P012

Antibiotic activity of staphylococcal peptide derivative(s) against Candida auris biofilms in vitro and in an animal model of catheter-associated infection

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Poster session 1, Sunday, 21 September, 2022, 12:10 PM – 1:30 PM

Objectives: Candida auris has emerged as a major multidrug-resistant nosocomial pathogen worldwide. The organism exhibits a persistent, colonizing phenotype, usually associated with biofilms formed on hospital surfaces, medical equipment, and underlying medical devices. Biofilm formation by C. auris can further aggravate the infection and outcome, owing to resistance to antibiotics, antifungals, and antiseptics. These drugs are released in two phases: non-antimicrobial and antiparasitic drugs. The present study aimed to evaluate the preventive and therapeutic efficacy of select peptide derivative(s) from staphylococcal against C. auris biofilms in vitro and in vivo, and to assess the model of catheter-associated infection.

Methods: Three potentially antimicrobial, staphylococcal alpha-helical amphipathic peptides (19-23 amino acids) were evaluated for antimicrobial and antibiofilm activity against clinical isolates of C. auris. The antibiofilm activity of C. auris planktonic cells and sessile cells was evaluated using the Clinical and Laboratory Standards Institute. Biofilm assays were performed in 96-well flat-bottomed microplates (MTT-1649), and the effect of the test agent on biofilm formation (MIC, minimum biofilm precursor concentration) as well as post-formed biofilm (MBIC, minimum biofilm inhibition concentration) was measured by live/dead staining of the 72-hour old biofilm. The MIC and MBIC values were calculated using the formula of the graph.

Results: The present study demonstrates that a 19 amino acid, alpha-helical staphylococcal peptide decreases biofilm formation (in vitro) and in vivo in a model of subcutaneous catheter-associated infection.

P013

Green synthesis of silver nanoparticles using Allium gavanianum and its antioxidant potential against Candida auris

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Objectives: This study aimed to evaluate the antimicrobial and antifungal activities of silver nanoparticles synthesized using onion (Allium gavanianum) a traditional agricultural plant with reported medicinal properties. The study was carried out to achieve results comparable to the drug-free controls. Furthermore, the present study aimed to establish a novel, green, and eco-friendly method of biosynthesis of silver nanoparticles from Allium gavanianum. The antioxidant potential of the synthesized nanoparticles was also evaluated.

Methods: Silver nanoparticles (AgNPs) were synthesized by adopting a green approach. Optimization and characterization of AgNPs were carried out using UV-Vis spectroscopy, TEM, and FTIR. Minimum inhibitory concentration (MIC), minimum fungicidal concentration (MFC), and minimum bactericidal concentration (MBC) were determined. Furthermore, their effect on cell morphology and cell permeability was also analysed using FCM/EM.

Results: Size and shape of AgNPs were determined using Transmission Electron Microscopy, which indicated that the nanoparticles were of spherical in shape and mono-dispersed in nature. The synthesized AgNPs were found to be stable even after 3 months. The synthesized AgNPs showed a remarkable inhibitory effect against various strains of C. auris. The incorporation of silver nanoparticles to plants extracts significantly improved the antimicrobial and antifungal activity against the tested strains in a synergistic manner.

Conclusions: Silver nanoparticles synthesized using Allium gavanianum extracts prove eco-friendly, biosynthesis nanoparticles with antimicrobial activity and have the potential for use as a therapeutic antimicrobial agent.

P014

Prevalence and antifungal susceptibility of Wickerhamiella anomalous in a tertiary care center

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Objectives: The spectrum of yeast species causing fungaemia has been expanding with emergence of many unusual pathogenic species. One such species is Wickerhamiella anomalous which has been recognized as an important cause of nosocomial fungaemias in neonates and pediatric patients. We evaluated antifungal susceptibility and the burden of antifungal resistance in W. anomalous.

Methods: Species identification of the isolates was performed using MALDI-TOF MS. Antifungal susceptibility testing was done according to the CLSI broth microdilution method following the M7-A3 protocol. C. albicans ATCC 20916 and C. dubliniensis ATCC 204328 were used as quality control strains. The lowest MIC or echinocandin concentration inhibiting 50% of the fungal growth was used as minimum inhibitory concentration (MIC). Antifungal agents used were amphotericin B (1.25 μg/mL), caspofungin (0.125 μg/mL), and voriconazole (1 μg/mL).

Results: Results of 637 isolates isolated over a 5-year study period from January 2014, through December 2019 at our center, were evaluated for susceptibility to amphotericin B, fluconazole, voriconazole, caspofungin, anidulafungin, and micafungin. The majority of W. anomalous was isolated from neonates (71.7%) followed by other pediatric patients (41.4%). Antifungal susceptibility testing analysis showed 100% of the isolates were susceptible to fluconazole, followed by amphotericin B, 31.2%, and voriconazole (4.4%). For amphotericin B, 99.6% (620/624) of the isolates exhibited MIC ≤ 0.5 μg/mL. For voriconazole, 95% (593/624) of the isolates were susceptible to voriconazole, with 5% resistant, and 14% exhibited susceptible dose-dependent phenotype. All the fluconazole-resistant isolates, two (3.5%) isolates were cross-resistant to voriconazole. Among echinocandins, the resistant rate was 2.4%, 1.2%, and 1.4% were resistant to caspofungin, anidulafungin, and micafungin, respectively.

Conclusions: Wickerhamiella anomalous exhibited intrinsic susceptibility to all the antifungal agents evaluated. A sub-clinical resistance to fluconazole was noted in this species while resistance to echinocandins was low.

P015

A study to demonstrate heterogeneity and tolerance to antibiotics in Candida auris

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Objectives: Candida tropicale can exhibit a trailing growth pattern phenomenon in vitro and antifungal susceptibility testing (AMF) of isolates. This phenomenon is considered as ‘resistance’ in some current CLSI guidelines. The phenomenon has been linked to treatment failure and isolates could either be heterogeneous (HR) or tolerant, which has been known to harbor higher MIC substrate (≥ 1%) of an inevitable susceptible population grows at drug concentrations at least 8 times higher than the minimum inhibitory concentration (MIC). Tolerant cells (≥5% of the population) endures antifungal treatment several times above