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Letter to the Editor

Pulmonary co-infection with *Pneumocystis jirovecii* and *Histoplasma capsulatum* in AIDS patients is not a rare event

We read with interest the article by Carreto-Binaghi et al. (2019) on *Histoplasma capsulatum* and *Pneumocystis jirovecii* co-infection published in the *International Journal of Infectious Diseases*. The authors performed the detection of the two fungi using PCR assays in bronchoalveolar lavage (BAL) specimens from patients monitored in their centre in Mexico City. Among the 289 patients screened, 84 were HIV-infected and 32 (38.1%), 16 (19%), and 9 (10.7%) were infected with *P. jirovecii*, *H. capsulatum*, and both fungi, respectively. Positive results of *H. capsulatum* culture were obtained in only four out of the 16 patients mentioned above.

In 2013, we published a photo-quiz showing an alveolar macrophage containing a cluster of *P. jirovecii* trophic forms and one spore of *H. capsulatum* (Le Gal et al., 2013). The diagnosis was performed by examining a BAL specimen from an HIV-positive patient from Martinique (West French Indies), who had been living in metropolitan France for 1 year. This overseas French territory is an area where histoplasmosis is endemic, and *Pneumocystis* pneumonia (PCP) and disseminated histoplasmosis represent frequent AIDS-defining illnesses (Le Gal et al., 2013). We were concerned by the apparent rarity of reports of pulmonary co-infections with both fungi in AIDS patients. Indeed, this fungal co-infection has been cited around 20 times. Since 2013, five reports, including that by Carreto-Binaghi et al., have been published (Table 1).

We hypothesized that this rarity of a diagnosis may be related to the low sensitivity of usual laboratory techniques. For this reason, the study by Carreto-Binaghi et al. is specifically relevant. The use of PCR assays provided a dramatic improvement in detection sensitivity. In the absence of PCR assays, the fungal infections would have been missed in 12 out of the 16 patients who developed histoplasmosis, and in 18 out of the 32 patients who developed PCP. The use of the PCR assays rendered it possible to diagnose pulmonary *H. capsulatum* and *P. jirovecii* co-infections in 12 patients. Likewise, using PCR assays, Gago et al. (2014) detected *P. jirovecii* in one out of 10 patients initially diagnosed with proven pulmonary histoplasmosis, and Almeida-Silva et al. (2016) detected *H. capsulatum* in one patient initially diagnosed with proven PCP. In summary, the study by Carreto-Binaghi et al. indicates that pulmonary co-infection with *P. jirovecii* and *H. capsulatum* in AIDS patients is not a rare event. The use of sensitive PCR assays for the routine diagnosis of both infections is relevant, specifically in HIV-infected patients living in, or who have lived in histoplasmosis endemic countries.

Table 1
Main reports on co-infections with *Pneumocystis jirovecii* and *Histoplasma capsulatum* in AIDS patients.

First author's name (Year of publication)	Country (City, Territory or State)	Number of patients	Method of diagnosis of PCP and histoplasmosis
Wheat et al. (1985)	USA (Indianapolis, Indiana)	2	Direct examination and/or culture[a]
Baughman et al. (1994)	USA (Cincinnati, Ohio)	5	Direct examination and/or culture
Huber et al. (2008)	France (Cayenne, French Guiana)	7	Direct examination and/or culture
Velásquez et al. (2010)	Colombia (Medellin)	5	Direct examination and/or culture
Le Gal et al. (2013)	France (Martinique)	1	Direct examination and/or culture
Gago et al. (2014)	Spain (Barcelona)	1	PCR assays
Almeida-Silva et al. (2016)	Brazil (Rio de Janeiro)	1	PCR assays
Caceres et al. (2018)	Colombia (Medellin)	3	Direct examination and/or culture or antigen detection[b]
Wahab et al. (2018)	USA (Flint, Michigan)	1	Direct examination and/or culture or antigen detection[b]
Carreto-Binaghi et al. (2019)	Mexico (Mexico City)	9	PCR assays

PCP, *Pneumocystis* pneumonia.
[a] Direct examination for *P. jirovecii* detection, direct examination and/or culture for *H. capsulatum*.
[b] Direct examination for *P. jirovecii* detection, *H. capsulatum* antigen detection in the absence of direct examination and culture.

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Ethical approval

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Conflict of interest

None.

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