

Efficacy of antibiotics for treating mastitis during lactation

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Mastitis, one of the most important diseases affecting dairy cattle, causes huge losses. Mastitis control includes successful treatment of clinical cases during lactation, with antibiotics having a major role. However, to curtail emergence and spread of antimicrobial resistance, there is increasing pressure to optimize and reduce antimicrobial use in food-producing animals. Therefore, we did a comprehensive literature search to identify and thoroughly explore studies characterizing efficacy of antimicrobials to treat mastitis during lactation. Effects of drug class, route, dose, duration of treatment and bacteria involved were also evaluated.

In total, 144 studies were included. In an initial assessment, there was no evidence that supportive therapy (e.g., anti-inflammatories, vaccines, frequent milking) altered efficacy of antimicrobial treatment. Thereafter, results were stratified according to severity of mastitis (acute clinical mastitis, mild and moderate clinical mastitis and udder infection), and bacteria (non-*aureus* staphylococci, *Staphylococcus aureus*, *Streptococcus agalactiae*, environmental streptococci and coliforms). For severe clinical mastitis, intramammary treatment with cephapirin or pirlimycin were as effective as combined therapies (use of 2 or more antimicrobial classes). For mild and moderate clinical mastitis, cure rates were similar for treatment with various classes of antimicrobials or no treatment. For udder infections, intramammary treatment with cephalosporins (3rd or 4th generation), lincosamides, or combinations containing penicillins and aminoglycosides, or systemically administered penicillins, resulted in higher cure rates than no treatment. There was no benefit to antimicrobial treatment for clinical mastitis caused by coliforms, although it was advantageous to treat cases caused by contagious bacteria. In conclusion, we conducted a rigorous assessment of various approaches for treating mastitis during lactation; consequently, we produced a comprehensive decision tree to select the best antibiotic treatment, based on bacteria and disease presentation. This summary is expected to be an essential part of programs to promote antimicrobial stewardship and thereby reduce emergence of antimicrobial resistance.