

Nasopharyngeal myiasis presenting in onset Diabetes Mellitus: A Case Report

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Abstract:

Background

Despite their confirmed nutritive usage, maggots, practiced in Uganda as poultry feed, are known to cause myiasis as an infection of a fly larva in human tissue. The risk of myiasis increases in individuals with immunocompromised such as diabetes mellitus (DM). This study aimed to report a rare case of nasopharyngeal myiasis with accidental type 2 diabetes mellitus diagnosis.

Case presentation

A 60-year-old female patient was referred to Kampala International University - teaching hospital with a chief complaint of bloody sneeze and nose maggot discharge for one week. The otorhinolaryngology team reported a swollen painful zygomatic arch, and the rhinoscopy revealed no active bleeding from the nose, and no maggots seen, examining the throat, bloodish secretion descending from the nasopharynx was identified from the single maggot sneezed, parasitological investigation identified *Lucille sericata* the causative pathogen. The patient was diagnosed with nasopharyngeal myiasis with aspiration pneumonia associated sepsis and, new onset of type 2 diabetes mellitus. Treatment included larval removal by sneeze that helped to expel the last maggot, wound care by nasal irrigation using antiseptic solutions, administration of ivermectin, antibiotics, and insulin therapy to control blood sugar. After four days of the treatment, the patient was discharged from the hospital with resolved infection-controlled blood sugar levels and continued follow-up at the nearby facility.

Conclusion

risk factors for myiasis, clinical recognition, and proper therapy are prominent. rhinoscopy coupled with other means like nasal antiseptic, antiparasitic drug administration, antibiotic, and insulin therapy effectively managed nasopharyngeal myiasis.

Keywords: nasopharyngeal; myiasis; diabetes mellitus

Introduction

Maggots despite their confirmed nutritive usage, practiced in Uganda as poultry feed [17], are known to cause myiasis as an infection of a fly larva in human tissue. It is an opportunistic parasitic infestation by larval stages of the flies in humans as well as in animals caused by house fly larvae and commonly found in tropical and subtropical areas of the world [5].

People with compromised immunity, nutritional disorders, diabetes mellitus, poor hygiene, sino nasal diseases such as atrophic rhinitis, leprosy of the nose, midline granuloma, and malignancy are at risk of developing myiasis infestation [7]. It is classified based on the infestation site, several parts of

the body can be the target of such infestation, determining the type of myiasis infestation, nasopharyngeal myiasis is one type of cavity myiasis. Other sites can be, cutaneous, oral, ocular, and urogenital. The cutaneous myiasis is the most frequent and impressive form [18].

Diagnosis of nasal myiasis is related to history taking and physical examination. Epistaxis, thick mucus nasal discharge, nasal obstruction, and malodorous are common symptoms in patients with nasal myiasis [7]. We report an unusual case of nasopharyngeal myiasis, with pneumonia-associated sepsis in a 60-year-old female admitted on 7th July 2023 in the

accident and emergency department of Kampala International University Teaching Hospital.

Case Description

In July 2023, a 60-year-old Ugandan woman was admitted to the Accident and Emergency Department of KIU Teaching Hospital, complaining of bloody sneeze and nose maggot discharge for one week. This started one week back with a sudden onset of bloody discharge when sneezing, volume not well determined, several times that often containing maggot. Occurrence two days after of coldness and permanent generalized moderate headache with no radiation. The above has motivated the family to consult a nearby health facility where she received adrenaline nose ointment and analgesic but any observed improvement is the reason why they've been referred from St Daniel Comboni Hospital to KIU Teaching Hospital for further management.

On review of other systems, she reported having a fever, cough, chest pain, and breathlessness.

Past medical history, no known chronic illness reported, HIV serology status has been unknown.

Past surgical history, several dental extractions years back.

Socio-family history, peasant, married many years ago but separated, she has three 3 children all of them in good health and appearance status. Neither alcohol drinker nor cigarette smoker. But usage of firewood for food cooking.

Past allergic history, no known drug allergy reported.

On examination, 60 years old female not known for any chronic illness, lying supine 450 on the bed, with a bloody stain on her nose, a foul smell around the patient, febrile on touch, not in obvious respiratory distress.

