Concentrations of methicillin in blood, normal milk and mastitic milk of cows after intramuscular injection of methicillin and tamethicillin

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Tamethicillin (TAM) is a basic ester pro-drug of methicillin (MET) which is converted in the body by non-specific esterases to MET. Equal doses of MET and TAM were administered intramuscularly in a crossover trial involving four dairy cows. Acute mastitis was induced in each cow by infusing two quarters of the udder with Escherichia coli endotoxin 3 h before antibiotic administration.

Peak serum MET concentrations after MET injection were significantly ($P<0.001$) higher than peak serum drug concentrations after TAM injection. The $t_{1/2}$ of MET in serum after MET and TAM treatments were 18 min and 2 h, respectively. Normal milk MET concentrations during the first 8 h after TAM administration were significantly ($P<0.05$) higher than after MET treatment. Mastitic milk MET concentrations during the period 2–6 h after MET injection were significantly ($P<0.01$) higher than after TAM administration. However, MET concentrations which were equal to or higher than the minimal inhibitory
the first 3 h after i.m. administration of MET than after treatment with TAM. Thus, mean peak drug concentration in the mastitic milk after MET injection (0.89 μg/ml) was significantly (P<0.05) greater than after TAM treatment (0.65 μg/ml). Since the minimal inhibitory concentration (MIC) of MET for the majority of penicillin G-resistant staphylococci of bovine udder origin is 0.4 μg/ml (Van Damme & Deverieze, 1971), it appears nevertheless that equal doses of MET and TAM administered i.m. resulted in MIC drug levels in mastitic milk for a similar length of time (approximately 8 h). There were indications, however, that sub-MIC levels of MET are likely to be found in mastitic milk for a longer time after TAM than after MET administration at equal doses. The therapeutic relevance of these findings must wait results of field efficacy trials.

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REFERENCES


