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Furuncularmyiasis in a Child Caused by Flesh Fly (*Wohlfahrtiamagnifica*) and Associated Bacterial Infections

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Abstract: *We report the case of a two-year-old boy with hypereosinophilia whopresented with a swelling on his left scapular that had persisted for more than three weeks. A second-stage larva of Wohlfahrtiamagnifica was found with associated bacterial organisms such as Proteusvulgaris, Staphylococcusaureus and Staphylococcusepidermidis, leading to the diagnosis of cutaneous myiasis. Following removal of the larva and secondary bacterial therapy,the clinical and hematological manifestations returned to normal. Diagnosisof myiasis and associated secondary infections should always be kept in mind in the event of clinical signs offuruncular lesions, pain, fever, exudation which may be accompanied by eosinophilia.*

Keywords: *cutaneous myiasis, Wohlfahrtiamagnifica, Secondary bacteria, infections, pus*

I. Introduction

Myiasis, from the Greek *myia*for "fly," has beendefined as the infestation of live human or vertebrateanimals with larvae of the insect order Diptera of the genera *Sarcophagidae*. It is usually classified from an entomological or clinical point of view. Entomologically flies may be classified into three myasis producing groups; obligate, facultative and accidental. Clinically myasis can be according to the organ that is affected (1.13).myiasis is classified as furuncular, wound, gastrointestinal, urogenital, ocular, nasal orauricular(3,4,8 and 20). One of the most common formsof human myiasis is furuncular myiasis, whichis the result of subcutaneous infestation by flylarvae. *Wohlfahrtiamagnifica*is an obligatorymyiasis agent, which infests only the livingtissue of animals and man. These larvae usuallyinfest the ears, eyes, and nose, as well ashealthy or damaged skin. In Turkey, *W. magnifica*has been reported as the cause of otomyiasis,orotracheal myiasis and wound myiasis (1,4).

The myiasis identified in our report is known to be complicated by secondary bacterial organisms which invade the infested areas leading to pain, pus formation, fever, and other cardinal signs of inflammation.(11). The presence of*Staphylococcus aureus*alongside*Staphylococcusepidermidis* isconnected to its ubiquitous nature and high affinity for residency on the skin(1); thereby causing the purulent infections indicated in our case report. Associated bacterial organisms include*Staphylococcus* species, *Streptococcus* species, *Micrococcus* species, *Pseudomonas* species, *Proteus* species and *Aeromonas* species. They organisms are capable of causing numerous diseases including: skin abscesses, pneumonia, fever, wound infections, gangrene, and intoxication and hypersensitivity reactions (2).In the present study, we report a case offuruncular myiasis caused by *W. magnifica*ina child who presented with significant bloodeosinophilia, axilla lymphadenopathy andswelling/ exudation over the left scapular muscle.

II. Case Report

A previously healthy two-year-old boy living inGwagwalada, Abuja, Nigeria was presented in June 2015with a history of swellingon his left scapular muscle that had persistedfor more than three weeks. His mother narrated that whileattempting to extract pus from the lesion a larvawas removed from the center of the furuncleand later identified as a second-stage larva of*W. magnifica*(Fig.1).Swap sample were aseptically collected from the pus and were subjected to standard laboratory culture and complete biochemical studies using Microbact^{TM}oxoididentification system based on the methods (2, 5). The culture results revealed three bacterial species which included: *Proteusvulgaris, Staphylococcus aureus*and *Staphylococcus epidermidis.*Histological examination shows a small cavity in the dermis where the larvae was removed. Around the cavity are heavy infiltration of mixed inflammatory cells, which include lymphocyte, histiocytes, occasional giant cells and plasma cells.

On clinical examination, the child was found to be mentally alert and hemodynamicallystable. He had lymphadenopathies and swelling measuring about 2 cm in diameter in the axilla region and theswelling

extending from the right axilla to thechest region. The laboratory examinations showeda white blood cell count of 8,600 cells/mm3(with an absolute eosinophil count of 5,160cells/mm3), hemoglobin 12.9 g/dl and platelets254,000/mm3. The patient had normal serumIgG, IgA, and IgM levels but a high IgE level of667 IU/ml. Direct parasitological investigationsof stool and serological examinations forToxocara species, *Fasciola hepatica* and *Echinococcus*species and their larvae were all negative.Following removal of the larva and treatment with penicillin-streptomycin combination at 1000 I.U/ml, for five days, the swellingover the right pectoral muscle and the axillalymphadenopathies regressed rapidly. Serum IgE levels graduallydecreased to 512 IU/ml, 307 IU/ml, 201 IU/ml and 182 IU/ml after 1, 2, and 4 weeks and 2months, respectively. Absolute eosinophil countdecreased to 1,360/mm (3) after one week andto 480 cells/mm3 one month later.