No jaundice, no pallor, no cyanosis, fully conscious, no pedal edema, no lymph node enlargement, no dryness of mouth mucus. Arm nails with curvature suggestive of finger clubbing.

Vital signs: Blood pressure of 128/70 mmHg, pulse rate of 112 beats per minute, respiratory rate of 24 movements per minute, temperature of 38.5 0 Celcius, Oxygen saturation of 92 % on room air.

Cardiovascular system: radial pulse regularly regular, normovolume, synchrone, rate of 122 beats per minute, no neck vein distended, the precordial area with palpable murmurs (Heaves), and apex beat located on fifth intercostal space midclavicular line. The first and second heart sounds are heard without added sound.

Respiratory system: symmetrical chest movements, neither obvious deformity nor scar, normal vocal fremitus, resonant sound on percussion, bilateral fine para scapular crackles.

Abdominal examination: normal fullness, no scar, febrile on touch, no tenderness, no organomegaly, bowels sound heard not increased.

Nervous system: Glasgow coma scale of 15/15, power, tone, reflexes, and sensation were normal

Ear nose and throat: nose with bloody stain, foul smell, tenderness on the glabella, unhygienic mouth, dental arch with removed teeth (two remaining only, one left superior incisor and one right premolar).

Discussion

Myiasis is a condition where flies lay eggs in a living vertebrate host animal's skin or cavities and the hatching larvae eat the surrounding flesh. This can be detected in the eyes, ears, nasal and oral cavities, skin, alimentary tract, and urogenital. The larvae can be of two types: maggots or bots. Maggots are long and slender (*Calliphora*, *Cochliomyia*, *Lucilia*, *Musca*, *Phaenicia*, *Phormia*, and *Sarcophaga* spp.) and typically associated with wound myiasis and typically wounded, unhealthy, or dirty and moist body parts are affected. Bots are large and rotund (e.g., *Cuterebra* and *Dermatobia* spp.) and manifested as so-called furuncular and migratory myiasis.[16]

Lucilia sericata has been identified as the larva leading to myiasis in this patient. (Fig 1) and was coming out from the nostril, several larvae have been seen according to the attendant report but throughout the hospital stay, especially on arrival we were able to identify a single larva following a sneeze (Fig 1).



Figure 1: The larvae of *Lucilia sericata* obtained after sneezing from the patient.



Figure 2: Posterior-anterior chest X-ray film.

Disease symptoms typically appear in malnourished, dirty people or in people with mental disabilities or retardation who are unable to defend themselves from fly bites. Leprosy, mental disease, and diabetes mellitus are among the medical situations in which it frequently manifests. [15]

In our study, the patient was not known to be diabetic, but regarding the diagnostic criteria of diabetes mellitus as recently updated by the American Diabetes Association Professional Practice Committee, diagnostic tests can be either Fasting plasma glucose test, glycosylated hemoglobin test, Random plasma glucose test or Oral glucose tolerance test. (American Diabetes Association, 2022).

diagnosis	Glycosylated hemoglobin test	Fasting plasma glucose	Oral Glucose Tolerance Test	Random plasma glucose test
normal	Below 5.7%	99 mg/dL or below	139mg/dL or below	N/A
prediabetes	5.7% to 6.4%	100 to 125 mg/dL	140 to 199 mg/dL	N/A
diabetes	6.5% or above	126 mg/dL	200 mg/dL	200 mg/dL or above

Table 1: Test results for diagnosis of prediabetes and diabetes.

