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Antimicrobial Resistance Patterns of Campylobacter from Pig and Cattle Carcasses in Poland

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Abstract : Campylobacter is recognized as the main cause of bacterial gastrointestinal infections in Europe. A main source of the pathogen is poultry and poultry meat; however, other animals like pigs and cattle can also be reservoirs of the bacteria. Human Campylobacter infections are often self-limiting but in some cases, macrolide and fluoroquinolones have to be used. The aim of this study was to determine antimicrobial resistance patterns (AMR) of Campylobacter isolated from pig and cattle carcasses. Between July 2009 and December 2015, 735 swabs from pig (n = 457) and cattle (n = 278) carcasses were collected at Polish slaughterhouses. All samples were tested for the presence of Campylobacter by ISO 10272-1 and confirmed to species level using PCR. The antimicrobial susceptibility of Campylobacter isolates was determined by a microbroth dilution method with six antimicrobials: gentamicin (GEN), streptomycin (STR), erythromycin (ERY), nalidixic acid (NAL), ciprofloxacin (CIP) and tetracycline (TET). It was found that 167 of 735 samples (22.7%) were contaminated with Campylobacter. The vast majority of them were of pig origin (134; 80.2%), whereas for cattle carcasses Campylobacter was less prevalent (33; 19.8%). Among positive samples C. coli was predominant species (123; 73.7%) and it was isolated mainly from pig carcasses. The remaining isolates were identified as C. jejuni (44; 26.3%). Antimicrobial susceptibility indicated that 22 out of 167 Campylobacter (13.2%) were sensitive to all antimicrobials used. Fourteen of them were C. jejuni (63.6%; pig, n = 6; cattle, n = 8) and 8 was C. coli (36.4%; pig, n = 4; cattle, n = 4). Most of the Campylobacter isolates (145; 86.8%) were resistant to one or more antimicrobials (C. coli, n = 115; C. jejuni, n = 30). Comparing the AMR for Campylobacter species it was found that the most common pattern for C. jejuni was CIP-NAL-TET (9; 30.0%), whereas CIP-NAL-STR-TET was predominant among C. coli (47; 40.9%). Multiresistance, defined as resistance to three or more classes of antimicrobials, was found in 57 C. coli strains, mostly obtained from pig (52 isolates). On the other hand, only one C. jejuni strain, isolated from cattle, showed multiresistance with pattern CIP-NAL-STR-TET. Moreover, CIP-NAL-STR-TET was characteristic for most of multiresistant C. coli isolates (47; 82.5%). For the remaining C. coli the resistance patterns were CIP-ERY-NAL-TET (7 strains; 12.3%) and for one strain of each patterns: ERY-STR-TET, CIP-STR-TET, CIP-NAL-GEN-STR-TET. According to the present findings resistance to erythromycin was observed only in 11 C. coli (pig, n = 10; cattle, n = 1). In conclusion, the results of this study showed that pig carcasses may be a serious public health concern because of contamination with C. coli that might features multiresistance to antimicrobials.

Keywords : antimicrobial resistance, Campylobacter, carcasses, multi resistance
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