Multimicrobial Helminthic Disease

Evaluation & Treatment of Periportal Fibrosis & Enhancing Cerebral Lesions in a Refugee Patient from East Africa

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Introduction

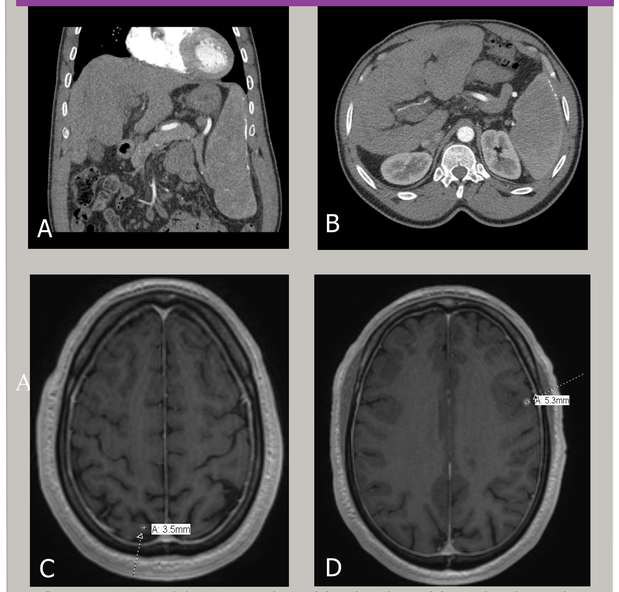
Helminthic diseases are uncommon in the United States, though the burden of helminthic disease falls disproportiontely among patients with higher cumulative disadvantage, including patients from refugee back-grounds. Consideration of parasite endemicity and patient-specific risk factors are critical to diagnosis and management of helminth infection. Extensive workup is often required to properly diagnose and manage helminthic infections, which can be quite challenging to accomplish in the outpatient setting.

Learning Objectives

- To learn about helminthic diseases endemic to East Africa, for which refugee patients may be at risk of, and to consider the complexities of their management

- To consider the complexities of navigating the US healthcare system as a refugee patient with limited English proficiency and consider how to expedite workup and management

Imaging Findings



Figures A & B: CT abdomen, coronal view (A) and axial view (B) revealing dysmorphic liver with periportal fibrosis and splenomegaly
Figures C &D: Axial MRI brain imaging revealing R parietal and L frontal (D) enhancing foci, concerning for neurocysticercosis.

References

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Case Summary

A 56-year-old male refugee from East Africa with history of portal hypertension and multiple prior malaria infections presented to our hospital due to concern for parasitic infection of the liver.

On arrival to the US, the patient had undergone post-arrival assessment with assistance of a Kiswahili interpreter. At the time, he noted a five-year history of abdominal distension, swelling and pain, and chronic nonspecific headaches. He was referred to gastroenterology given concerns of portal hypertension, with evaluation significant for marked abdominal distention and splenomegaly along with leukopenia (WBC 2.8 thousand/uL) and thrombocytopenia (PLT 79 thousand/uL). Given concern for helminthic causes of liver disease, he was recommended for hospital admission to facilitate testing and treatment.

On admission, CT revealed a dysmorphic liver with periportal fibrosis, and splenic capsular calcifications that were thought to be possibly related to schistosomiasis. Infectious workup revealed no HIV, prior HAV, cleared HBV, and positive Strongyloides and Schistosoma IgG. He was treated for strongyloidiasis with ivermectin 200 ug/kg. His MRI-Brain revealed 2 enhancing foci within the left frontal and right parietal lobes without surrounding vasogenic edema. Given lack of vasogenic edema, the patient was thought to have chronic neuroschistosomiasis, and was treated with praziquantel 60 mg/kg, without need for preceding steroids. He was discharged following treatment for strongyloidiasis and schistosomiasis.

Following discharge, cysticercosis IgG returned positive. His MRI-Brain was re-reviewed, with concern that his cerebral enhancing lesions were more consistent with neurocysticercosis. He was seen for follow-up in infectious disease clinic, where he was prescribed a fourteen-day course of albendazole 15 mg/kg/day, with preceding and concurrent prednisone to reduce risk of vasogenic edema and seizure. He has been seen in follow up since completion of his albendazole therapy and remains well.

