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## **Tungiasis: An Underdiagnosed Problem**

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### **ABSTRACT**

Tungiasis is a cutaneous ectoparasitosis caused by the flea parasite *Tunga penetrans*, prevalent in South America, the Caribbean, and sub-Saharan Africa. Clinically it is characterized by the formation of single or multiple papules with a translucent whitish halo and a brownish-black central region, frequently located on the feet. The lesions may present with itching or mild pain, with bacterial superinfection being the most frequent complication. The diagnosis was made based on the clinical characteristics of the lesions in a patient from endemic areas. The treatment of choice is surgical removal of the flea followed using topical antimicrobials and tetanus vaccination. Prevention is essential with the use of closed footwear and repellents.

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### **INTRODUCTION**

Tungiasis is an endemic ectoparasitosis exclusive to tropical areas. It is caused by penetration of the blood-sucking flea on the skin of the host. *Tunga penetrans* is the most frequently isolated, followed by *Tunga trimamillata*, to a lesser extent. It is in Ecuador and Peru. Only these two species of the 10 known, can affect man or pets.<sup>1</sup>

Originally from Central and South America and the Caribbean, it spread to Madagascar, sub-Saharan Africa, Pakistan, the eastern coast of India and the Indian Ocean. In endemic areas, the prevalence is 15-55%. In the Argentine Republic, is found in the regions of northwest, northeast and part of Mesopotamia.<sup>1</sup>

The natural habitat of *Tunga penetrans* is the soil sandy, dry and shady. Its main hosts are dogs, cats, pigs and rats. The most affected is the dog, with an infestation rate of up to 62% and the lesions are located in the legs and snout. Tungiasis is related to elevated levels of poverty and the World Health Organization included it in the group of "neglected or neglected tropical diseases." The social vulnerability of people with low incomes, overcrowding, poor hygienic conditions, and the presence of domestic animals, which suffer from and amplify the disease, create the right environment for its acquisition and propagation.<sup>2</sup>

In relation to host factors, no there is a predilection for sex, race, or age. However, the elderly and children are the most affected. due to their lower capacity for self-care, especially the latter, due to the lack of use of footwear.<sup>3</sup>

The life cycle of the parasite is about a month and consists of four biological stages: egg, larva, pupa and adult. The eggs, deposited in the soil, they hatch after 3 or 4 days. After 2 weeks the larva forms a cocoon and passes through the stage nymph to later become the adult flea and thus complete its life cycle.<sup>4</sup>

The male flea, such as *Sarcoptes scabiei* var. *hominis*, dies after copulation and the fertilized female penetrates the skin of the host to the papillary dermis, feeding on the blood of the capillaries. Its size increases during a period of 7 to 10 days, until reaching 0.6 to 1 cm in diameter and it expels between 100 and 200 eggs per day.<sup>5</sup>

It is an exclusive disease of the skin, and its clinical manifestations depend on the stage of the parasite and the inflammatory component that is triggered. This inflammatory response is due to three factors: the presence of a foreign body (*Tunga penetrans*), the secretion of proteolytic enzymes that produced by the parasite during its penetration into the tissue and the bacterial superinfection that often accompanies most cases.<sup>6</sup>

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### CLINICAL MANIFESTATIONS

The lesion usually appears on the soles and back of the feet, in the interdigital spaces, in the regions subungual and periungual and ankles. is the zone of easier access for the flea, since it moves with small jumps. However, ectopic locations are being described more and more frequently, especially all in children living in suburbs infested with *Tunga penetrans*.<sup>7</sup>

The gravid female flea penetrates the skin of the host (we will never find an introduced male) using her mouth and releasing keratolytic enzymes. When her head reaches the dermis, it feeds on the blood of the host and reaches 1 cm in diameter.<sup>8</sup>

Leave out the last segments of the abdomen to breathe through the entry hole. After that she releases about 100 eggs and she dies shedding the skin in about 2 weeks. Once the eggs come out, they hatch in 3-4 days and in 3-4 weeks the larvae become adults after undergoing a metamorphosis. The complete cycle of *Tunga penetrans* lasts approximately 1 month. With respect to incubation period we can say that the first signs appear immediately or in a few days.<sup>8</sup>

