Implications. First, it implies that there is distinction in subtypes between the two hosts. This may further imply that other sources may also be important. Recently, report by Barber et al. stressed the underestimation of the role of non-food animal sources such as humans and pets (Barber et al., 2003). Second, the finding may indicate that only certain subtypes of this serovar are able to cause clinical illness strengthening the notion that not all strains of Salmonella serovar Typhimurium are capable of causing clinical illnesses.

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ANTIMICROBIAL AGENT SUSCEPTIBILITY OF CAMPYLOBACTER AND SALMONELLA FROM SWINE HERDS WITH VARIOUS THERAPEUTIC REGIMENS

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Summary: Fecal samples were collected in pens from 27 farrow-to-finish swine herds using (n = 10) and not using fluoroquinolones (n = 17) and in herds using (n = 20) or not (n = 7) tetracycline. Workers on the farms participated to the study. Salmonella was found in 4 out of the 27 sampled herds and were all resistant to tetracycline and susceptible to enrofloxacin. No Salmonella and no Campylobacter were isolated from human. C. coli was found in all sampled herds with an average of 68.5 % positive pens. In farms not using quinolones and tetracycline, no resistance was observed among 2 herds but resistance to enrofloxacin (71 %) and to tetracycline (100 %) were observed in some farms. In herds where tetracycline was used, resistance levels varied from 7 % to 100 %. Resistance levels to quinolones in herds using this agent varied from 0 % to 100 %.

Keywords: resistance, agar dilution, fluoroquinolones, tetracycline, antimicrobial use

Introduction: Campylobacter and Salmonella are zoonotic pathogens frequently recovered from pigs. The incidence of antibiotic resistance of Campylobacter and Salmonella isolates increased over the past few years. The use of antibiotics in food animal productions would be in part responsible for the increased resistance among foodborne bacterial pathogens (McEwen & Fedorka-Cray, 2002).
Resistance to fluoroquinolones is recognized as an emerging public health problem (Engberg et al., 2001). Recent use of this antimicrobial agent in food animals production would be responsible for this increase in resistance levels. On the other hand, tetracyclines have been and are still widely used to prevent or to treat human and animal infections and as growth promoters in animals (Chopra & Roberts, 2001). The aims of this study were to evaluate the prevalence of *Campylobacter* and *Salmonella* in humans and animals in swine herds and to compare the resistance levels of bacteria recovered from farms using or not antimicrobial agents such as tetracycline and fluoroquinolones.

**Materials and Methods:** A total of 27 farrow-to-finish farms were sampled once from June to August 2002. Farms were selected as follows: 7 farms not using tetracycline, 20 farms using tetracyclines, 10 farms using fluoroquinolones and 17 farms not using quinolones. At the finishing stage, 10 pens per farm were randomly selected and a pool of 5 g of feces was collected. Cary-Blair swabs were used for collection of human samples. For *Campylobacter* detection, fecal swabs were inoculated onto charcoal-based selective medium (CSM) with supplements and incubated at 42 °C under microaerophilic atmosphere for 48 h (Karmali et al., 1986). From each plate, three typical colonies were processed for biochemical identification tests. For *Salmonella* detection, samples were enriched in nutrient broth for 24 h and 1 ml was transferred into TBG broth for another 24 h at 42 °C. A loopful was plated on BGS media with novobiocine for 48 h. Typical colonies were tested by TSI, urea and slide agglutination for *Salmonella* and sent for serotyping by Health Canada (Guelph, Canada). Resistance to antimicrobial agents tetracycline and enrofloxacin was evaluated by the agar dilution technique for *Campylobacter* and by disks diffusion for *Salmonella*. Breakpoint values were designated as recommended by NCCLS for veterinary pathogens.

