Minimum Inhibitory Concentrations for Ceftiofur and Comparator Antimicrobial Agents against Bacterial Pathogens of Veterinary Importance to Cattle from 1997 to 2001

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Objective

Ceftiofur is an extended spectrum cephalosporin antimicrobial agent that was developed solely for veterinary therapeutic use, and was first approved for the treatment of bovine respiratory disease (BRD) in 1988 by the FDA-CVM. In 1997 Pharmacia Animal Health (PAH) initiated a target pathogen susceptibility monitoring program, and continues to monitor the *in vitro* activity of ceftiofur as well as other antimicrobials used in the treatment of BRD. This paper discusses the results of monitoring the sensitivity of BRD isolates to ceftiofur over the last four years.

Materials and Methods

Accredited veterinary diagnostic laboratories across the United States and Canada participated in the monitoring program. The labs forwarded bacterial isolates from diseased animals to the PAH Research Laboratories, where *in vitro* activity was evaluated to determine if any change in susceptibility has occurred. The submitting laboratory identified the organisms prior to forwarding them. All isolates were stored in Trypticase soy broth supplemented with 10% glycerol at -70° C until tested. For testing, isolates were revived onto freshly prepared Trypticase soy agar plates supplemented with 5% sheep blood. Plates were streaked for isolation and incubated for 18-24 hours at 37° C in 5% CO_2. This 18-24 hour growth was used as inocula to determine the minimum inhibitory concentrations (MICs). The MICs for isolates were determined using a commercially available broth microdilution system that conforms to the guidelines of the National Committee for Clinical Laboratory Standards (NCCLS) broth microdilution method. Antibiotics consistently monitored during the four years included ceftiofur, tilmicosin, tetracycline and florfenicol. BRD pathogens monitored include *Mannheimia haemolytica*, *Pasteurella multocida* and *Haemophilus somnus*.

Results

MICs were determined for 1743 BRD isolates that were collected from 1997 to 2001. Ceftiofur exhibited excellent activity against the pathogens, with MIC values well below the NCCLS approved breakpoint for susceptible, 2.0 μg/mL. MIC_{90}. Values for all four years were: *H. somnus* - ≤0.03, *P. multocida* - ≤0.03 and *Mannheimia haemolytica* - 0.06 in 1997 and ≤0.03 for 1998 through 2001.

Conclusion

Ceftiofur has been approved for the treatment of BRD for 15 years. There has been no change in the ceftiofur MIC values for BRD pathogens since its approval. The MIC values for ceftiofur are very low and demonstrate that BRD pathogens remain exquisitely susceptible to ceftiofur.