Feline sporotrichosis outcome and its impact in public health in Southern Brazil

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Poster session 5, September 23, 2022, 12:30 PM - 1:30 PM

Sporotrichosis due to *Sporotrichum brasiliense* is an emerging and neglected disease in Brazil. Domestic cats are susceptible to a severe presentation of this mycosis, carrying a high feline load in their lesions. They frequently infect other animals and even humans by scratches and/or bites. Thus, the correct management and treatment of feline sporotrichosis are crucial aspects of the control of the disease in a population.

Objective: We aimed to evaluate the management and outcome of feline sporotrichosis cases in a hyperendemic city in southern Brazil (Rio Grande do Sul state).

Methods: Database from the Mycology Laboratory (LabMyc) of the Federal University of Rio Grande (FURG-FURG) was consulted to gather data from all proven feline sporotrichosis cases (confirmed by mycological cultures), between January 2019 and December 2021. It was included in this study in all cases in which the phone number of the cat’s owner was available. All of them were contacted and interviewed for an interview by quick and short questions regarding the management and the outcome of their cats with sporotrichosis. Diagnosis to participants, and changes/new phone number contacted were used as exclusion criteria.

Results: During the 3-year period studied a total of 62 owners, from 165 felines diagnosed with sporotrichosis in the LabMyc, had a phone number available. A total of 35 owners were excluded, resulting 27 participants in this study. More than half (18/27, 66.7%) were consulted only once due to the veterinary to clinical acrilymphcyte, 48.1% (13/27) of them do not use personal protective equipment to handle the infected animal, 44.4% (12/27) highlighted the difficulty to daily administering drugs to the cat and only 18.5% (5/27) affirmed to had isolated the infected animal during the treatment. Two animals (7.4%) with advanced signs of disseminated sporotrichosis died before starting treatment, and the others receiveditraconazol and potassium iodide as the drug of choice. Clinical care was achieved in 40% of the cats treated (10/25), 28% (7/25) evolved to death, 16% (4/25) are still in treatment due to new lesions (resistance), and the other four animals were abandoned in the streets. In addition, asymptotic transmission occurred in three (11.1%) owners, which developed lymphocutaneous sporotrichosis after a scratch or bite by the infected cat.

Conclusion: Sporotrichosis in Southern Brazil is a public health threat, in view of this, our study shows the urgent necessity of governmental strategies and interventions that promote health education and implement a service to at-risk, and provide treatment accomplishment to feline sporotrichosis in view of the current epidemiology of this mycosis.

The mechanism of action of antifungal activity of Zanthoxylum armatum fruit’s oil against Candida cells does not involve ROS generation

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Objective: To explore the antifungal activity of Zanthoxylum armatum fruit’s oil against different Candida species and its mechanisms of action.

Methods: The Z. armatum fruit’s oil was assessed against C. albicans, C. laurentii, C. glabrata, C. parapsilosis, C. tropicalis, and C. guilliermondii through different drug susceptibility assays including, MIC, agar diffusion and spot assay. The mechanism of action was explored through mixed analysis, germ tube inhibition, epithelial cell adhesion, and ROS generation. Results: The oil from the fruits of Z. armatum was subjected to GC-MS analysis, and identified (72%) was found to be the major component. The drug susceptibility measured through different methods, including minimal inhibitory concentration (MIC), where equal to or less than 5% c/v for different species tested, and the same pattern was observed in agar diffusion and spot assay. The antifungal activity was found to be fungicidal in nature and the major reason appeared to be the reduction in ergosterol levels inside cells. It resulted in lowered germ tube formation, an important indicator in virulence of C. albicans. The oil reduced adherence of Candida cells to buccal epithelium significantly, which is the first step in invasion, biofilm formation, and damage to oral epithelial cells. Interestingly, unlike most antifungals, where reactive oxygen species generation mediated killing is involved, was not found significant in the present study.

Conclusions: The Z. armatum fruit’s oil exerts its antifungal activity by inhibiting ergosterol formation and reduced germ tube formation.

Genomic epidemiology of antifungal-resistant Candida auris in Colombia

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Introduction: Candida auris is a public health threat. Five major clades of C. auris have been identified (Clades I–V). In Colombia, C. auris infections were first reported in 2014 with ongoing transmission reported from multiple cities. Here, we describe C. auris genomic epidemiology in Colombia detailing cases from 2016–2021.

