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Diagnosis of *Strongyloides stercoralis* infection in immunocompromised patients: problems and perspectives

Diagnóstico da infecção por *Strongyloides stercoralis* em pacientes imunocomprometidos: problemas e perspectivas

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Abstract

The main aspects and problems related to laboratory diagnosis of the human infection by Strongyloides stercoralis, especially in the case of immunocompromised patients, are discussed. The perspectives for improving the performance of diagnostic tests are also appointed.

Keywords: *Strongyloidiasis, Clinical laboratory techniques, Patients, Immunocompromised hosts*

Resumo

O presente artigo discute os principais aspectos e problemas relacionados ao diagnóstico laboratorial da infecção por Strongyloides stercoralis em pacientes imunocomprometidos. São abordadas, também, as perspectivas para aperfeiçoamento dos testes diagnósticos na estrongiloidíase humana.

Descritores: *Estrongiloidíase, Técnicas de laboratório clínico, Pacientes, Hospedeiro imunocomprometido*

Strongyloidiasis is a parasitic disease caused by the intestinal nematode *Strongyloides stercoralis*, prevalent in several parts of the world, especially in tropical and subtropical regions such as Latin America. The evaluation of the human infection by *Strongyloides stercoralis* is not quite precise; according to some authors it is estimated that 30 to 370 million people are infected with this helminth throughout the world[1-3].

This helminthiasis, more often, is responsible for chronic asymptomatic or oligosymptomatic infections of the gastrointestinal tract in immunocompetent human hosts and may remain undiagnosed for long time[4-5]. However, in immunocompromised patients, this infection may be extremely serious, disclosing such as hyperinfection syndrome and / or disseminated disease with high morbidity and lethality[6-7]. Therefore, the diagnosis and early treatment of this helminthiasis is essential for a favorable prognosis[8-9].

The definitive diagnosis of strongyloidiasis is performed mainly by the identification of larvae in faecal samples, using concentration techniques or culture methods[5,10]. However, these larvae are excreted irregularly and, sometimes, in a small number. So, the coproparasitological methods show low sensitivity for the detection of this parasite in many cases, requiring the analysis of several faecal samples to increase the sensibility of the test[5, 10-11]. Considering the group of patients submitted to immunosuppression, in some occasions, the infection by *Strongyloides stercoralis* is not suspected, resulting in no request for coproparasitological diagnostic tests.

In contrast, several immunological tests, with increased sensitivity and specificity, have been proposed for the diagnosis of *Strongyloides stercoralis* human infection. The ELISA test has been highlighted mainly by the practicality of the analysis of several samples together, while Western blotting is indicated by the recognition of antigenic protein fractions of the parasite[12-14]. However, the use of these methods has some limitations, such as cross-reactivity with other helminthic infections, serological positivity resulting from previous *Strongyloides stercoralis* infections or, even, low sensitivity in immunocompromised patients. Another limitation for the immunodiagnosis of

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strongyloidiasis is the difficulty for obtaining enough amounts of *Strongyloides stercoralis* larvae or adults for production of specific antigens. This fact justifies the need for standardization and use of heterologous antigens, especially in the endemic areas[12, 15-17]. Thus, wild-rodent species *Strongyloides venezuelensis* and *Strongyloides ratti* have been employed for the development of immunological techniques for the study and diagnosis of human strongyloidiasis[15,18].

On the other hand, the development and implementation of new studies involving proteomic techniques will be of fundamental importance for the accurate serological diagnosis of *Strongyloides stercoralis* infection in the future[13-14,19-20]. In this context, using the *Strongyloides venezuelensis* heterologous species as an alternative source for antigen production, proteins recognized by antibodies present in the sera of patients with strongyloidiasis has been evaluated[14].

Trying to implement the diagnosis of strongyloidiasis, molecular tests have been used in recent years([21-23]). Although using molecular biology techniques in the context of strongyloidiasis diagnosis present promising results, some problems must be considered: the target region for DNA amplification, the presence of inhibitors in the faecal material, the lack of a standard protocol for DNA extraction, and small amount of faecal material in collected samples are challenges that yet must be solved. These obstacles may compromise the sensitivity of the trials([21-22]). However, the wide range of proteins secreted by *Strongyloides stercoralis* larvae and adults recently identified, that have been previously found in other helminth species, must be considered as an additional problem for the specificity of these diagnostic techniques[24]. On the other hand, there are scarce number of reference laboratories that would provide the precise methodology[25], mainly constituting a distant reality in the endemic areas[26].

Although the scientific literature demonstrates the importance and applicability of serological and molecular diagnosis, similar to the parasitological diagnosis, these are not yet systematically used in the screening of immunocompromised patients, due to the unavailability of these techniques in routine laboratories.

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