Patients at a higher risk to develop chronic pulmonary aspergillosis (CPA) are frequently immunocompetent but are individuals who have structural damages in their lungs. The most common diseases linked to the development of CPA are previous pulmonary tuberculosis (PT) and infection with atypical mycobacteria (15.3% and 14.9%, respectively) [1]. Less frequently, CPA can affect individuals who suffer from immune suppression and who may suffer subacute invasive pulmonary aspergillosis (SIPA) following colonization by Aspergillus. However, the symptoms and the imagological characterizations of the lungs of a patient who suffers from this pathalogy are similar to those resulting from PT. Consequently, misdiagnosis is frequent particularly in HIV+ patients whom tend to be diagnosed with CPA only post-mortem [2]. The quick detection and identification of Aspergillus as the etiological agent of infection is necessary to avoid misdiagnosis and to start antifungal treatment in order to avoid the progression of CPA. Molecular methods might aid in the diagnosis, but standardization is crucial in order to use the obtained data as a possible diagnostic tool.

INTRODUCTION

OBJECTIVES

To determine the potential of a real-time PCR (rt-PCR) in the detection of Aspergillus spp. DNA in respiratory samples from a cohort of patients with suspicion of fungal respiratory infection and whose samples had been previously analyzed by culture and/or immunoenzymatic techniques. We focused particularly in HIV+ patients and patients with active or previous respiratory samples from a cohort of patients with suspicion of fungal respiratory infection and whose samples had been previously analyzed by culture and/or immunoenzymatic techniques.

METHODS

High number of positive cases

The rt-PCR tested showed an overall higher positivity rate (39.0% vs. 77.3%) (table 1) comparing with the results obtained by the conventional methods for the diagnosis of pulmonary aspergillosis. Aspergillus DNA was detected in higher frequency in respiratory samples than the frequency of positive cases obtained by culture (94,1%) (figure 1).

Table 1 - Prevalence of Aspergillus spp. detected by the conventional methods used for the diagnosis of aspergillosis (culture and immunoenzymatic assay) and by Aspergillus real-time multiplex PCR in the cohort studied.

<table>
<thead>
<tr>
<th>Analyzed cohort</th>
<th>Prevalence of Aspergillus detected [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>By standardized methods</td>
</tr>
<tr>
<td></td>
<td>39.0 (n=55/141)</td>
</tr>
<tr>
<td>HIV+ patients</td>
<td>63.3 (n=11/18)</td>
</tr>
<tr>
<td>Patients with previous Mycobacterium spp. infection</td>
<td>27.3 (n=3/11)</td>
</tr>
<tr>
<td>Patients with active Mycobacterium spp. infection</td>
<td>42.9 (n=3/7)</td>
</tr>
</tbody>
</table>

High prevalence of Aspergillus in patients at risk to develop CPA

Aspergillus spp. was detected with high prevalence (64.3%) in the respiratory tract of the analyzed HIV+ patients (table 1).

Results

Figure 2 and Table 2 show examples of the obtained results for the Aspergillus PCR.

Final remarks

The rt-PCR assay showed higher positivity rate (77.3% vs. 39.0%) possibly due to its higher sensitivity and it allowed a faster and more accurate obtention of results, when compared to cultures.

Aspergillus spp. was detected in high prevalence in the respiratory samples of the tested HIV+ patients. Although the methods employed in this work cannot be used per se in the diagnosis, our results evidence that the airways of these patients are frequently colonized/infected by Aspergillus. Thus, in cases of PT suspicion, besides performing tests to detect Mycobacterium spp., laboratory tests to detect Aspergillus spp. should also be performed in parallel in order to avoid misdiagnosis and unnecessary antibiotic treatments of HIV+ patients.

Abbreviations

- BHI: Brain heart infusion
- C4: control internal
- C: control external
- Ct: cycle threshold
- CPA: chronic pulmonary aspergillosis
- IPA: invasive pulmonary aspergillosis
- SDA: Sabouraud dextrose agar
- PT: pulmonary tuberculosis
- ASIAN: American Society of Infectious Disease
- HI-PCR: real-time PCR
- MAC: Mycobacterium avium complex
- HIV: human immunodeficiency virus
- SITA: subacute invasive pulmonary aspergillosis

References