Methods: A total of 39 isolates from C. auris cases were collected between June 2016 to January 2021 in Colombia, representing 15 geographic locations. Species confirmation, antifungal susceptibility testing, and whole-genome sequencing (WGS) were performed. In all, 37 genomic sequences generated previously from isolates from C. auris cases in Colombia, Venezuela, Panama, Israel, and United States were also analyzed. MycoNofWp workflow was used to assess sequence quality, may reads to the reference, and identify single-nucleotide polymorphisms (SNP). Pairwise distances and a neighbor-joining tree were generated. JTracker was used to generate a maximum-likelihood tree with bootstrap values.

Results: Phylogenetic analysis identified 1,493 SNP positions. Isolates from Colombia clustered to Clade IV and predominately grouped by country except for 18 fomacazol-resistant isolates from Bogota, which grouped with five isolates from Venezuela. In this clade, 20 (53%) were resistant to fomacazol and 5 (24%) were resistant to fomacazol and the echinocandins micafungin. Remaining isolates from Bogota did not group in this clade and were susceptible to fomacazol and micafungin.

A total of 98 isolates from Colombia clustered together. Within this Colombian clade, there were two subgroups that had bootstrap support of 100% and were separated by 15 SNPs. The first subgroup was a cluster that contained 18 isolates from the north coast; 17 (94%) isolates were resistant to amphotericin B. A second subgroup comprised of 24 isolates from Casar and Norte de Santander, and 22 (96%) isolates were resistant to fomacazol.

Conclusions: Based on the phylogenetic reconstruction, C. auris in Colombia continues to be of Clade IV. Amphotericin-resistant isolates were predominantly from the north coast, fomacazol-resistant isolates were from a wider geographic area in Colombia, and echinocandins-resistant isolates were from Bogota. Within the Colombian cluster comparing two subgroups, we observed high genetic relatedness between isolates from different geographic locations suggesting transmission among cities.

The value of PCR-based azole resistance detection in invasive aspergillosis: A prospective multicenter study

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Objective: Prompt detection of azole-resistant Aspergillus fumigatus will result in the timely start of active treatment and the survival of patients aspergillosis (PA). The use of a multiplexed polymerase chain reaction (PCR) targeting Aspergillus species and fungal DNA as well as the most prevalent azole resistance-associated mutations (RAMs) in the cyp51A gene (TRIMA51M and TRIMV212)@2022) could decrease the time to detect azole-resistant IA.

Methods: In a prospective study in 12 Dutch and Belgian centers, we evaluated the clinical value of the multiplex As- perGenTest PCR in hematology patients with a pulmonary infiltrate undergoing bronchoalveolar lavage (BAL) sampling. The primary endpoint was antifungal treatment failure in the 6 weeks after antifungal treatment initiation in the patients in which azole-resistant IA was detected. Treatment failure was defined as death or a switch to an antifungal agent from another class after at least 5 days of first-line therapy. Patients with a mixed azole-susceptible/-resistant infection were excluded from this analysis due to ascertaining that the infection was indeed caused by the resistant strain.

Results: Of 123 patients enrolled, sufficient BAL for PCR testing was obtained in 299. Probable fungal disease was diagnosed in 95 (34%), Aspergillus cultured in 24 (8%), Aspergillus DNA detected in 118 (39%), and A. fumigatus DNA in 89 (29%) patients. The resistance PCR was conclusive in 54/98 (45%) and RAMs were detected in 8 (15%). Table 1. All 8 had probable IA but 2 had a mixed infection and were excluded. In the 6 remaining patients, treatment failure was observed in one compared with the GM-negative patients, and despite antifungal therapy, a positive GM test was associated with a 13% higher 6-week overall mortality (P = .01). Table 2. Surprisingly, the 6-week mortality in the 65 patients who had a positive Aspergillus PCR but a negative GM and culture was not associated compared to those with a negative PCR (P = .14 in PCR; 14% in PCR; 14% mortality, P = .68).

Conclusions: In patients with an underlying hematological disease and a pulmonary infiltrate, the detection of Aspergillus DNA by PCR on BAL was not associated with mortality. The exact place of the Aspergillus PCR in the SORTEMICORE aspergillosis fungal infection criteria is therefore uncertain. In 13% of the patients in whom A. fumigatus DNA was present, azole RAMs were detected by PCR. In only 16% probable cases of IA with RAMs detected, antifungal treatment failure was observed. Based on the choice of antifungal therapy on the result of a cyp51A resistance PCR may help to reduce the impact of azole resistance on mortality.