III. Discussion

Myiasis due to *W. magnifica*is very rare inchildhood. A few cases of wound (9), auricular(18) and ophthalmomyiasis (2, 13) have been reported.In the *Calliphoridae* and *Sarcophagidae*, mostspecies that cause myiasis deposit their eggsor larvae directly onto the host at somepredisposing site, such as those caused bywounding, necrosis or bacterial contamination (7).Healthy hosts are much less attractive, even forobligate species such as *W. magnifica*, which canattack healthy tissue. Advanced age, poor socialconditions, mental retardation, immobilization,diabetes mellitus, alcoholism, vascular occlusivedisease, and infected dermatitis complicated by bacterial infections are predisposingfactors for cutaneous myiasis(3,10).

The predisposing factors indicated in our study included close contact withdogs in the outdoors and probably from drying laundry outdoors which exposes the clothes to flies as soon as the sun sets and the clothes are not immediately removed. The possible presence of microorganisms associated with the pus lesions in our case may be due to bacterial invasiveness in which the presence of larvae may draw the microorganisms to sites of braided lesion thereby causing pus formation as observed in our studies. The flesh and skin of humans also provides conducive temperature for the growth of most of these isolated bacterial organisms. More so, the metabolites from the larvae may provide carbon source for microbial biosynthesis, thereby aiding the proliferation of the bacteria at the site of lesion. The presence of these microorganisms indicated in our case report may further lead to serious health challenge such as skin abscesses, necrosis, fever, pneumonia, gangrene, and many others had it been the case has not been arrested early enough. Our report profess a signal for public health authorities in Nigeria to be strengthened and more cases of this nature be reported to relevant authorities to minimize the scourge of myiasis.

Infestation of mammalssuch as cows, horses, goats, sheep, pigs anddogs is not uncommon (11). It seems probablethat the eggs of larvae of the fleshflymigrated from dogs from neighborhoodvia aerosol or contact to our patientfrom his clothes which were sun dried after laundry but were not removed even after sunset. Another possibility could be through contact while the child plays with dogs around the neighborhood. The eggs may find lodgment to the skin thereby especially at night hours at ambient heat while the child sleeps, thereby hatching to larvae which immediately penetrates the soft skin and lodge in the flesh(11. 12).

In furuncular myiasis,a pruritic papule of approximately 2 to 3 mmin diameter develops within 24 hours of initialinfestation by the larva and associated microorganisms. The patient may feelpain caused by the bacterial infection and tearing of the tissue caused bythe feeding and movement of the larvae (12). Only one or a few larvae are usually presentin furunculoid whereas many larvae commonlyoccur in wounds and cavities. Our patient hadonly one larva and he rapidly healed followingits removalfollowing secondary bacterial therapy. The clinical pattern depends on thespecies of fly and location of the infestation.Marked inflammatory reactions and bacterialpruritus, massive destruction andlife-threatening outcomes, such as intracranialinvasion, can be caused by myiasis.

Analysis oftissues exhibiting an inflammatory response tomaggot infestation revealed a high concentrationof lymphocytes, giant cells, neutrophils,eosinophils and plasma cells (13).Helminthic parasites and allergies are themost common cause of eosinophilia, while theassociation of blood eosinophilia and myiasisis rare. Often, before the parasitic infestationbecomes detectable, eosinophil reach a highlevel and this can result in an incorrectdiagnosis (13). The case report ofan adult patient with cutaneous myiasis sufferingfrom multisystem discomfort for nine monthswho was treated for hypereosinophilicsyndrome (14).

A case of a 54-year-old man who developedrecurrent painful migratory subcutaneousnodules and eosinophilic pleural effusion dueto myiasis has also been reported15. Both caseswere due to the larvae of *Hypodermalineatum*.To our knowledge, there have not been anyreported cases of myiasis due to *W. magnifica*accompanied by eosinophilia and complicated bacterial infections in areas covered by this study. Our report is therefore very significant as it provides baseline information for relevant public health authorities and clinical practitioners on the on the need to control this problem.

In conclusion, Our report presents the first case of myiasis diagnosed byidentifying a living fly Lavae(*Wohlfahrtiamagnifica*)in left scapular muscle of thehuman body, which could be accompanied byeosinophilia; and bacterial organisms such as *Proteus vulgaris, Staphylococcus aureus*and *Staphylococcus*

epidermidis were identified within the pus lesion. Clinicians should be more alertto the possibility of myiasis in patients withfuruncle-like lesions on their skin.

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