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Case Report

Simulium fly bites

Capt Rupesh Prasad^a, Col A.S. Kushwaha^{b,*}^a RMO, 111 Rocket Regiment, C/o 56 APO, India^b Officer Commanding, Station Health Organisation, Kirkee, India

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Introduction

Military personnel deployed in mountainous regions in northern and north eastern India face risk of insect and arthropod borne diseases as an occupational hazard. The risk further increases during long outdoor campaigns when the personal safety is compromised and risk of exposure is high, especially keeping operational commitments in mind. In this paper the authors are presenting cases of simulium fly bites amongst soldiers on an expedition in Arunachal Pradesh. During military expedition the expedition team suffered several bites of simuliids. However, team never suffered any symptoms of Onchocerciasis.

The cases are being presented to raise awareness about the insect and their implication on soldiers operating in such regions where the simulium fly is found in abundance. Case reports from different parts of the world have been reported.^{1–5}

Only one singular rare case of ocular Onchocerciasis has been reported from non-endemic north eastern part of India.³

Environmental characteristics

Altitude of location from where expedition started is 1968 m whereas altitude of expedition varied from 1698 m to 2438 m. The climate was humid subtropical at lower heights and temperate at higher reaches. The average temperature recorded was 14–22 °C with maximum 26 and minimum of 7 °C during April to July during which expedition was conducted. The valley receives most of precipitation from May to September averaging up to 2818 mm annually with warm humid (relative humidity from 50 to 90%) climate and this is the time of maximum simulium fly nuisance. Vegetation is subtropical dense forests. Expedition team of 20 members walked along a river throughout the expedition.

* Corresponding author.

E-mail address: arvind6077@yahoo.com (A.S. Kushwaha).<http://dx.doi.org/10.1016/j.mjafi.2017.02.011>

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Clinico-morphological features of bite lesions (Figs. 1 and 2)

All suffered black fly bites in exposed parts of body including hand, forearm, foot, leg, face and neck. The fly entered the gaps in sleeves and lowers of trousers and bit on forearm and leg. The cases suffered superficial, erythematous, evolving itchy rashes which were annoying. But team members of expedition never suffered ocular symptoms of Onchocerciasis. A detailed follow up of the cases with the lesions were made (Fig. 3).

Morphological description of the evolution of rashes as a result of simulum fly bite with respect to time was as follows:

- Immediately after bite: Severely pruritic clear fluid filled vesicle with surrounding edema.
- Few hrs after bite: Vesicles become hemorrhagic. Peri-vesicular edema present.
- After 24–48 h: Fresh itchy hemorrhagic vesicles with surrounding erythema.
- After 72 h: Fresh blood of vesicles becomes clotted.
- After 4–5 days: Vesicle turns black.
- After 10 days: Scab formation and it shrivels off.

All members of expedition tried application of odomos repellent cream (N,N-diethyl benzamide 12%, w/w) but its effect lasted only an hour or two. Based upon the inputs from

Fig. 3 – Black fly.

locals the patients were asked to use a mixture of dettol (Chloroxylenol 4.8%, w/v) and mustard oil that lasted longer up to 5–6 h. Also, preventive measures like using full sleeves shirts and wearing socks over lower end of trousers were practised.

Discussion

Human onchocerciasis is a parasitic disease caused by *Onchocerca volvulus* transmitted by blackflies (*Simulium* spp.). Vectors breed in fast flowing rivers and streams. Symptoms of Onchocerciasis are provoked by the death of microfilariae that circulate in the subcutaneous tissue and in the eyes, inducing intense inflammatory responses.⁶

Simulium flies commonly known as black flies have a worldwide distribution. They belong to the family Simuliidae, which contains over 1800 species. The members of this family are found from sea level to a height of 2000 m. In Arunachal Pradesh, local people know it by the name of *Dim Dam* flies. In tropics and subtropics breeding is continuous throughout the year. The life span of the adult is about 3 months.⁷

Simulids are strong fliers with a flight range of about 4–5 km. Both male and female simuliids feed on plant juices, nectar and pollens of flowers; the females however, require blood meal for development of eggs and are voracious and persistent biters. They may enter through any opening in the clothing such as the sleeve or through the trousers lower opening for biting. They bite only by day in the open and are especially active on bright sunny days and retire at night to the neighboring vegetation where the females mature their eggs.

Several species of simuliids are known vectors of Onchocerciasis, a filarial disease caused due to *Onchocerca volvulus* occurring in tropical Africa, central America and Venezuela. However, simuliids species of Arunachal Pradesh under this study did not carry the parasite.

A case report from Iran describes pruritic dermatitis with marked edema and considerable discomfort following multiple black fly bites.² In Japan, course of dermatitis induced by

Fig. 1 – Simulium fly bite lesions.

Fig. 2 – Close up view of simulium fly bite lesions.

the black fly bite resulting in erythematous macule with itching and edema developed the next day and the inflammatory reaction was severe in 2–3 days after the bite. This indicates that delayed-type hypersensitivity to components of saliva takes part in the black fly bite reaction.¹ Another case of Kawasaki disease in a case of black fly bite has been described. The patient had 3-day-history of fever and left neck swelling and redness and he was initially presumed to have cervical cellulitis, lymphadenitis, and retropharyngeal abscess.⁵ Case reports from North Eastern India include a rare case of ocular onchocerciasis.³ The worm was identified as *Onchocerca volvulus*. The reported features of simulum dermatitis are chronic eruptions of pruritic papules, vesicles, and erythematous wheals resulting from a hypersensitivity reaction.⁴

Conclusion

The fact that simulum fly in tropical Africa, Central America and Venezuela causes Onchocerciasis while in Arunachal Pradesh such phenomenon has not been reported needs further exploration. There is a need for continued epidemiological and entomological surveillance regarding vector potential of black flies in north eastern India. There is a need also to develop long acting repellents for use by soldiers in such areas.

Conflicts of interest

The authors have none to declare.

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