P3: 23

Insights into *Pseudomonas aeruginosa* and *Candida albicans* interactions in ventilator-associated pneumonia - effect of combinational antimicrobial therapy

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Ventilator-associated pneumonia (VAP) is a frequent hospital-acquired infection occurring in mechanically ventilated patients, with a mortality of 20-70%. These infections are often caused by mixed populations of bacteria and yeast, which combined with the indiscriminate use of antimicrobials leads to ineffective treatment and contributes to the emergence of multidrug resistant pathogens.The understanding of antimicrobial resistance and the development of new antimicrobial strategies is attracting considerable research interest. In this scope, this work aimed to characterize single and dual species biofilms of *Pseudomonas aeruginosa* and *Candida albicans*, common in VAP infection, and to assess the effect of combinational antimicrobial therapy using amphotericin B (AmB) and polymyxin B (PolyB).Phenotypic analysis of single species biofilms revealed *C. albicans* biomass reduction after 48 h. Dual-species biofilms were dominated by *P. aeruginosa*. The activity of isolated antimicrobials was evaluated against planktonic cultures with AmB being most effective against *C. albicans* and PolyB against *P. aeruginosa*. Mixed planktonic cultures required equal or higher concentrations. In biofilms, only PolyB reduced the microbial population, affecting *P. aeruginosa* in both single and dual-species biofilms, but only at the highest doses. The antimicrobial combinations had a synergistic effect in dual-species planktonic and biofilm cultures, but biofilms were able to regrow.To conclude, combination of antimicrobials shows promising results in the treatment of VAP involving mixed populations, but further optimization of doses and timing of administration are required to avoid reinfection.