Clinical Mycology in Latin America: diagnostic capabilities and antifungal therapy

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Abstract

The Latin America and Caribbean region is a fertile terrain for fungi: a large population of rural workers is exposed to fungal pathogens; there are many patients suffering from comorbidities and in increased risk for fungal infections; moreover, Brazil, the largest country in the region, has the second largest kidney and liver transplant program in the world.

Despite the significant burden, insufficient attention is paid to the problem by the medical community and society, and no data are available about diagnostic capabilities and clinical mycology practice in the Latin America and the Caribbean region.

Results

We got 128 responses, each one from a single health care institution. Countries (number of institutions) included Brazil (96), Mexico (3), Colombia (1), Uruguay (3), Guatemala (3), Argentina (2), Chile (2), Paraguay (2), Venezuela (2), Barbados (1), Ecuador (1), Honduras (1) and Peru (1). Most frequent institutions profiles were public (38%), private (24%) and university hospitals (36%). Number of hospital beds varied between 12-3000 beds (median 209 beds). ICU beds ranged 3-500 beds (median 15 beds). Most institutions provided care for hematopoietic (63%) and HIV (83%) patients. Yeast identification was performed by biochemical tests (74%), automated methods (71%), and MALDI-TOF (19%). Seventeen percent of responders had access to DNA sequencing. Among a half (39%) of the institutions did not perform antifungal susceptibility tests, 41% did so only for yeasts, 2% for molds. Fifteen (12%) institutions performed antifungal susceptibility tests routinely for all fungal isolates. Automated methods were the most frequently used antifungal susceptibility methodology (61%). Eighty-two (64%) institutions had no access to therapeutic drug monitoring (TDM). Cryptococcal antigen testing was available for 75% of the responders.

The majorities of institutions reported the existence of a mycology laboratory (74%), and almost a quarter (21%) had an outsourced mycology lab. Brazil had a significantly higher number of outsourced mycology laboratories than other countries in the region (20/25 vs. 1/5; p<0.002). Regarding to mycology diagnostic procedures, almost a half (49%) have been made within the institution. Other institutions performed fungal diagnosis only at outsourced laboratories (18%), partly at outsourced laboratories (26%) and 7% reported no access to mycology diagnostic procedures. Of these (9) institutions without fungal diagnostics, there were 7 hospitals, all of them located in Brazil.

Fluconazole was available for 93% of institutions, followed by amphotericin B deoxycholate (88%) and itraconazole (87%). Iopamidol amphotericin was accessible in 46% of institutions, and micafungin in 39% of institutions. Fluconazole was available in 94% (17) medical centers.

India ink for Cryptococcus was ordinarily performed in 116/128 (92%) centers. In the clinical suspicion of pneumonia/ therapy, silver stain was made in 54/127 (43%) of institutions. Fluorescent dyes were only available in 33/122 (27%). Automated blood cultures for fungi have been used in 99/127 institutions (78%).

Identification methods utilized by the institutions are summarized in Figure 1. In Table 1, we describe the ability to identify fungi at species level, in yeast and molds, in the responders' institutions.

Background

No data is available about diagnostic capabilities and practice in clinical mycology in Latin America and the Caribbean. Methods: Here, we conducted an online survey aimed to assess availability, routine diagnostic procedures and access to therapy. Contacts were made through LIFE initiative (Brazilian Society of Infectious Diseases). SBI (Brazilian Society of Clinical Analysis) and SBM (Brazilian Society of Microbiology) during the first 2018 trimester.

Results: We got 128 responses, each one from a single health care institution. Countries included Brazil (96), Mexico (9), Colombia (3), Uruguay (3), Guatemala (3), Argentina (2), Chile (2), Paraguay (2), Venezuela (2), Barbados (1), Ecuador (1), Honduras (1) and Peru (1).

Conclusions

- Profile of responders indicate high-complexity institutions, including transplant centers.
- Even though Brazil has the strongest economy in the region, the practice of outsourcing was more common and there is significantly less access to antifungal susceptibility tests in this country, suggesting a low level of awareness for fungal diseases.
- Lack of access to antifungal drugs is common: echinocandins, first-line of therapy for invasive candidiasis is not available in over 60% of responders; fluconazole, an important drug to fight cryptococcal meningitis is available for 82% of responders.
- Despite some scarcity, there are laboratories with modern technology such as DNA sequencing and MALDI-TOF.
- Unfortunately, there is no access to CRAG in a quarter of responders – CRAG is considered an essential diagnostic tool by the World Health Organization. Serology for fungal pathogens also has limited availability and TDM is rarely performed.
- The results are worrisome despite its high incidence and endemicity for mycoses, the Latin America and the Caribbean region is not appropriately prepared to fight against fungal infections.