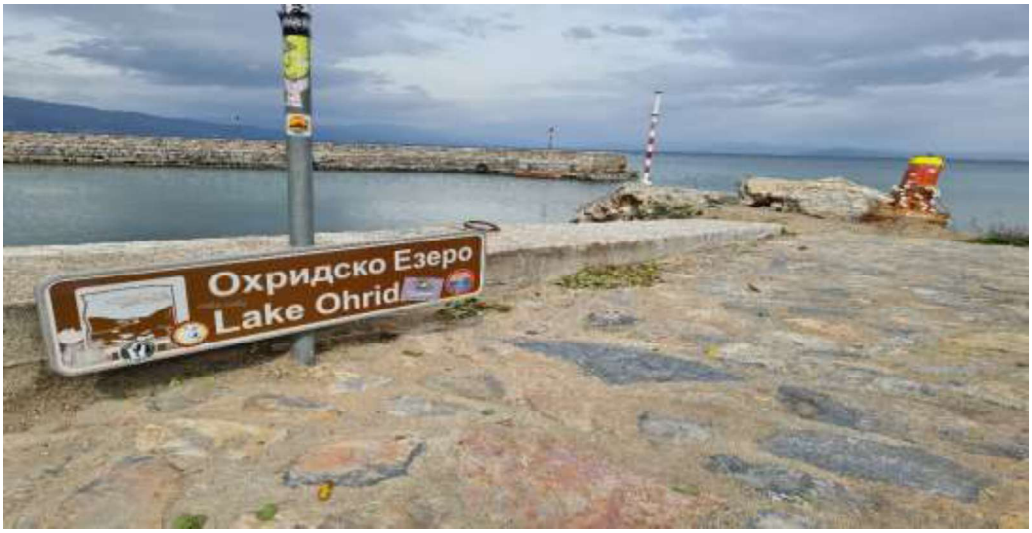
14th SEEC CONFERENCE
ON INFECTIONS AND CANCER

Ohrid, North Macedonia • October 3rd to 6th, 2024



Proceedings of Supplement J. IMAB
Publications of papers presented in the Scientific Programme of the
14-th Southeast European Conference Infections and Cancer
Ohrid, North Macedonia
3-6 October 2024

SECTION MEDICINE

Proceedings of Supplement J. IMAB
Publications of papers presented in the Scientific Programme of the
14-th South-East European Conference Infections and Cancer
Ohrid, North Macedonia
3-6 October, 2024

Publications of presented papers in Scientific Programme of Joint Forum:
14-th South-East European Conference Chemotherapy, Infections and Cancer
and
34-th Annual Assembly International Medical Association Bulgaria (IMAB)
3-6 October 2024, Metropol Lake Resort, Ohrid, North Macedonia

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IMPORTED FURUNCULAR MYIASIS IN THE REPUBLIC OF NORTH MACEDONIA - A THREE CASE STUDY

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ABSTRACT
Introduction: Furuncular myiasis is a parasite disease most commonly found in tropical regions. It is the most widespread clinical manifestation of myiasis that occurs when larvae of various species of flies penetrate the skin and cause cutaneous lesions. **Objective:** To present cases of imported furuncular myiasis acquired during a stay in Africa. As far as we know, these are the first cases reported in the Republic of North Macedonia. **Case report:** We present a group of three patients with myiasis acquired during a journey to Tanzania. The symptoms occurred three days after being bitten by hairy flies, and manifested with sporadic papular lesions accompanied by pain and itching. They contacted our hospital 6 days after being bitten. During examination of all three patients, on the bitten spot, several papulonodular, indurated, separated lesions, with centrally positioned eschar, localized on the upper, lower extremities and glutes were noted. On the sixth day of symptom appearance, the patients had sensations of subcutaneous movements in skin lesions, dropping out of the eschar and a beginning of larvae coming out from the nodular changes. All cutaneous changes were treated by a plastic surgeon by extirpation of larvae from them. Favorable clinical course followed, with a complete regression of the local findings. Larvae have been forwarded to the Microbiology and Parasitology Institute with myiasis confirmation. **Conclusion:** In patients with cutaneous papulonodular changes returning from tropical regions it is necessary to include myiasis in differential diagnostic consideration.

Key words: Africa, cutaneous lesions, larva, fly, imported disease.

INTRODUCTION
Human myiasis is a neglected disease caused by parasitic infestation of the skin, cavities, and other body parts by larvae (maggots) of a wide variety of dipteran flies [1]. Myiasis has a global sporadic distribution. However, it is more frequently reported from people visiting tropical areas in Africa [2,3,4,5]. Numerous types of myiasis could occur in humans. Depending on the affected body parts it can be classified as cutaneous, nasopharyngeal, intestinal, and urogenital myiasis [6]. Cutaneous myiasis is the most common form of human myiasis which occurs after the penetration of dipteran larvae into the skin [7]. Furuncular, migratory, and wound myiasis are the three clinical forms of cutaneous myiasis [8]. However, furuncular myiasis is the major type that usually manifested with papular and nodular skin lesions. Cordylobia anthropophaga in Africa and Dermatobia hominis in North America are the primary fly species identified for the distribution of furuncular myiasis [5].
We present a mini series of imported furuncular myiasis on three patients who were on a vacation in Tanzania.

