Use of Cephalosporins in Veterinary Medicine

Results Of the German National Antibiotic Resistance Monitoring (GERM-Vet)

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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 5 different cefalexin, amongst other antimicrobials.

Conclusions:
An intelligent and rational usage 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 marked differences in resistance rates and 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 estimate the development of antimicrobial resistance in veterinary pathogens to 3rd and 4th generation cephalosporins.

Results:

S. aureus, mastitis

Bascially low resistance rates were detected for S. aureus from diary cattle. Higher rates were only seen against penicillins (14-20%) and amoxicillin/clavulanic acid (4-18%), against cefalexin they were very low (0-3%). Since 2008 MRSA isolates were rarely observed. MIC-values range on a similar level over the sample period.

E. coli, mastitis

E. coli strains from diary cattle also showed low resistance rates below 17%. The newer cephalosporins showed a good effectiveness with low MIC-values (data not shown). MIC-values range on a similar level over the sample period. Very few ESBL-positive isolates were found.

E. coli, enteritis

High resistance rates were shown for E. coli against aminopenicillins (up to 80%) from calves as for isolates from pigs as well. MIC-values of cefalexin, for the excellent cooperation.

References

Figure 1. Resistance level [%] of S. aureus strains (n = 1,567) from dairy cattle with acute mastitis, Germany 2002-2013.

Figure 2. Resistance level [%] of E. coli strains (n = 1,773) from diary cattle with acute mastitis, Germany 2002-2012.

Figure 3. Resistance level [%] of E. coli strains from calf (N=588) and piglet (N=626) with enteritis, Germany 2010-2013.

Table 1. MIC-values [μg/L] of E. coli strains from calf (N=588) and piglet (N=626) with enteritis, Germany 2010-2012.

Table 2. MIC-values [μg/L] of E. coli strains from different animal species, Germany 2006-2013.

Table 3. MIC-values [μg/L] of E. coli strains from pets (Gastrointestinal-tract; GIT; N=83, Urogenital-tract, UGT; N=189), Germany 2010-2013.

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, MIC values were used for classification.