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Case Report

Two Cases of Meningitis Associated with Gram Negative Bacteremiae and Strongyloidiasis

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ABSTRACT

Background: Strongyloidiasis is a neglected tropical disease and is widely distributed. HTLV-1 co-infection is frequent, and this disease increases the risk of hyper infestation. Disseminated strongyloidiasis often causes severe enterobacteria infection.

Case Presentation: We report the cases of two patients presenting with meningeal syndrome. The meningitis was associated with a Gram negative bacteremiae. The investigations performed proved an infection or a previous contact with *Strongyloides stercoralis*. The infectious outcome was favorable after antibiotic treatment and antiparasitic treatment but one of them was also co-infected with HTLV-1 and died after a lymphoma occurred.

Discussion: *S. stercoralis* infects the intestinal mucosa, and chronic infection of this pathogen induces inflammation of the intestinal mucosa. Enteric bacteria can gain systemic access and be responsible of organ involvement, including Central Nervous System. HTLV-1 infection increases the prevalence of strongyloidiasis, the rate of treatment failure, and the risk of hyperinfestation.

Conclusions: Strongyloidiasis should not be underdiagnosed, as a specific treatment with antiparasitic drugs is available. We should perform direct microscopy of the stool to detect *S. stercoralis* in patients who develop severe enterobacterial infection when patients are from an endemic area.

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Background

Strongyloidiasis is a disease caused by helminths, mainly by *Strongyloides stercoralis*. It is a neglected tropical disease and is widely distributed [1, 2]. It can cause intermittent symptoms that mainly affect the intestine, the lungs or the skin [3]. Disseminated strongyloidiasis often causes severe enterobacteria infection especially in immunocompromised hosts, such as those who are human T-lymphotropic virus 1 (HTLV-1) or human immunodeficiency virus (HIV) carriers and those who have been administered systematic corticosteroids [4]. An increasing number of serious infections has been reported in the literature. We herein report on two new cases of enterobacteria infection with meningitis and strongyloidiasis.

Cases Presentations

The first patient is a 51-year-old man presented a meningitis due to *Escherichiae coli* in January 2015 treated with Cefotaxim. He came from Congo and his medical history consisted only in a chronic B hepatitis. HTLV-1 serology was positive. A disseminated strongyloidiasis was also diagnosed, with a research positive at the parasitologic examination of stool. A first treatment with Ivermectine was initiated. In June, a second meningitis occurred, and cerebrospinal fluid analysis was positive to *Klebsiella pneumoniae*. A new parasitologic analysis of stool was positive for strongyloidiasis and the patient underwent a gastric endoscopy, and the liquid were found larvae of *S. stercoralis*. A treatment with Ivermectine was conducted again for three days, and the patient was treated with three weeks with Cefotaxim for the meningitis. Cerebral Magnetic Resonance Imaging showed unspecific

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hyperintensities of white substance. A treatment with Ivermectine three days a month was decided, and the B hepatitis has been treated with Entecavir. In March 2018, the patient was admitted in intensive unit care for HTLV-1 acutisation (ATCL, adult T-cell leukemia/lymphoma). Clinical outcome was rapidly unfavorable and the patient died.

The second patient is a 30-year-old man who was admitted on May 2019 for fever and headaches. He came from Cameroun the previous week. Cerebrospinal fluid was optically normal, with 232 cells/mm³, 45% PMN and 55% of lymphocytes, without hypoglyrachy, and protein at 0.93 g/L. The direct examination as the culture were negative without any antibiotherapy. Two blood cultures were positives to *Serratia marcescens*. Serologies were negative for HIV, and HTLV-1/2 and positive for *S. stercoralis*. The parasitologic examination of stool were negative. Cerebral CT scan did not find any abnormality. Colonoscopy performed found a Forrest III bulb ulcer and a *Helicobacter pylori* gastritis. The patient was treated with antibiotics and Ivermectine.

Discussion

S. stercoralis infect the intestinal mucosa. Nutman proposed that larvae in non-disseminated hyperinfection were increased in numbers but confined to the organs normally involved in the autoinfective cycle [5]. Systemic infection can be responsible for several diverse clinical manifestations such as reactive arthritis [6]. Larves are also known to give direct involvement of central nervous system (CNS) [7, 8]. Meningeal signs and altered mental status are the most common manifestations seen in patients with CNS strongyloidiasis [8, 9].

CNS culture is often negative but can also be positive for enteric organisms [5, 10, 11]. Recent hypothesis is evoked as that larvae may cause cerebral perfusion defects through capillary obstruction which is seen on Magnetic Resonance Imaging as diffuse infarcts [12]. HTLV-1 infection and strongyloidiasis are two diseases that often share a common geographic distribution. French Guiana is known to harbor high levels of endemicity for both of them [13]. HTLV-1 infection increases the prevalence of strongyloidiasis, the rate of treatment failure, and the risk of hyperinfection [14, 15].

Conclusion

Strongyloidiasis should not be underdiagnosed, as a specific treatment with antiparasitic drugs is available. We should perform direct microscopy of the stool to detect *S. stercoralis* in patients who develop severe enterobacterial infections.

Highlights

- We report two cases of meningitis associated with Gram negative bacteremiae and strongyloidiasis.
- One of our case was also associated with HTLV-1 acutisation (ATCL, adult T-cell leukemia/lymphoma).
- Human T-lymphotropic virus 1 (HTLV-1) infection and strongyloidiasis are two diseases that often associated.

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

The patients consented for publication.

Availability of Data and Material

Not applicable.

Competing Interests

None.

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None.

Author Contributions

KD drafted the manuscript. AB, JB, and PCP revised it critically for important intellectual content. All authors read and approved the final manuscript.

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