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Antimicrobial susceptibility and resistance for local use in ophthalmology

G Grandi, G Strani, M Cibinel and E Savio

Ophthalmic Hospital, Italy

The indiscriminate use of antimicrobial drugs, not only in medical environment but also in an agricultural and livestock context, has led to the selection of always more resistant bacteria. Therefore, it is very important to follow the evolution of bacterial resistance and evaluate the rise of multi-resistant families over time. There are few literature sources on local use of antimicrobial in ophthalmology. In this study, we showed data from the microbiology laboratory in Turin Ophthalmic Hospital obtained in the last 10 years divided in two groups: 2007-2011 and 2012-2016. The aim of this study was either to supervise susceptibility changes in bacteria groups of utmost importance - *Staphylococcus aureus*, Coagulase Negative *Staphylococcus* (Cons), *Pseudomonadaceae*, *Streptococci*, *Enterobacteriaceae* or to evaluate the presence of multi-resistant family sensitive only to 1-2 antimicrobial drugs in 16 we tested. The antimicrobial tested were: Ampicillin, Chloramphenicol, Tetracycline, Neomicin, Netilmicin, Amikacin, ciprofloxacin, Moxifloxacin, Ofloxacin, Gentamicin, Fusidic acid, Tobramycin, Norfloxacin, Lomefloxacin, Vancomycin and Levofloxacin. Cultures were grown using both liquid (heart-brain broth) and solid (chocolate agar, blood agar) media. All isolates were identified from the standard laboratory procedure. Susceptibility tests were conducted using the Kirby-Bauer method. In the last 10 years, we have observed a decrease of the sensitivity of the amino glycoside versus *Staphylococcus aureus*, in contrast with our previous study in which we observed a decreased sensitivity for fluoroquinolones. In addition, *Staphylococcus aureus* (1349 cases in the first period and 1410 cases in the second one) shows a decrease sensibility for Amikacin from 81,8% to 69 %, Tobramycin from 64,6% to 47,8% and Netilmicin from 93,4% to 82,5%. The last one remains with the Moxifloxacin (84,4%) the second-best sensitive antimicrobial drug against *Staphylococcus aureus*. Cons susceptibility (485 in the I period/306 in the II period) is constant for all antimicrobial drug tested in our study even if they remain the bacteria more difficult to treat. Our data confirmed that Netilmicin is the best antimicrobial drugs with a susceptibility of 78.1% followed by Moxifloxacin 76.4% and Chloramphenicol 68.6%. The best antimicrobial drugs against the family of Streptococcus bacteria in the first period are Moxifloxacin, Levofloxacin and Chloramphenicol with a sensitivity respectively of 97.5%, 94.3%, 94.07%; in the second period the resistances increase against Levofloxacin (89.4%) and Ampicillin (90.48%); Moxifloxacin and Chloramphenicol remain almost unchanged. *Pseudomonadaceae* don't show significant variations: Ciprofloxacin and Levofloxacin have the higher sensitivity. In *Enterobacteriaceae* families (*E. coli*, Enterobacter, Proteus, Klebsiellae) the more powerful antimicrobial agents are Levofloxacin, Ciprofloxacin and Moxifloxacin in the two groups, but everyone with decreased sensitivities. Furthermore, it is interesting to notice that *Enterobacteriaceae* show the greatest percentage of multi-resistant from 1,03% to 2,40% followed by *Staphylococcus aureus* that increase the multi-resistant from 0,30% to 0,71%, while we observed a decrease of multi-resistant in Cons from 2,89% to 1,31%. In conclusion, treatment of bacterial eye infections usually begins before the results of pathogen identification and antibiotic susceptibility tests are available, and thus broad spectrum antibiotics are generally used. However, the frequent and sometimes unnecessary use of both systemic and topical antibiotics has led to the emergence of resistant strains, somewhat reducing the potential of many antibiotics commonly used in empirical therapy. Antimicrobial drug resistance concerns almost all classes of antibiotics, but with differing extents in the case of different bacterial strains. The growing antibiotic resistance of common pathogens clearly influences the efficacy of antibiotic therapy and makes necessary to evaluate the susceptibility of bacterial species or strains responsible for ocular infections.

Biography

Grandi graduated in medicine and surgery at Turin University in 1981. He obtained, at the University of Turin: advanced professional degree in Pathology in 1984, in Microbiology in 1998 and in Clinical Pathology in 1996. He worked at the Service of Clinical Pathology and Microbiology Pediatric Hospital of Turin and at Public Health Laboratory, Asti. He has been Director of Clinical Pathology and Microbiology of Ophthalmic Hospital in Turin from 2010 to 2017. Nowadays he works as former Director at the same service. He taught at the University of Turin Clinical Pathology and Microbiology as visiting professor.

grandi.giuseppe@libero.it