Case report

Incidental diagnosis of strongyloidiasis in a patient with hepatic metastasis

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Abstract

Strongyloides stercoralis is a soil-transmitted helminth infecting humans that can cause hyperinfection and disseminated disease in the immunocompromised host. This case report describes a 56-year-old patient, diagnosed with hepatic metastasis, who was screened for strongyloidiasis by faecal culture. The agar plate culture became positive on the third day of incubation, demonstrating characteristic tracks and yielding rhabditiform larvae. The charcoal and Harada-Mori cultures were negative. The patient was treated with albendazole for 7 days but declined further follow up.

Keywords: *Strongyloides stercoralis, Strongyloidiasis, immunocompromised, malignancy*

Introduction

Human strongyloidiasis is mainly caused by the soil-transmitted helminth *Strongyloides stercoralis*, which has the unique ability to autoinfect.[1] Infective filariform larvae enter the human body by penetration of skin. Hyperinfection and disseminated infection may occur in the immunosuppressed, and it is usually fatal without treatment.[1]

We report a patient with an incidental diagnosis of strongyloidiasis, encountered during a study to determine the prevalence of strongyloidiasis among immunosuppressed individuals in Sri Lanka.

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Case Report

A 56-year-old previously healthy male from Beruwala was admitted to the Colombo South Teaching Hospital with lethargy and anorexia for 6 months. He also complained of loss of weight, bloating and frequent body aches. He had no respiratory symptoms or skin rashes. A businessman by profession, he frequently walked outdoors barefoot, but used water sealed latrines. On examination, his body mass index was 20 kg/m^2; he was afebrile and not pale. The systems examination was normal except for the presence of hepatomegaly which was hard in consistency, with irregular edges and a nodular surface.

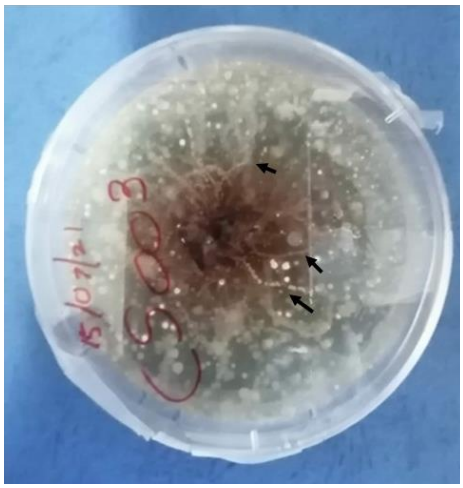

Figure 1. Nutrient agar plate of the culture. The black arrows demonstrate the tracks

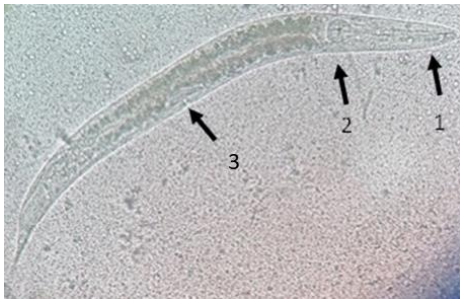

Figure 2. Morphology of a *Strongyloides stercoralis* rhabditiform larva extracted from the agar plate culture (x 400 magnification)

Arrow 1 points to the short buccal canal, Arrow 2 shows the prominent oesophageal bulb, and Arrow 3 shows the prominent genital primordium.

The full blood count, erythrocyte sedimentation rate, C-reactive protein, liver functions and renal functions were within normal limits. An abdominal ultrasound scan revealed multiple hepatic metastases. He was extensively investigated for a primary focus by means of tumour markers, computerized tomography scans and endoscopies, but none were conclusive.

As he met the inclusion criteria for the strongyloidiasis study because of the disseminated malignancy, a faecal sample was obtained for parasitological investigations. The direct wet mounts with saline and iodine were negative. Faecal culture was performed by means of agar plate culture, Harada-Mori culture, and charcoal culture.
For agar plate culture, approximately two grammes of faeces were placed on a petri dish with nutrient agar, sealed, covered with foil, and incubated at room temperature for 72 hours.

For Harada-Mori culture, faeces were smeared on a strip of filter paper, and the strip placed in a 15 ml centrifuge tube containing 3 ml of tap water, with the lower end of the strip just touching the water. The lid was closed, and the tube incubated at room temperature for ten days.
For charcoal culture, approximately five grammes of No-12 hardwood granulated charcoal was moistened with tap water until the charcoal glistened, mixed with an equal amount of faeces, and incubated at room temperature for ten days.

The agar plate culture showed the presence of serpiginous tracks under the dissection microscope, with rhabditiform larvae morphologically identified as *S. stercoralis* based on the short buccal cavity, prominent oesophagus and prominent genital primordium (Figures 1,2). Filariform larvae or adult stages were not seen in the agar plate culture. The other two cultures were negative.

