Severe tungiasis in Western Tanzania: case series

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Abstract

Tungiasis is caused by infestation with the sand flea (Tunga penetrans). This ectoparasitosis is endemic in economically depressed communities in South American and African countries. However, data on the epidemiology of tungiasis in Tanzania are very limited and the disease does not receive much attention from health care professionals. During a community cross-sectional survey in northwest Tanzania, we identified five individuals extremely infested with high number of parasites. A total of 435 lesions were recorded with the mean annual rainfall of 1100 mm. The majority of the cases were identified during a cross-sectional study in Kasulu district, western Tanzania. This stands in contrast to reports from local populations, which are frequently suffering from severe disease.

Case Reports

We identified five cases of severe tungiasis during a cross-sectional study in Nyansha and Nyakitonto villages, which are located at Kasulu district in Kigoma region, western Tanzania. The two villages have a population of about 7500 inhabitants and are comprised of poor communities lacking appropriate urban services such as electricity, water supply, and health facilities. Most of the houses are located on relatively large compounds, and are roofed with grass materials, palm stems and do not have concrete floor. Waste and sewage disposal are insufficient and hygienic conditions are precarious.

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Key words: tungiasis, morbidities, living conditions, northwest Tanzania.

Acknowledgements: we acknowledge and convey our sincere thanks to patients who agreed to participate in the present study and the all community of Nyansha and Nyakitonto villages. We thank parents and guardians for allowing their children to participate in the study. JH is research fellow from the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq/Brazil).

Contributions: HDM, JH, EB, MZ, OD study design, fieldwork data collection organization and supervision, manuscript drafting and final revision; LLM, EJK, ETK first manuscript version drafting, critical revision; RW first manuscript version drafting, critical revision. All authors contributed to the manuscript and approved its final version.

Conflict of interest: the authors report no conflicts of interest.

Received for publication: 31 October 2010. Accepted for publication: 14 May 2011.

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Case Report

A 3-year-old girl living in a grass-roofed house with mud walls and sand floor. She slept on traditional bed type with other children and she did not use closed shoes. Garbage was disposed in the compound and the house had no toilet. The family kept chicken and goats all together in the same house and there was no water supply for the household. Her father died two years before and the mother is the only source of income; she was illiterate and did not have enough time to take care of her children.

On examination, the girl had dry and scaly skin especially in the sore and palm areas, covered with a layer of dirty. The sore was fissured. Both toes and fingers were infested with sand fleas. Mostly infected regions were the nail bed of both toes and fingers. Fingers were inflamed and ulcerated beneath the nails. Mixed vital and avital infections in the sore and toes of both feet.

She had a total of 95 T. penetrans-associated lesions. Of these, 60 (15 vital and 45 avital lesions) were located on the toes, soles and heels of both right and left feet. All toes were infested with sand fleas. Thirty five (38.9%) were found on ectopic sites, on fingers of both right and left hands. The lesions on hands impeded the girl from gripping. Most of the lesions were surrounded by erythema and oedema. Sleep was reported by her mother to be highly disturbed and she was reported to be crying during the night.

Case #2

A 12-years-old primary school boy lived with his parents in a grass-roofed house, with mud brick wall and sand floor. He slept on a traditional made type of bed with other children who were also infested with sand fleas. He reported not to wear shoes regularly. The family kept pigs and chicken within the house compound. Garbage was scattered within the compound, and the house had a pit toilet. On examination, the skin was dry and fissured. He was highly infested with sand fleas especially on the toes beneath the nails (Figure 1). Several toes were deformed and nails damaged. Erythematous, non-oedematous and non-inflamed toe skins with ulcerations were present. Watery discharges (pustules and suppurations) from the sand fleas lesion with bad smells were observed.

He had a total of 75 sand flea lesions, of which 45 (25 vital and 20 avital lesion) and 30 lesions (20 vital and 10 avital) were present on the right and left feet respectively. He reported difficult walking.

Case #3

A 20-year-old illiterate mentally challenged woman lived with her parents in a grass-roofed house with mud bricks wall and sand (mud) floor. The informant (neighbours and parents) reported that she slept on traditional type of bed alone and she gets bath about once a month. The patient was reported to linger throughout the day from one house to another in the village. She had no shoes and always wore slippers made from used vehicle tyres. Garbage was observed to be scattered within the household compound, including the room she slept. On examination, the skin was scaly, rough and dry especially on the hands and feet. She experienced itching of most body parts, and all toes were infested with sand fleas. Toenails were deformed and some amputated, the first digits of both the feet had ulceration and inflamed. She experienced difficulty walking.

There was no obvious discharge but bad smell was coming from the sand fleas lesion suggesting the presence of secondary infections. She had a total of 165 sand flea lesions on both right and left feet. Out of these, 90 (35 vital and 55 avital lesion) and 75 (35 vital and 40 avital lesions) were present on the right and left feet respectively.

Case #4

A 9-year-old school boy living with his family (polygamy family) in an iron sheet roofed house made up with mud bricks and sand (mud) floor. Children in the family were poorly taken care by parents. He put on slippers all the day and occasionally closed shoes and washed his body once a week. He reported to sleep on a traditional type of bed. In the compound where he lives, there is no proper garbage disposal system and garbage is scattered throughout the compound. On examination, the skin was dirty and very rough, dry and fissured especially on the sole and palms.

Table 1. Distributions of lesions according to topographic sites.