Helminthic Infections of the Liver and Brain in East Africa

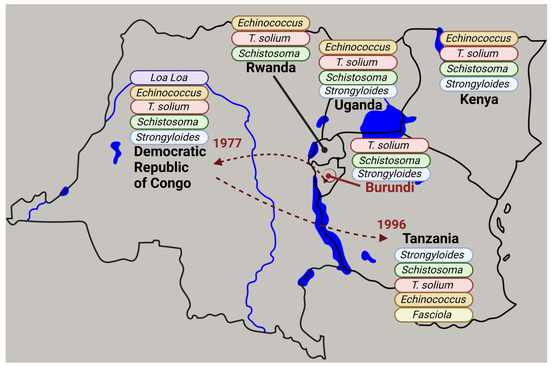

Figure E: Differential diagnosis of helminthic infections should be narrowed based on geographic distribution of pathogens based on the patient's residence, travel and risk factors. For patients from East Africa, helminthic infections that should be considered include echinococcosis, fascioliasis, strongyloidiasis, schistosomiasis, and cysticercosis, according to the WHO.

Helminthic hepatic and intracerebral infections can be diagnostically and therapeutically challenging, especially in regions where such helminth infections are not endemic. Treatment is disease specific, and dependent on a broad workup to ensure that treatment related adverse events related to hyperinflammation from rapid parasite death, or other superinfections do not develop. Consideration of potential for adverse events and treatment approaches are detailed below in Table 1.

Treatment Considerations

Table 1: Treatment considerations for helminthic infections endemic in East Africa

Endemic Helminth	Anthelminthic Agent	Adjunctive Corticosteroids	Coinfection Consideration
Schistosoma mansoni haematobium	Praziquantel	Used for acute visceral and active cerebral disease	Strongyloides
Taenia solium	Albendazole	Used for active cerebral disease, can be used in visceral disease	Strongyloides Tuberculosis
Strongyloides stercoralis	Ivermectin	Risk of severe coinfection with gram negative rod bacterial translocation	Loaisis
Loa loa	Diethylcarbamazine Albendazole	Possible symptomatic benefit, may consider	

Discussion

Treatment of strongyloidiasis, infection from a nematode in the genus *Strongyloides,* was thought to be an important primary consideration for our patient, given the risk of possible hyperinfection syndrome and dissemination of disease [2,3]. Given potential need for concurrent corticosteroids treatment which could result in a hyperinfection syndrome, it was critical to ensure that the patient was treated for strongyloidiasis prior to initiating steroid treatment. [2] Treatment for strongyloidiasis requires ivermectin 0.2 mg/kg. Ivermectin, however, can be fatal in patients with concomitant loaisis given its rapid microfilaricidal effect on *Loa loa*, and risks and benefits must be weighed with consideration of partial initial treatment with albendazole prior to definitive therapy [4].

Treatment of schistosomiasis, or infection with a trematode fluke from the genus *Schistosoma* requires praziquantel, though timing, dosing and concurrent management vary depending on species, extent and acuity of infection. Acute visceral schistosomiasis is often treated with a course of preceding corticosteroid therapy to decrease possible pathologic hyperimmune response to parasite destruction. Patients with acute neurologic involvement, or with evidence of vasogenic edema surrounding enhancing lesions also require preceding corticosteroid therapy to decrease risk of cerebral edema and seizure [5]. Patients with chronic visceral schistosomiasis and with cerebral schistosomiasis without evidence of vasogenic edema may be safely treated with praziquantel alone, although corticosteroids are sometimes still used. Global guidelines regarding acute versus chronic disease and timing of steroids are currently under investigation [6].

The management of cysticercosis, or infection with a cestode from the *Taenia* genus also requires anthelminthic therapy and is dependent on careful staging based on imaging findings that consider number, location and appearance of parenchymal lesions. Albendazole is the mainstay antiparasitic recommended for treatment of cysticercosis, with courses lasting 1-2 weeks [7]. Patients with >2 parenchymal lesions with viable cystercerci the central nervous system may qualify for combination therapy with concomitant praziquantel [7]. Preceding and concurrent steroid treatment are necessary for management of neurocysticercosis in order to blunt inflammatory reactions for patients with neurologic involvement, as this may lead to worsening cerebral edema and seizures.

Conclusion

Management of multimicrobial helminth infections requires a nuanced approach with consideration of multiple potential pathogens, the antihelminthic agents used to treat them, and the need for adjunctive corticosteroids to reduce pathologic inflammation. There are potential harms from treatment if concomitant infections are not identified and adequately addressed, which requires an extensive workup to ensure no harm is done from antihelminth or concomitant corticosteroid therapy.