavity, when they infect their host, and subsequently cause more extensive damage than the *Oestris ovis* larvae [6]. In addition, flies from the *Calliphoridae* or *Sacrophaginae* lineage can also occasionally infect the human host and tend to cause necrosis and invasion [4,15].

Nasal myiasis is commonly a disease of the lower socioeconomic population, and is associated with poor hygiene and unsanitary living conditions [1,16,17]. It is also common in patients with severe halitosis, as well as in chronic mouth breathers, epilepsy patients with lip lacerations, and individuals with severe periodontal infections or fungating neoplasms [18-22].

Pediatric patients are less commonly infected than adults and most reported cases of nasal myiasis are seen in the elderly [1,16].

Patients will commonly present with a foreign body sensation in the nose or throat, as well as cough, sneezing, nasal discharge, epistaxis, pain, and respiratory symptoms such as dyspnea and stridor [16,23-25]. In addition, nasal congestion and edema are commonly seen in patients affected by myiasis, and the edema is usually minimally responsive to topical decongestants [16,26].

Imaging for these cases is usually in the form of computer tomography scans, with areas of hypolucencies at the level of the soft tissues surrounding the nasopharynx, nasal cavities and paranasal sinuses being suggestive of larvae infestation. Superimposed bacterial infections can manifest as edema and obstruction of sinus outflow tracts on CT imaging [17].

If the disease is not treated, it can result in complications such as tissue necrosis and destruction, as well as perforation of the palate or septum, ulceration of the posterior pharynx or tonsils, and facial cellulitis [25,27]. This of course depends on the type of parasite involved, as well as on the status of the host. Myiasis tends to occur more commonly in patients who are somehow debilitated and unable to ward off flies [4]. Infections tend to be more severe in the immunocompromised since the immune system is not adequate to fight off the parasite leading to the larvae's capability to mature and grow [3]. In addition, the maggots tend to be attracted to areas of necrosis or malignancy [3].

Turpentine oil, and other chemicals such as ether, ethyl chloride, chloroform and phenol, among others, have been described as a helpful product in order to extract larvae from the nasal cavity [4,28,29]. Exposure to the sun was also described as a tool to attract the maggots out of the nose [4].

Nowadays, ideal treatment is performed by manual extraction of the larvae with proper observation of deeper areas to make sure they are clear of maggots [4,9]. It is very effective and leads to low rates of recurrence. Use of an endoscope can help with the removal of maggots, especially when they are located in areas difficult to access [25]. Patients will often require more than one visit to the operating room in order to completely clear the infection [17].

Pyrantel pamoate has been described in the literature as a paralyzing agent, allowing easier removal of larvae from the nasal cavity [16,25].

Ivermectin has recently been advocated as a safe drug to be used in humans infected with myiasis before or after manual extraction of the maggots [26,30,31]. Larvae can also be removed by nasal irrigation with saline [32].

Topical intranasal corticosteroids and antibiotic agents may be added after manual extraction to avoid superimposed bacterial infections [33].

Removal of larvae in closed sinus cavities can be difficult at times and treatment in such cases should focus on symptom relief, as the parasite will eventually spontaneously be expelled from the nose. However, if patients develop persistent symptoms, one should consider retained larvae as a cause, and proceed with intraoperative exploration of the sinuses [10].

In our patient, a pediatric girl from a poor socio-economic background with no prior exposure to sheep, *Oestris ovis* was retrieved from the right nasal cavity on two occurrences after which she was found to be free of parasites. The finding of nasal myiasis was almost incidental, as the patient was intubated and sedated and thereby could no voice out complaints.

Our case is particular in the fact that the patient is not part of the usual age group affected by nasal myiasis, and had no prior history of exposure to sheep. At the time the nasal myiasis was discovered, she was in an immunocompromised state, and the parasite recovered was found to be *Oestris ovis*, which is not known to lead to necrosis and invasion in the human host.

Cases have been reported in the literature, whereby infestation with flies from the *Calliphoridae* or *Sacrophaginae* family led to necrosis and invasion of the oral and nasal tissues in the human host [4,15].

In our patient, manual extraction was performed without the need for any paralyzing agent and was enough for the patient to completely recover from her infection. However, one should stress on the importance of early identification of the species, family and genus to which the myiasis belongs, as different families will have different manifestations in the human host. Specifically, when these parasites are recovered in immunocompromised patients, early identification becomes all the more important due to higher propensity for damage in case of an invasive larva. One should consider removal of the larvae irrespective of the family they belong to, in order to identify the organism, predict outcome, and avoid any tissue invasion and necrosis if it has not happened at the time of diagnosis.

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