Considering the history of anorexia in this patient, we performed the random plasma glucose test on arrival which showed hyperglycemia of 255.6 mg/dL and when repeated on the second day, the fasting blood sugar revealed hyperglycemia of 196.2 mg/dL, this led us to a diagnosis of type 2 diabetes mellitus newly diagnosed in this patient and initiated insulin therapy. [1] Researchers observed that, in comparison to normal mice, diabetic animals exhibit higher rates of persistent glycation and glycoxidation chemical changes involving sugar molecules on immune cell proteins. Those Key immune proteins undergo extensive physical and chemical alterations that modify their functions and, in turn, the immune system's reaction to specific circumstances [4]. "The primary structure of a protein can be dramatically changed when these extra molecules from glycation and glycoxidation are present, and its function may change because, for example, its active site is disrupted or it folds abnormally," Dr. Santambrogio, who studies an associate director for precision immunology at the Englander Institute for Precision Medicine at Weill Cornell Medicine, as well as a professor of physiology and biophysics [4]. Since model antigens can elicit an immunological response, they are frequently employed in immunology investigations. She and her colleagues found that these sugary changes

specifically inhibit the capacity of immune cells known as dendritic cells to assist in organizing an immune response. A possible explanation for the general weakened immunity to pathogens observed in diabetes is this decrease in dendritic cell activity. [4] For myiasis to find a conducive habitat, it needs circumstances where immunity seems to be lacking. [15] this patient, in addition to coming from a rural environment carrying out its rural activities, which makes her very at risk of contracting an infection by the larvae not only by promiscuity but also by following a low level of hygiene, already having a history of multiple tooth extractions, the causes of which remain unknown to us, But it was likely tooth decay as a result of poor oral hygiene that could justify the location of the current myiasis, but also her socio-economic level leaving much to be desired, The fact of being accidentally recognized as diabetic becomes only a logical consequence of this clinical presentation. Combining the report of the otorhinolaryngologist with the clinical findings, the diagnosis of pneumonia-associated sepsis accompanying nasopharyngeal myiasis with newly diagnosed diabetes mellitus was maintained. In addition to the ENT consultation, the plan was to perform a Chest x-ray, head CT scan, complete blood count, sputum gene xpert, culture and sensitivity, malaria blood smear, and HIV test. During rhinoscopy, some larvae can be seen in the nasal cavity with edema,

ulceration, and crusting on the nasal mucosa. Anterior rhinoscopy is a diagnostic and therapeutic tool since it helps manually remove the larvae using forceps. Nasal endoscopy, on the other hand, provides deeper access and a more detailed picture of the nasal cavity than rhinoscopy, enabling larvae removal from occupying hard- to-reach locations in the nasal cavity [14]. The ENT team reported a swollen painful zygomatic arch, and the rhinoscopy revealed no active bleeding from the nose, and no maggots seen, examining the throat, bloodish secretion descending from the nasopharynx was identified. Despite the previous diagnosis, an impression of both Zygomatic tumor and sinusitis was planned to be ruled out by the head CT scan. Unfortunately, the head CT scan and sputum gene were not done. Tranexamic acid is an antifibrinolytic agent. It works by blocking the breakdown of blood clots, which prevents bleeding, patients with nosebleeds treated with tranexamic showed decreased bleeding, decreased rebleeding, decreased emergency department times, and improved patient satisfaction. [2]

500 mg of tranexamic acid was given to stop bleeding and the dose was repeated two times the first day.

The treatment consists of the removal of larvae with forceps and daily washing and debridement of the wound until new tissues emerge. [15] In therapy with antiparasitic drugs, complete larval expulsion is prominent since their fragments can trigger an allergic reaction in the patient. Wound care is carried out periodically by washing the nose using an antiseptic solution. Studies have shown that systemic administration of ivermectin, an antiparasitic drug can be administered orally or topically, and it is the most widely used parasiticide. [12] In various case reports, administration of ivermectin facilitated larval extraction and accelerated wound healing. Ivermectin showed a good safety profile with minor adverse effects. Other alternatives include thiabendazole and turpentine solution. Antibiotics are given only if clinical signs are indicative of secondary bacterial infection.

[8,9]. Similar cases have reported treatment with a single dose of oral ivermectin. [10].

Studies have shown the role of antibiotic therapy especially when an obvious bacterial infection is found. [13].

In this patient, we gave a single dose of 12 mg of ivermectin since the first day, and have associated empirical ant biotherapy of Levofloxacin 500 mg once per day and metronidazole 500 mg three times per day.