Figure 3. Gel photograph of the qualitative PCR. From left to right ;Lane 1 – Patient sample ; Lanes 2 and 3 – DNA extracted from negative samples ; Lane 4 – Positive control (Band at 129 BP) ; Lane 5 – Negative control ; Lane 6 – 100 BP ladder.

A polymerase chain reaction subsequently carried out on the faecal sample using *S. stercoralis* specific primers targeting the ITS1 region[2] was positive for *S. stercoralis* (Figure 3).

The patient was treated with albendazole 400mg twice daily for seven days and referred to the National Cancer Institute for further management. The timeline of events is shown in Figure 4.

Unfortunately, the Covid-19 pandemic prevented further follow up. When contacted after the lockdown was lifted, he did not consent to further investigation. However, he denied diarrhoeal, respiratory, or cutaneous symptoms.

The timeline of the patient's stay is shown in Figure 4.

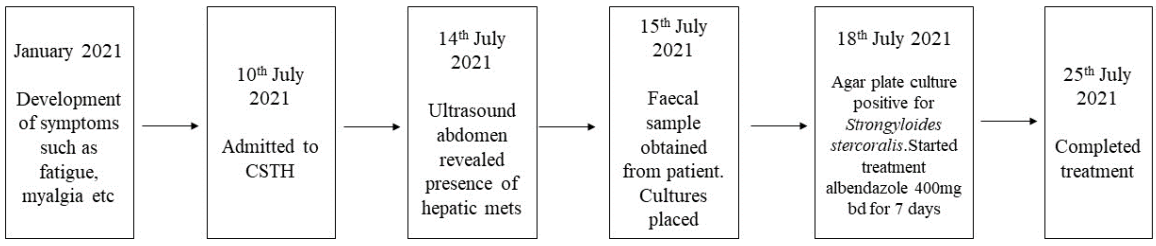

Figure 4. Timeline of events. The flowchart demonstrates the sequence of events since the presentation of symptoms to completion of treatment. CSTH; Colombo South Teaching Hospital

Discussion:

The diagnosis in this patient is chronic intestinal strongyloidiasis complicating hepatic malignancy. It was an incidental diagnosis as he did not have specific symptoms (that could be attributed to the malignancy and/or the chronic infection), and autoinfection may have led to the chronicity of the disease.

Only the rhabditiform larvae were seen in the agar plate culture, and filariform larvae and adult stages were not retrieved. This is a limitation in the identification, as the morphology of the rhabditiform larvae of *Strongyloides stercoralis* and hookworm are quite similar. However, the short buccal canal, and the prominent genital primordium is characteristic of *Strongyloides stercoralis* rhabditiform larvae, and the subsequent PCR also confirmed our diagnosis. As to why filariform larvae and adults were not retrieved from the agar plate culture is inexplicable. Had the culture been left for two more days, there may have been a possibility of retrieving filariform larvae.
Although he was managed with albendazole, ivermectin is the treatment of choice.[1,3] However, ivermectin was not licensed for human use in Sri Lanka at the time of treatment and is still not. As the efficacy of albendazole is inferior to that of ivermectin[4], further follow up was required, with repeated treatment, if infection persisted.

One of the most neglected diseases[5] , strongyloidiasis is estimated to infect more than 600 million individuals globally.[4,6] Data from Sri Lanka are scarce; a lesser-known study indicates approximately 10% prevalence among those with malignancies and end-stage renal disease.[7]

A strong case can be made for improved diagnosis of strongyloidiasis in Sri Lanka. Firstly, since hyper-infection and disseminated disease can occur with commencement of immunosuppressive medication, prior screening and treatment will reduce the risk of such disease. Secondly, agar plate culture, the investigation of choice in the immunosuppressed[8], is a test that could be easily carried out in a routine microbiology laboratory, and positive cultures could be followed up with family screening and treatment, thus reducing the reservoir of infection.

Moreover, close liaison between the curative and diagnostic centres is of vital importance to provide optimum treatment and continuation of care. Although ivermectin and albendazole can be used as treatment, ivermectin is the treatment of choice. It is a relatively safe drug and is administered as a single dose.[1] However, ivermectin is not registered for human use in Sri Lanka [9], and therefore, making it available with proper guidelines in place is also of great importance.

Declarations

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Authors' contributions: The data collection and laboratory processing of samples was by CJW and CMW. The management of the patient was by SAAS, JPA and NP. The manuscript was drafted by CJW and was critically evaluated by NRDeS. All authors read and reviewed the manuscript . The funding was acquired by DRW. The contact point for the arranging of molecular studies was NRDeS. Overall supervision of the project was by DRW, NRDeS and NP.

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