CASE REPORT

Human infection by Trichostrongylus sp in Tunisia: Case report

Trichostrongyloïdose humaine en Tunisie : A propos d'un cas

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Abstract

Introduction: Nematodes of the Trichostrongylus genus are primarily parasitic in herbivores, although sporadic zoonotic infections have been documented in various countries, including Iran, the Far East, and Australia. In Tunisia, one case has been reported, rendering this parasitic infection relatively unknown.

Observation: A 3-year-old female patient, congenitally monorenal, presented to the pediatric department at Charles Nicolle Hospital in Tunis with symptoms of anorexia, weight loss, and growth retardation. Hematological analysis revealed anemia concomitant with hypereosinophilia. The patient, originating from a rural region in Kasserin and currently residing in Tunis, had exposure to avian species, poultry, and sheep. Parasitological examination of stool samples, performed in our Parasitology and Mycology department, detected the presence of Trichostrongylus spp. eggs in two out of three specimens. A thorough family survey, including detailed interviews and stool parasitology, indicated no familial exposure to trichostrongylosis risk factors, and no parasitic eggs were found in the parents' samples.

Conclusion: Given the rarity or atypical nature of human infections with animal-derived hookworms, trichostrongylosis may be underrecognized, and the prevalence of common human hookworm infections might be overestimated. Enhancing environmental and personal hygiene and avoiding the consumption of raw vegetables in endemic regions are crucial preventive measures against this infection.

Key words: Trichostrongylus spp, infection, human, diagnosis, eosinophilia, Tunisia

Résumé

Introduction: Les nématodes du genre Trichostrongylus sont principalement des parasites des herbivores, bien que des infections zoonotiques sporadiques aient été documentées dans divers pays, dont l'Iran, l'Extrême-Orient et l'Australie. En Tunisie, un seul cas a été signalé, rendant cette infection parasitaire relativement inconnue.

Cas clinique: Une patiente de 3 ans, monorénale congénitale, s'est présentée au service de pédiatrie de l'hôpital Charles Nicolle à Tunis avec des symptômes d'anorexie, de perte de poids et de retard de croissance. La numération formule sanguine a révélé une anémie concomitante à une hyperéosinophilie. La patiente, originaire d'une région rurale de Kasserine et résidant actuellement à Tunis, avait été en contact avec des oiseaux, des volailles et des moutons. L'examen parasitologique des échantillons de selles, réalisé dans notre département de Parasitologie et Mycologie, a détecté la présence d'œufs de Trichostrongylus spp. dans deux des trois échantillons. Une enquête familiale approfondie, incluant des interrogatoires et des examens parasitologiques des selles, n'a révélé aucune exposition familiale aux facteurs de risque de trichostrongyloidose, et aucun parasite n'a été trouvé dans les échantillons des parents.

Conclusions: Étant donné la rareté ou le caractère atypique des infections humaines par des ankylostomes d'origine animale, la trichostrongylose peut être sous-estimée, et la prévalence des infections humaines courantes par les ankylostomes pourrait être surestimée. Améliorer l'hygiène environnementale et personnelle ainsi qu'éviter la consommation de légumes crus dans les régions endémiques sont des mesures préventives cruciales contre cette infection.

Mots clés: Trichostrongylus spp, infection, humaine, diagnostic, hyperéosinophilie, Tunisie

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Introduction

Trichostrongylosis is a zoonotic helminth infection caused by nematodes in the genus Trichostrongylus. Its geographic distribution is worldwide, but it is more common in areas where livestock is raised. Normally a parasite of herbivorous mammals, several species of Trichostrongylus have been known to infect humans after the ingestion of water and vegetables contaminated with third-stage larvae (filariform) (1).

Till date, Trichostrongylus infections in humans have been reported only in a few parts of the world. The reason for such rarity in cases of human trichostrongylosis could most probably be the occurrence of asymptomatic infections and comparatively less sensitivity of microscopic detection due to low egg output (2). As a result, there could be many undiagnosed cases of Trichostrongylus infection in the human populations worldwide.

In Tunisia, only one case has been reported in the literature (3). We report in this article the second case of trichostrongylosis in a 3-year-old Tunisian girl, detected in the department of Parasitology and Mycology at Charles Nicolle Hospital of Tunis.

