

An Unusual Itching in a Hemodialysis Patient Caused by Maggots of Dipterous Larvae in Asir Region, Saudi Arabia: A Case Report

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Abstract

81-year-old female patient suffered from End-Stage Renal Disease (ESRD) and on regular hemodialysis since 2012, was observed to have intense itching and cutaneous furunculoid lesions. The lesions on both legs were found infested with fly larvae (maggots). The amplification of the mitochondrial Cytochrome c Oxidase subunit I gene (COI) was successful with the annealing temperature of 51.8°C but sequencing was of poor quality that did not allow species identification. The case was treated by applying debridement with irrigation of chloroform and vegetable oil to eliminate the larvae from the wound under local anesthesia and it was effective. The study presented the first case of myiasis in ESRD and a diabetic patient in asir region of Saudi Arabia.

Keywords: Kidney failure • Diabetic mellitus • Dipterous larvae • Dyiasis • Mitochondrial cytochrome c oxidase gene • Sequence analysis

Introduction

Myiasis is the infestation of live vertebrates (humans, animals) with dipterous larvae which feed on the host's live or dead tissue causing a broad range of infestations depending on the body location [1]. Seven cases of human cutaneous myiasis caused by maggots of the tumbu fly, *Cordylobia anthropophaga* have been reported from Asir region [2]. A case of myiasis caused by *Sarcophaga* species in a diabetic patient was reported from Makkah region, Saudi Arabia [3]. This report describes a case of skin myiasis in 81-yr-old diabetic patients in Asir region, Saudi Arabia.

Case Presentation

An 81-year-old female patient suffered from End-Stage Renal Disease (ESRD) and on regular hemodialysis since 2012, was observed to have intense itching and cutaneous furunculoid lesions on both legs. The history indicated long standing DM type II for more than 30 years controlled with insulin (last HbA1c 7.2%), HTN for 20 years controlled without medication. Also, IHD with history of CABAG

since July 2003 with permanent pacemaker for sick sinus syndrome inserted in March 2017. She received levothyroxine 50 mcg daily for hypothyroidism (last TSH 1.69 µU/mL). A history of previous multiple fractures (pelvis, radius) and osteoporosis diagnosed based on DEXA scan. (T score -3.1) and received Denosumab 60mg/ml last dose was 6 months ago. Recently, she started having complaints of severe itching over both LL and her back for about 2 months with no history of recent medication added except a shift from Atorvastatin 10 mg to Rosuvastatin 10 mg.

Regarding her medication, she was receiving Alphacalcidol 1 mcg twice weekly (no phosphate binder more than 2 months), aspirin 81 mg daily, Rosuvastatin 10 mg daily, Levothyroxine 50 mcg daily, vitamin B tab OD, pantoprazole 20 mg daily, Isosorbide 10 mg BD, Insulin NPH, and Cetirizine 10 mg OD. In spite of oral antihistaminic and topical steroid cream, the patient did not improve and continued the same complaints (itching). For this reason we looked for other causes of itching, for examples, Pantoprazole and Rosuvastatin were discontinued but without any improvement, also the frequency of dialysis was increased to four times weekly but again without improvement.

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She was seen by the dermatologist and prescribed for her antihistamine without improvement. During routine Pre-dialysis assessment, brownish areas of discoloration and Boil-like swellings simulating cutaneous myiasis (furuncular or furunculoid lesions) on the left thigh and leg (Figure 1) were found infested with fly larvae (maggots, Figure 2).

The maggot died before developing into a mature fly, although efforts have been made to grow it but without success. Therefore, the fly could not be fully identified and the next step was to perform a molecular method for identification

The patient was referred to surgery for further assessment and management, the worms were also sent to parasitology for further assessment. The treatment involved debridement with irrigation to eliminate the larvae from the wound after minor surgical removal. Application of chloroform, chloroform in light vegetable oil with removal of the larvae under local anesthesia, has been followed. The treatment was successful and identification of the fly species was only possible by the molecular method from maggots due to lack of fly tracking (Table 1) (Figures 1 and 2).

Table 1: Results of the laboratory investigations of ESRD-maggot infested patient.