CASE PRESENTATION
On the 29thof January 2024, three female patients (daughter, mother and mother-in-law), on the age of 12, 35 and 58 years came for a medical examination at the University Clinic of Infectious Diseases – Skopje (Figure1). Prior to that on the same day they were examined by a dermatologist and redirected to the clinic. Their symptoms occurred three days before their check

up with the appearance of sporadic papular lesions accompanied by pain and itching. Their epidemiology questionnaire consists of a journey to Tanzania- Zanzibar for a vacation which lasted for ten days from 16.01.2024 to 26.01.2024. Three days before symptom appearance, in their hotel room, they were bitten by big hairy flies on the same spots where the skin changes appeared. During examination, on all the three patients, on the bitten spot were noted multiple papulonodular, indurated, separated lesions,with a diameter of 1-2 cm, with centrally positioned eschar. The skin lesions total of five on patient 1 (the 12year old) where localized as two on the upper left arm (Picture 1.), two on the glutes and one on the lower right arm. On the day of the bites the patient presented with vomiting, diarrhea and temperature of 38°C lasting for one day. Patient 2 (the 35year old) presented with two papulonodular, indurated, separated lesions, with centrally positioned eschar, one located on the lower left leg and the other on the lower right leg. No general symptoms where noted. Patient 3 (the 58year old) presented with two lesions with the identical characteristics as the two other patients. One of them was located on the lower left leg and the other one on the lower right leg. No general symptoms where noted. On all patients' biochemical analysis and serological tests for Leishmania were made, and no abnormalities where noted. Therapy was not given and they were rescheduled for another check-up after 4 days.

On the 2nd of February, after six days of symptom appearance, the patients came for another check-up. They all had sensations of subcutaneous movements in the skin lesions, dropping out of the eschar and a beginning of larvae coming out from the nodular changes (Picture 2). Antibiotic treatment with amoxicillin/clavulanic acid for five days was ordinated to all patients alongside a tetanus prophylaxis for patients 2 and 3. All patients were forwarded to a plastic surgeon where all cutaneous changes were treated and extirpation of larvae (Picture 3.) was made on all of them. The larvae were examined by a microbiologist at the Institute of Microbiology -Skopje where myiasis was confirmed. Favorable clinical course followed for all patients, with a complete regression of the local findings, without any complications.

Figure 1. Timeline of events:

23.01.24 (Bites by flies)	**26.01.24 (First symptoms appearance)**	**29.01.24 (Paopular/nodular lesions, First hospital check up)**	**02.02.24 (Larval extirpation)**

Picture 1. Skin lesions six days after bite in patient no. 1


Picture 2. Skin lesions nine days after bite in patient no. 1
Picture 3. Larva from skin lesions

DISCUSION

Here, we present a mini-series of the first cases of imported furuncular myiasis in the Republic of North Macedonia. They are close relatives and had identical exposure to hairy flies while they acquired the disease during their stay in Tanzania- Zanzibar.

Sporadic cases with imported furuncular myasis are described in different countries in the world [5, 9], including the Republic of Serbia [10], as a neighboring country. Additionally, a lot of the cases were imported from different countries of Africa [2,3,4,5] including Tanzania [11].

Based on the characteristics of the skin lesions and the fact that the disease was acquired in Africa, our opinion is that myasis in our patients was caused by Cordylobia anthropophaga. In the present study all patients were deployed in urban/semi-urban setting of an endemic geographic area of East Africa. All patients in this study reported skin papulonodular lesions with a diameter of 1-2cm and symptoms of pruritus, pain and movement, similar to other report [3]. The average duration from the moment they were bitten to symptom onset was three days, and the penetration in the dermis was nine days matching with other similar cases where the shortest period of penetration to the dermis was 2 days and the longest was 7 days [12]. The only difference between our and other studies was the lesion distribution. In our study the most common sites involved were the gluteus and extremities compared with the other case studies where the most common sites were the abdomen and chest [2]. We suppose that the lesion distribution happened in this manner because in our patients those areas of the body were covered by clothes.

Our patients were treated by previous recommendations with antibiotics. On the other hand, tetanus prophylaxis was given to those patients previously inadequately vaccinated [12]. In the literature there is a discrepancy of the therapeutic approach in the post extirpation phase of the larvae, considering that some medical practitioners do not use tetanus prophylaxis [13] and other medical practitioners do not use antibiotic treatment [14].

Prevention for myiasis in travelers should include avoiding contact with flies and prevent bites by wearing long-sleeved clothing, using insecticides, drying clothes in bright sunlight and ironing them in order to destroy occult eggs laid in clothing [15].

CONCLUSION

The increased tourism to tropical countries enhances the risk of acquiring imported cutaneous myiasis, so it should be considered in differential diagnostics in patients with skin lesion that have recently travelled to tropical regions.

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