Antipyretic (Paracetamol 1g) and normosaline were given on the first second days, and a nasal drop made with a combination of neomycin sulfate, and betamethasone sodium phosphate was used three times per day. Studies report that nasal decongestant drops can improve the patient's symptoms, and it is important to use this medicine to prevent any damage to the delicate tissues of the eyes, ear, or nose and to prevent any infection from developing. [6,11] Insulin initiation and titration can be challenging for many primary care providers who are involved in the treatment of patients with type 2 diabetes. Despite the introduction of advanced insulin analogs and improvements in insulin delivery devices, many patients with type 2 diabetes continue to experience suboptimal glycemic control. With an increasing number of treatment options available, type 2 diabetes management is moving away from a "one-size-fits-all" approach and toward individualized treatment regimens based on particular patient needs. [3] Blood sugar regulation was initiated by a bolus of rapid insulin 5 IU the first day with 1 liter of normal saline, from the second day a treatment plan with mixtard 10 IU pre-breakfast and 5 IU pre-super was established. The patient was discharged on 4th day of therapy and underwent outpatient treatment with Metformin 500mg BD, levofloxacin 500 mg, and metronidazole 500 mg BD, neither nasal discharge was observed nor foul smell was noted, this being a discharge against medical advice, patient has been addressed to a nearby facility for the follow-up. One month later, relatives reported the patient to be better and with no complaints.

Test name	Result	Normal range
Cbc full blood count		
WBC	12.0 X 10 ⁹ /L	4.0 – 10.0
LYMPHOCYTES	2.3 X 10 ⁹ /L	0.8 – 4.0
MID	1.3 X 10 ⁹ /L	0.1 – 1.5
LYMPHOCYTES %	19.2 Percentage	20.0 – 40.0
MID%	10.6 Percentage	3.0 – 15.0
GRANULOCYTES %	70.2 Percentage	(M 40.0 – 70.0) (F 45.0 – 70.0)
HGB	14.0 g/dl	12.0 – 16.5
RED BLOOD CELL	5.40 X 10 ¹² /L	3.5 – 5.5
HEMATOCRIT	45.5 Percentage	M (37.0 – 54.0) F (35.0 – 44.5)
MCV	84.3 fL	80.0 – 100.0
MCH	25.9 Pg	27.0 – 34.0
MCHC	30.7 g/dl	32.0 – 36.0
RDW-CV	13.4 Percentage	11.0 – 16.0
RDW-SD	42.7 fL	35 – 56.0
PLATELET	224 X 10 ⁹ /L	100 - 300
MPV	9.2 fL	6.5 – 12.0
PDW	15.6	9.0 – 17.0
PCT	0.205 percentage	0.108 – 0.282
GRAN#	3.4 X 10 ⁹ /L	2.0 – 7.0
Blood smear for malaria	Negative	
Hiv test	Negative	
Random blood sugar	14.2 mmol/l	
Fast blood sugar	10.9 mmol/l	

Table 2: Test results for diagnosis of prediabetes and diabetes.

Conclusion

We report a case of a 60-year-old woman with bloody sneeze and nose maggot discharge as the chief complaint. The patient was not a known diabetic. Based on the clinical and adjuvant examinations, the patient was diagnosed with nasopharyngeal myiasis with aspiration pneumonia associated sepsis and, a new onset of type 2 diabetes mellitus. The patient underwent various treatments including larval removal by a sneeze that helped to expel the last maggot, wound care by nasal irrigation using antiseptic solutions, administration of ivermectin, antibiotics, and insulin therapy to control blood sugar. CT scan was not done, the rhinoscopy exam helped to locate the infestation, and other clinical features like cough and fever were attributed to aspiration pneumonia. The parasitological investigation identified *Lucille sericata* as the causative pathogen. After four days of treatment, the patient requested to be discharged, neither nasal discharge was observed nor foul smell was noted, this being a discharge against medical advice, the patient has been addressed to a nearby facility for follow-up. One month later, relatives reported the patient to be better and with no complaints.

Patient Consent

The patient signed an informed consent form and agreed the case to be published in a scientific journal.

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Disclosure of Conflicts of Interest

The authors declare no conflict of interest regarding the manuscript.

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Authors Contribution

The authors contributed significantly to the case report.

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