**Results:** *Campylobacter* isolates were found in all sampled herds. All *Campylobacter* were identified as *C. coli* and the incidence per farm varied from 10 % to 100 % of pens with an average of 68,5 % of positive pens. Resistance levels to quinolones in herds using this agent varied from 0 % to 100 % with an average resistance in pens of 24 %. Resistance levels as high as 59 %, 71 % and 75 % were observed among herds from farms using no quinolones. In herds where tetracycline was used, resistance levels to this antimicrobial agent varied from 7 % to 100 %. At the opposite, only 2 out of 7 herds where there was no use of tetracycline had no resistant bacteria. In this study, 4 out of the 27 (14,8 %) sampled herds were positive for *Salmonella*. From these herds, various serotypes, including *S. Typhimurium* DT104, were observed in a maximum of 30 % of pens on a given farm. All *Salmonella* isolates were resistant to tetracycline and susceptible to enrofloxacin. They all came from farms using no quinolone. However, tetracycline was used on 1 out of 4 positive herds. No *Salmonella* and no *Campylobacter* were isolated from human samples.

**Discussion:** In this study, resistant *Campylobacter* were recovered more frequently in pens from farms not using quinolones than in farms using this drug. On the other hand, even if tetracycline is widely used in swine production, in some farms not using this product, no resistance to this antimicrobial agent was observed in *Campylobacter* isolates from those herds. A previous utilization in another production cycle and/or the transmissible nature, for tetracycline, of the resistance determinant may explain the recovery of resistant isolates in farms not using quinolones and/or tetracycline. Prevalence of *Salmonella* was relatively low compared to other studies. The low recovery rate for *Salmonella* in this study make it hard to conclude on the impact of antibiotics use on a possible selection of resistant *Salmonella* isolates. In addition the absence of *Salmonella* and *Campylobacter* in all human samples suggest that few transmissions from animals to humans occurred in these herds. Overall, our findings indicate that the resistance to antimicrobial agents such as fluoroquinolones and tetracycline in *Campylobacter* isolates found on swine farms is weakly associated with the on farm use of these antimicrobial agents.

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O 81 ANTIMICROBIAL AGENTS RESISTANCE IN CAMPYLOBACTER COLI FROM SWINE AND HUMANS

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Summary: C. coli from slaughtered pigs and from human patients were examined for resistance to quinolones and tetracycline. Detection of tetO was performed. Gyrase A gene (gyrA) was amplified and sequenced and tested by an alternative method. Tetracycline resistance levels were respectively of 67,7 % and 56,3 % in swine and human isolates. In C. coli of human origin, all resistant isolates had the tetO determinant while 82,8 % of resistant C. coli from swine possessed it. Among the susceptible swine isolates, 17,2 % possessed this gene. Resistance to enrofloxacin (7,3 %) and ciprofloxacin (11,4 %) was observed in swine isolates and resistance for enrofloxacin (12,5 %) and ciprofloxacin (18,8 %) were observed in C. coli from humans. In addition, 72,7 % of swine resistant isolates and all isolates from humans had a mutation at position 86. Results were similar with MAMA-PCR which can thus be considered as a good alternative to sequencing.

Keywords: MAMA PCR, tetO, gyrA, agar dilution, sequencing.

Introduction: An increase in antimicrobial agents resistance have been reported in many countries for Campylobacter, specially for tetracycline, fluoroquinolones and erythromycin (Engberg et al., 2001). Campylobacteriosis is generally associated with sporadic episodes of diarrhea linked with consumption of improperly handled or cooked food. Animal productions such as swine are potential reservoirs for this bacteria. Some authors suggested that the usage of antimicrobial agents in animal productions play a key role in the dissemination of antimicrobial resistance genes from animals to human population (Swartz 2002). To evaluate this possible link it is important to verify the distribution of antimicrobial resistance determinants in various populations. The aim of this study was to evaluate the incidence and the distribution of antimicrobial resistance in Campylobacter isolates from humans and swine recovered within a restricted geographical area in order to increase chances to establish links. The detection of some genetic determinants of resistance was performed in order to characterize the resistance.

Materials and Methods: A total of 16 human clinical cases isolates and 96 isolates from cecal content of slaughtered swine were included in the study. Resistance tetracycline and fluoroquinolones was evaluated by the agar dilution technique following guidelines of the NCCLS for veterinary pathogens.

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