Case report

A three-year-old girl with a single kidney consulted the pediatric department at Charles Nicolle Hospital in Tunis due to symptoms of anorexia, abdominal pain, weight loss, and stunted growth. In her biological data, she presents with anemia associated with hypereosinophilia. Hailing from Kasserin, a rural area of Tunisia, she currently resides in Tunis, the capital, with contact exposure to birds, poultry, and sheep.

Parasitological examinations for helminths were requested from our Parasitology and Mycology department at the same hospital. These examinations involved three fecal specimens collected over a 10-day period. Analytical methods included direct wet mount microscopic examination, the Ritchie formol-ether concentration technique, and stool culture.

Results of direct examination and stool culture were negative for all samples. However, the Ritchie formol-ether concentration technique detected parasite eggs belonging to the genus Trichostrongylus (Figure 1) in two out of three samples.

To further investigate, we conducted a family survey involving meticulous questioning and parasitological examination of the parents' stools. Despite the family's high socioeconomic status (the father being an engineer and the mother a government official) and their residence in a well-equipped villa with proper water supply and hygiene facilities, no parasite eggs were found in their stools.

Our patient was treated with Albendazole 400 mg/day following this protocol: Day 1, Day 7, then Day 30. Post-treatment parasitological control of stools 1 month after treatment was negative. Clinical remission was obtained with an improvement in the general condition, an enhancement in appetite, and a weight gain of 4 kg within one year.

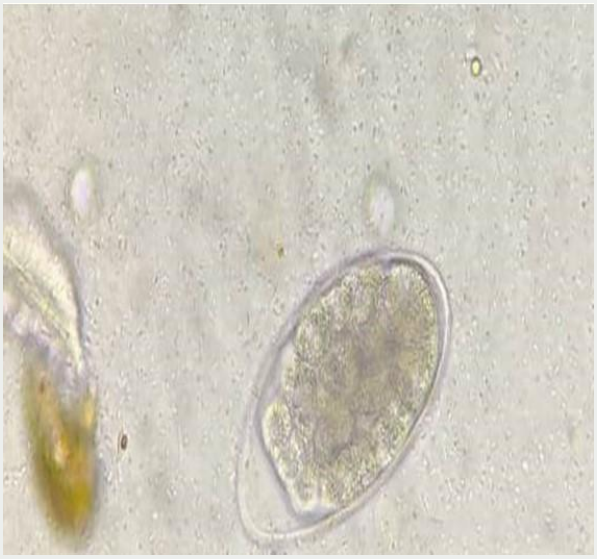

Figure 1. Trichostrongylus spp egg isolated by the Ritchie stool concentration technique (magnification 40X)

Discussion

Trichostrongylus species are primarily parasites of livestock with a worldwide distribution in ruminants but they have also been reported from humans in Middle and Far East, particularly in rural communities with poor personal hygiene and close cohabitation with herbivorous animals (4).

Humans acquire trichostrongylosis when L3-larvae of Trichostrongylus spp. are ingested orally while consuming contaminated food. Application of night-soil (human excreta) or livestock fecal matter as manure and the resistant nature of the eggs gives rise to the propagation of this parasite in human populations. Shady areas with high humidity and an abundance of grass are more favourable for the spread of Trichostrongylus spp. (5).

Human infection with Trichostrongylus species is common in many countries throughout the world, in particular those located in the Middle East, Far East, and some African countries (4). It has also a long history in Iran with the highest infection rates in the world especially the northern region which represents one of the endemic areas of Trichostrongylus spp. due to the climatic conditions (6). In the previous decades, at least 50% of rural residents in this province were positive (1) but in most reports published during the recent years, the infection rate has reduced and the prevalence of Trichostrongylus spp. in different regions of Iran is estimated from 0.4 to 18% (4). It's probably due to people's habit of living in close contact with their livestock in rural regions and nomadic style of life (2). In addition, use of animal feces as fertilizer, consuming fresh wild grown aromatic plants, collecting from environment by villagers, as a part of human diet in many endemic areas and preparing parts of needed fuel from animal dung could be regarded among the other possible risk factors of human trichostrongylosis in endemic areas of Iran (4).

