

TITLE: MOLECULAR CHARACTERIZATION OF OPTOCHIN – RESISTANT STRAINS OF *Streptococcus pneumoniae*. IMPLICATIONS FOR LABORATORY DIAGNOSTIC.

AUTHORS: Ana Carolina Carvalho de Oliveira¹; Deize Gomes Cavalcanti de Matos²; Ivano de Filippis³

INSTITUTION: ¹Programa de Pós-Graduação em Vigilância Sanitária, Instituto de Controle de Qualidade em Saúde – INCQS/FIOCRUZ; ²Setor de Bacteriologia, Lab. de Meningites Bacterianas, LACEN-PE; ³Instituto Nacional de Controle de Qualidade em Saúde – INCQS/FIOCRUZ.

ABSTRACT

Streptococcus pneumoniae or pneumococcus is a Gram-positive bacteria, which can be found in the nasopharynx of human beings and is responsible for a large number of cases of invasive diseases worldwide, with treatment and prophylaxis performed by antibiotic therapy. Therefore, the correct identification is important for proper treatment. In clinical analysis laboratories, the disk-diffusion method to evaluate optoquine susceptibility is used to differentiate sensitive pneumococcus from other optoquine-resistant *Streptococcus*. Studies have reported optochin-resistant pneumococcal strains, decreasing the reliability of the identification method. This work aims to quantify the optoquine-resistant strains of *S. pneumoniae* deposited in the INCQS Collection of Pathogenic Bacteria, in addition to classifying them according to serotypes, MLST and susceptibility to other antimicrobials. Strains from the pre- and post-vaccination period were used, taking into account the introduction of the 10-valent vaccine in the 2010 PNI calendar. Sensitivity to optoquine is analyzed by the diffusion method for the most commonly used antimicrobials in the treatment: penicillin (PEN), levofloxacin (LEV), erythromycin (ERY), tetracycline (TET) and chloramphenicol (CLO). Strains that are resistant to any antibiotic after the disk diffusion test are subsequently submitted to the MIC test with E-test strips. Serotypes will be determined by serology (latex agglutination) or PCR. Of the 113 strains analyzed so far, 11 showed resistance to optoquine and 26 strains showed decreased susceptibility to at least one of the five antibiotics. Only one strain showed resistance to at least one antibiotic of three different classes (ERY, TET and PEN), and was classified as multidrug resistant strain (MDR). This strain was sensitive to optoquine. The next step in this study will be to sequence the *atpC* gene of optoquine-resistant strains to determine the mutations regions where the target gene has been modified. In addition, the mechanisms of resistance to other antimicrobials will be determined. The results obtained raise some concern, as resistance to antimicrobials has been growing in recent years and ends up becoming, according to the WHO, a public health problem. Optoquine resistance in particular shows the need for constant monitoring and to the development of another method for identifying the pathogen in routine laboratories.

Keywords: *Streptococcus pneumoniae*, optochin, antimicrobial resistance.