The typical lesion is a small inflammatory papule with a central black dot that in a few weeks becomes a whitish nodule with well-defined edges. It reaches about 4-10 mm in diameter and can be painful, sometimes itchy and even asymptomatic. The inflammatory reaction can cause discomfort in the wandering. If the infestation is multiple it can give rise to a group of honeycomb-like nodules of bees.<sup>8</sup>

### DIAGNOSIS

For the diagnosis we will base ourselves on the clinical history, with special emphasis on the trips that he has been able to conduct in endemic areas of tungiasis, in the morphology of the lesions and their location. We can also use microscopic observation of the exudate and the eggs that come out of the lesion.<sup>9</sup>

In the biopsy of the nodule/papule and the histological study, we can observe an intraepidermal cavity surrounded by an eosinophilic cuticle (representing the body of the flea). Eggs can be seen in the cavity and ring-shaped components of the tracheal system and the digestive tract. A narrow band of striated muscle.<sup>9</sup>

It goes from the head to the terminal orifice. usually this presents an inflammatory infiltrate in the underlying dermis. However, we consider that both the biopsy and the histopathological study should only be performed in the case of diagnostic doubt or suspicion of another pathology, since we are dealing with a parasitosis whose characteristics allow an eminently clinical diagnosis.<sup>10</sup>

Diagnosis is clinical and based on location and the morphology of the lesions in patients who live in endemic areas or have traveled to them. Since the flea executes a short jump, the lesions are located on the feet in 95% of cases, with predilection for the plantar, malleolar, periungual, interdigital, dorsum of the foot and ankle regions and, exceptionally, any other part of the body, such as in the cases presented. Lesions may be single, few, or multiple.<sup>10</sup>

Uncommon clinical variants include the bullous, the crusted, the pustular, the ulcerated and the verrucous. Dermoscopy is an effective, practical, and non-invasive tool for diagnosis. It allows to distinguish the pigmented concentric rings, which surround a paler central pore, which constitutes the exoskeleton of the parasite, and the greyish-blue areas, which correspond to the eggs.<sup>10</sup>

Biopsy is not indicated, except in cases of diagnostic doubt regarding location or atypical morphology.<sup>10</sup>

Among the complications, bacterial superinfection stands out, always caused by *Staphylococcus aureus*, which can cause ulcers, abscesses, phlegmon, osteomyelitis, lymphangitis, and gangrene. I also know described the association with deep mycoses.<sup>10</sup>

Tetanus is the most serious and life-threatening complication, especially in children. It has been reported in several endemic areas where there is no adequate vaccination coverage.<sup>11</sup>

The differential diagnosis includes plantar warts, myiasis, sting or bite of other arthropods, foreign body reaction, scabies, pyodermitis, abscesses, tumors, and cutaneous larva migrans.<sup>11</sup>

### TREATMENT

The treatment of choice is manual removal complete flea the procedure must be early.

In initial injuries, the use of a needle is recommended sterile to extract the parasite and thus try to prevent it from spreading rupture so as not to trigger an intense inflammatory reaction. When the lesion acquires a volume older, its extraction en bloc, with a punch or punch, and electrocoagulation of the cavity may be useful resultant to eliminate the remains of the cuticle of the parasite. After the procedure it is suggested to apply on the topical antibacterial, such as mupirocin 2% or 2% fusidic acid, twice daily for 7 to 10 days. Systemic oral antibiotics are indicated if signs of infection are observed and those used are against *Staphylococcus aureus* and anaerobic bacteria.<sup>12</sup>

In cases of multiple lesions, some authors suggest, although there is no information on its efficacy, using thiabendazole at doses of 25 to 50 mg/kg/day for 5 to 10 days or ivermectin orally at a dose of 200 mg/kg.<sup>13</sup>

### CONCLUSIONS

As conclusions, we will say that we are facing a imported pathology, easy to recognize by its clinical and epidemiological characteristics. It constitutes a mild condition in our environment and of good evolution. after outpatient treatment.

It is a parasitosis whose incidence we ignore due to lack of suspicion and diagnosis, as well as lack of registration, among other reasons. It is common, however, in Tropical Medicine consultations, which makes us It suggests that the casuistry will have increased as the number of travelers to endemic countries has increased.

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