Objectives

Cephalosporins (3rd and 4th generation) are classified from WHO as “highest priority critically important antimicrobials” and from OIE as “critically important antimicrobials”. Nevertheless, they are important to treat bacterial infections in veterinary medicine. Since 2001, an annual representative German-wide study (GERM-Vet) monitors bacterial isolates from diseased animals for resistances against a set of five different cephalosporins, amongst other antimicrobials.

Methods

Based on a statistically valid sampling plan the bacterial isolates were investigated by using the broth microdilution method according to CLSI document VET01-A4. The MIC values were assessed with their corresponding clinical veterinary breakpoints (CLSI VET01-S2). If no breakpoints were available, MIC90 values were used for classification.

Results

The resistance data were evaluated according to bacterial species, animal species and indications.

Mastitis (dairy cows)

*S. aureus* isolates show very low resistance rates against cephalosporins (0-0.8%). *E. coli*: MIC90 values have increased over a period of 2 years, e.g. for ceftiofur from 0.12 to 8 mg/L, corresponding to resistance rates of 2% in 2005 and 9% in 2012).

Calves

MIC90 values of cephalosporins of the 3rd and 4th generation are high for bacterial strains isolated from calves (for all tested cephalosporins >32 mg/L). The rate for ESBL positive *E. coli* isolates from calves seems to be still increasing from 7% in 2006 to 20% in 2012.

Poultry

Cephalosporins are not approved for veterinary use in poultry. Nevertheless, we see high MIC90 values for broilers, although the ESBL rates for *E. coli* are still at 2.4%.

Pets

The resistance situation is similar as for poultry: Only recently increasing MIC90 values for *E. coli* and cephalosporins have been detected. Particularly bacterial strains isolated from infections of the gastrointestinal tract are affected.

Conclusion

An intelligent and rational application of antimicrobial agents is needed to minimise the development and the spread of antimicrobial resistant bacteria and their resistance genes as far as possible. Depending on the affiliation to animal and bacterial species we see large differences in resistance data a very different impact on resistance situation in veterinary medicine. This representative antimicrobial resistance monitoring serves as a valid tool in risk management. With these representative and quantitative data, we are able to monitor and to estimate the development of antimicrobial resistance in veterinary pathogens to 3rd and 4th generation cephalosporins.