Laboratory test	Result
Creatinine	6.1 mg/dL
Blood urea (pre/post)	15.6 /3.7 mmol/L
Serum sodium	135 mmol/L
Serum potassium	5.5 mmol/L
HCO ₃	20 mmol/L
Serum Albumin	3.52 g/dL
Serum Calcium (corrected calcium)	9.3 mg/dL
Serum Phosphorus	3.2 mg/dL
iPTH	189 pg/mL
Alkaline phosphatase	2.16 μ kat/L
ALT	0.23 μ kat/L
AST	0.36 μ kat/L
Serum Bilirubin (Total)	11 μ mol/L
HbA1c	7.20%
CBC (Hb/TLC/PLt)	11.9/7.2/210
Serum ferritin	493 ng/mL
TSAT%	18%
KTV	1.65
TSH	1.69 μ U/mL



Figure 1: Cutaneous myiasis (furuncular or furunculoid lesions) on the leg with ulcer caused by an unidentified flies.



Figure 2: Larva removed from the furuncular myiasis on the leg of a 81-yr old ESRD patient.

The mitochondrial cytochrome c oxidase subunit I gene (*COI*) a 710-bp fragment, was amplified by the universal *COI* primers, LCO1490 (GGTCAACAAATCATAAAGATATTGG) and HCO₂198 (TAACTTCAGGGTGACCAAAAAATCA) [4]. Polymerase Chain Reaction (PCR) was performed using a master mix: 17 μ l of 1 \times BSA, 2.5 μ l of 10 \times Thermopol reaction buffer, 2 μ l of 2.5 μ M dNTPs, 1.25 μ l of each 10 μ M primer and 0.2 μ l (1 unit) of polymerase with 2 μ l of DNA template. A gradient PCR was adopted with initial denaturation of 2 min at 94°C, 40 cycles of denaturation at 94°C for 30 s, and extension at 72°C for 45 s, with a final extension of 2 min at 72°C [5]. Annealing temperature from 48°C~68°C was tried. The best band was achieved with the annealing temperature of 51.8°C (Figure 3). Although this 51.8°C was promising but the PCR product that was needed for sequencing reactions based on optimum PCR conditions was not successful even with repeated trials.

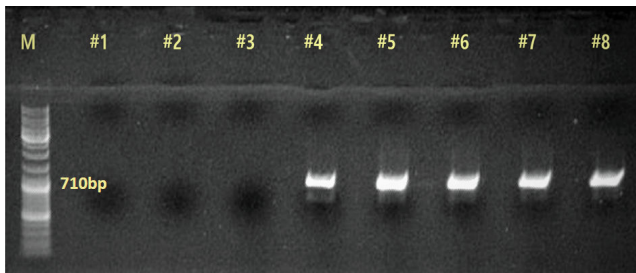


Figure 3: PCR product of the COI gene at the following annealing temperature: 68°C (lane 1); 66.4°C (lane 2); 63.9°C (lane 3); 60°C (lane 4); 55.5°C (lane 5); 51.8°C (lane 6); 49.4°C (lane 7); 48°C (lane 8); and M, molecular weight marker.

Discussion

Myiasis was first described by Hope in 1840 who observed insects and their larvae infesting a human body, and many cases of myiasis affecting humans have been reported subsequently [6-8]. To the best of our knowledge, this is the first case of myiasis in association with ESRD patients. Although myiasis has been described in diabetic patients. Our case was a long-standing DM type II and has been suffering from ESRD and on regular hemodialysis since 2012. A case of orbital myiasis ascending from nasal myiasis, which was caused by *Chrysomya bezziana*, was described in a patient with diabetes [9]. Also nosocomial myiasis was reported in a patient with diabetes [10]. This later report stressed on the need for more care and education in hospitals to avoid myiasis in vulnerable patients. Seven cases of human cutaneous myiasis caused by maggots of the tumbu fly, *Cordylobia anthropophaga* have been reported from Asir region [2]. A case of myiasis caused by *Sarcophaga* species in a diabetic patient was reported from Makkah region, Saudi Arabia [3]. This report describes a case of skin myiasis in 81-yr-old diabetic patients in Asir region, Saudi Arabia.

The initial evaluation of parasitology was maggots (cutaneous myiasis), specimens of the worms were sent for DNA for identification. Identification of *Delia* spp. (Robineau-Desvoidy) (Diptera, Anthomyiidae) and its cruciferous host in Mexico have been successfully accomplished using the mitochondrial Cytochrome c Oxidase subunit I gene (COI) 710-bp fragment [4,5,11].

Conclusion

Non-destructive DNA extractions from fly larvae (Diptera: *Muscidae*) enable molecular identification of species and enhance morphological features. The study presented the first case of myiasis in diabetic and ESRD patient in Asir region of Saudi Arabia. The treatment was successful but identification to the fly species level has not been completed.

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Conflicts of Interest

There are no conflicts of interest.

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