TITLE: EFFECT OF ANTIMICROBIAL PHOTODYNAMIC THERAPY ON *Escherichia coli* ISOLATED FROM VENOUS LESIONS: AN IN VITRO STUDY.

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ABSTRACT:

Bacterial infection is one of the most common complications in wound healing. Due to the increasing in antimicrobial resistant strains, the search for effective antibacterial therapeutic treatment becomes of utmost importance. In this sense, Photodynamic Antimicrobial Therapy (aPDT) has presented a promising modality for eliminating microorganisms. aPDT uses the combination of light and photosensitizer in the presence of molecular oxygen. However, its effectiveness depends on the photosensitizer (PS) concentrations, type of bacteria species and doses of light applied. Thus, this study aims to evaluate the susceptibility of a clinical strain of *Escherichia coli* to conventional antibiotics as well as to aPDT. Such strain was collected from a patient with venous lesion, under treatment at the Wound Ambulatory of Policlínica Uniguairacá, Guarapuava city, Paraná State. Antimicrobial susceptibility test was performed using the disk-diffusion method recommended by the Brazilian Committee on Antimicrobial Susceptibility Testing (BrCAST). Methylene blue (MB) used as PS was applied at 0.5% and 1.0 % concentrations, 10 and 30 minutes incubation times, and 7.52 J/cm^2 and 3.76 J/cm^2 light doses. In addition, *Escherichia coli* with MB in the absence of light were performed as control. Bacterial viability was assessed using 2, 3, 5-triphenyltetrazolium chloride solution (TTC) and absorbance at 540 nm was measured. Antibiotic susceptibility analyses of the isolates were susceptible to imipenem and susceptible to high-dose meropenem. On the other hand, it demonstrated to be resistant to penicillin and cephalosporins, to aminoglycosides (amikacin and gentamicin), ciprofloxacin, sulfamethoxazole + trimethoprim, aztreonam, chloramphenicol, nitrofurantoin, and tetracycline. Therefore, it was considered a multidrug resistant bacteria. No significant statistical differences were observed among groups tested with multidrug-resistant strain of *Escherichia coli* using MB. Neither antibacterial effect with MB concentrations, incubation times and irradiation evaluated was observed. Thus, such results agree with what is usually found in the literature on aPDT low activity against Gram-negative bacteria. Further studies and tests are required.

Keywords: Bacterial resistance, *Escherichia coli*, Photosensitizer, Methylene Blue.

Funding: UGF/SETI, CENTELHA/FA/FINEP, CAPES.