Pharmacokinetics of amoxicillin administered in drinking water to recently weaned 3- to 4-week-old pigs with diarrhea experimentally induced by Escherichia coli O149 : F4

Objective-To measure effects of Escherichia coli O149:F4-induced diarrhea on water consumption and pharmacokinetics of amoxicillin after administration in drinking water.

Procedure-10 pigs were inoculated with E coli O149:F4; all 10 pigs subsequently developed diarrhea. Pigs were medicated by administration of amoxicillin in the drinking water (0.75 mg/mL) for a 4-hour period on 2 consecutive days. Fourteen age-matched noninfected healthy pigs (control group) were medicated in a similar manner. Blood samples were obtained from both groups daily, and plasma concentrations of amoxicillin were analyzed by use of high-performance liquid chromatography. Results-Diarrhea reduced the area under the plasma concentration-versus-time curve (AUC) and maximum plasma concentration (C-max) of amoxicillin on the first day of medication by 56% and 63%, respectively. The AUC of amoxicillin on the second day of medication for diarrheic pigs did not differ significantly from that of control pigs on the first day of medication. Conclusions and Clinical Relevance-E coli-induced diarrhea reduced the AUC of amoxicillin and time that plasma concentration of amoxicillin was > 0.025 μg/mL and, hence, less likely to have a therapeutic effect on the first day of administration in drinking water. On the assumption that plasma concentrations may indirectly reflect concentrations at the site of infection, analysis of our results suggests that higher doses of amoxicillin may be appropriate for administration in drinking water during a 4-hour period on the first day that pigs have diarrhea attributable to E coli O149:F4.