However, the infection could be much lower in other regions, such as Italy: Until 2016, only 16 diagnosed patients had Trichostrongulys spp.(2).

In the Maghreb, the parasitosis has only been described in two countries: Morocco and Tunisia. In Morocco, four cases have been published (7). While in Tunisia, a single case was described in 1977 in a 54 years old woman complaining about abdominal cramps (3).

The present case represents the second observation confirming the existence of human trichostrongylosis in our country.

It is found 30 species of Trichostrongylus (T.) in ruminants and twelve valid species have been detected from humans in various areas of the world, nine of which were only reported from Iran (8). With the exception of T. orientalis, the other species are zoonotic and transmitted to human through close-contact with herbivores. Actually, the metrics indicate that T. colubriformis is the predominant species infecting humans around the world because of its high prevalence in domestic animals and its high zoonotic potential (8).

The usual habitat in man is the duodenum or the upper part of the jejunum. The head of the adult burrows into the mucosa causing an inflammatory response when numerous worms are present. Clinical symptoms are related to the intensity of worm burden. Persons with infection intensity of 24–300 eggs per gram (EPG) of feces are symptomatic while an infection intensity below 24 EPG shows no symptoms (5). So, several hundred worms must be present before symptoms become significant. As a result, clinical symptoms are absent in most cases and heavy infections can cause abdominal pain, anorexia, headache, fatigue, anemia and eosinophilia. A mild eosinophilia may sometimes be the only indication of infection. In children, it can cause retardation of development (9) as in the case of our patient.

Diagnosis of trichostrongylosis depends on observing the characteristic eggs in stool samples or finding the larva in fecal cultures.

Their eggs may be mistaken with those of hookworms. Eggs of Trichostrongylus spp (73-94µm ×40-53µm) can be differentiated from those of Necator and Ancylostoma spp. because they are longer, narrower, elongated, asymmetrical, with one side flat and the other domed side with a rather pointed appearance at one of the poles and containing 16 to 32 blastomeres at oviposition, filling the egg. In our case, the eggs (contained 16 blastomeres) were observed using the Ritchie concentration technique, while direct wet mount microscopic examination was negative. Pandi et al demonstrated in their study that the direct wet mount method had very low sensitivity (5.6%) for the diagnosis of trichostrongylosis compared to the other parasitological methods (8).

Additionally, emergent rhabditiform larvae from fecal culture are relatively similar to those of hookworms and Strongyloides stercoralis, which can be difficult to distinguish clearly requiring some expertise. They can be differentiated by the ball-shaped swelling at the end of the tail (8). For our patient, the stool culture was negative. However, species identification on the basis of eggs is difficult. This can be done by isolating adult worms, which are rarely present in feces. For the morphological identification, the differences in the characteristic spicules of adult male were important for differentiation to species (10). But required considerable expertise. To help confirm species, PCR-based techniques using the ITS2 region of rDNA have been developed and are currently considered to be effective tools for the detection and identification of Trichostrongylus spp. in human fecal samples (8). In our case, species identification was not possible due to the unavailability of molecular biology techniques.

Trichostrongylosis is a parasitic disease associated with fecal contamination. Effective control of this parasite relies, primarily, on preventive measures, including the thorough washing of vegetables and fruits consumed raw, as well as the implementation of improved farming practices. Theyinvolve avoiding the immediate use of animal manure as fertilizer for vegetable crops and promoting hygienic agricultural methods, such as preventing the irrigation of crops with water contaminated by fecal matter. It is essential to subject livestock to regular veterinary check-ups to detect and treat this parasitic infection. This is particularly important for young animals, which should receive appropriate anthelmintic treatments to prevent the transmission of the parasite and disrupt its life cycle (7).

Conclusions

In conclusion, this article highlights the second diagnosed case of trichostrongylosis in a young Tunisian girl, noteworthy for the absence of identifiable risk factors and the absence of any similar cases within her immediate surroundings. This case serves as a reminder that parasitic infections may manifest unexpectedly, even in the absence of traditional risk factors, necessitating a broad and inclusive approach to diagnosis and management. Further research and awareness efforts are warranted to better understand the epidemiology of Trichostrongylus spp infections in non-endemic regions and to enhance early detection and effective intervention strategies.

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