<table>
<thead>
<tr>
<th>Topographical sites</th>
<th>Number of lesion</th>
<th>Vital lesion (stage I-III)</th>
<th>Avital lesion (stage IV-V)</th>
<th>Percentage of all lesions (n=435)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet-toes, soles and heels</td>
<td>400</td>
<td>190</td>
<td>210</td>
<td>91.95</td>
</tr>
<tr>
<td>Hands-fingers</td>
<td>35</td>
<td>30</td>
<td>5</td>
<td>8.1</td>
</tr>
<tr>
<td>Total</td>
<td>435</td>
<td>220</td>
<td>215</td>
<td>435</td>
</tr>
</tbody>
</table>

Table 2. Clinical findings in five patients with severe tungiasis.

<table>
<thead>
<tr>
<th>Clinical pathology</th>
<th>Present in patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute inflammation</td>
<td>55 (100)</td>
</tr>
<tr>
<td>Chronic inflammation-oedema, desquamation and deformation of fingers</td>
<td>55 (100)</td>
</tr>
<tr>
<td>Ulcerations</td>
<td>45 (80)</td>
</tr>
<tr>
<td>Superinfection-Suppuration and pustules</td>
<td>25 (40)</td>
</tr>
<tr>
<td>Severe itching</td>
<td>55 (100)</td>
</tr>
<tr>
<td>Loss of nails and deformed nails + eggs attached to the nails</td>
<td>25 (40)</td>
</tr>
<tr>
<td>Difficult walking</td>
<td>25 (40)</td>
</tr>
<tr>
<td>Difficult gripping</td>
<td>15 (20)</td>
</tr>
</tbody>
</table>
Ulceraions were present on all the toes of both feet. Non-oedematous and non erythematous infected areas of the toes. White eggs on the surface of both infested toes signifying the presence of active infections was observed. No significant indicators of bacterial superinfection were observed. He had a total of 45 sand fleas lesion; 25 of these lesions were located on the toes, 10 on the soles of the feet and 10 on the heels. Of the total lesions, 20 were vital and 25 avital lesions.

Case 

A 90-year-old male, illiterate and traditional healer lived alone in a small house made of mud walls, grasses roofed with sand (mud) floor. He slept on the traditionally made carpet (Milago), which was placed on the sand (mud) floor. The room was dirty and dusty and contains traditional materials necessary for his work. He had eye problems with reduced vision. There was no proper garbage disposal system and no water supply for the household. On examination, the skin was rough and scaly, very dry and looks dirty throughout exposed part of the body. The toes of both feet were infested and some toenails were deformed and other had already fallen off. Neither obvious inflammation nor oedema was present. Presence of fissures was obvious and he experiences difficulty walking. Neither ulcerations nor discharge were observed, though there were obvious small white patches (eggs) on the infested toes, which signified the presence of active T. penetrans infestation. He had a total of 55 lesions, all located on right and left feet. Of the total lesions, 20 were located on the toes, 13 on the soles of the feet and 22 on the heels. No signs of bacterial superinfection were observed.

A total of 435 tungiasis lesions were recorded in five patients with a minimum number of 45 lesions and a maximum of 165 lesions. Of the 435 lesions, 400 (92%) occurred on the feet (Table 1). All patients had lesions on the toes and soles of the feet but the most affected part was the periungual region of the toe. Lesions on the hands were observed in only one patient. Clinical findings are presented on Table 2. Acute and chronic inflammation was common to all patients.

Comment

Tungiasis continues to be an endemic Public health concern in countries hardest hit by poverty. However, data on the epidemiology such as disease burden, transmission dynam-ics and risk factors of the disease in endemic African countries, including Tanzania, are still limited;3,4 this makes planning for control program against tungiasis difficult. To continue raising awareness of the disease to public health professionals and other health stakeholders, here we present five cases of severe tungiasis with heavy infestation from Western Tanzania. Previously, only one endemic case of tungiasis from an indigenous Tanzanian patient with heavy infestation has been reported in the country.4

We observed patients living in underdeveloped and poor villages in rural Tanzania with up to 165 tungiasis lesions, in contrast to reports from travellers who rarely present with more than one lesion.5,10 The types of lesions and environments the patients lived were similar to observation from other previous studies from Brazil, Cameroon and Nigeria.3,11,14 In our study, all patients were living in areas previously described to be high risk areas for tungiasis.15

T. penetrans has a predilection to particular sites of the body and most of the tungiasis associated lesion will be seen to these body parts. All of our patients had lesions in the toes, soles and heels. Two of the patients in our study presented with difficult walking and one with lesion on hand presented with gripping difficulties. These observations in our patients have also been reported from other endemic countries.3,11,13 These types of lesions in primary schoolchildren may result into school absenteeism and in adult individuals they may be forced to suspend their economic activities e.g. agriculture or trades. Penetrations of the female sand flea into the skin of the host induce inflammatory response due to release of metabolically active substances (proteolytic enzymes) and continuous enlargement of the parasites. This results into severe itching, erythema, oedema, suppuration, pustules and pain. The lesion formed may be the portal of entry for pathogenic bacteria.5 We observed two patients presented with bacterial superinfection indicated by the presence of pustules and suppuration. In conclusion, we have shown that tungiasis is common in individuals living in a resource-poor communities in Tanzania. The disease may cause severe infestations and deformation in endemic communities. Tungiasis needs to be considered as a Public health concern in Tanzanian’s endemic communities. Further studies on risk factors and disease-related behavior of affected populations are needed to design adequate control measures.

References