Emergence of Fluoroquinolone Resistance in Pigs, Nigeria

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Abstract : A comparison of resistance to quinolones was carried out on isolates of Shiga toxin-producing *Escherichia coli* O157:H7 from cattle and *mecA* and *nuc* genes harbouring *Staphylococcus aureus* from pigs. The isolates were separately tested in the first and current decades of the 21st century. The objective was to demonstrate the dissemination of resistance to this frontline class of antibiotic by bacteria from food animals and bring to the limelight the spread of antibiotic resistance in Nigeria. A total of 10 isolates of the *E. coli* O157:H7 and 9 of *mecA* and *nuc* genes harbouring S. aureus were obtained following isolation, biochemical testing, and serological identification using the Remel Wellcolex *E. coli* O157:H7 test. Shiga toxin-production screening in the *E. coli* O157:H7 using the verotoxin *E. coli* reverse passive latex agglutination (VTEC-RPLA) test; and molecular identification of the *mecA* and *nuc* genes in *S. aureus*. Detection of the *mecA* and *nuc* genes were carried out using the protocol by the Danish Technical University (DTU) using the following primers *mecA*-1:5'-GGGATCATAGCGTCATTATTC-3', *mecA*-2: 5'-AACGATTGTGACACGATAGCC-3', *nuc*-1: 5'-TCAGCAAATGCATCACAAACAG-3', *nuc*-2: 5'-CGTAAATGCACTTGCTTCAGG-3' for the *mecA* and *nuc* genes, respectively. The *nuc* genes confirm the *S. aureus* isolates and the *mecA* genes as being methicillin-resistant and so pathogenic to man. The fluoroquinolones used in the antibiotic resistance testing were norfloxacin (10 μg) and ciprofloxacin (5 μg) in the *E. coli* O157:H7 isolates and ciprofloxacin (5 μg) in the *S. aureus* isolates. Susceptibility was tested using the disk diffusion method on Muller-Hinton agar. Fluoroquinolone resistance was not detected from isolates of *E. coli* O157:H7 from cattle. However, 44% (4/9) of the *S. aureus* were resistant to ciprofloxacin. Resistance of up to 44% in isolates of *mecA* and *nuc* genes harbouring *S. aureus* is a compelling evidence for the rapid spread of antibiotic resistance from bacteria in food animals from Nigeria. Ciprofloxacin is the drug of choice for the treatment of Typhoid fever, therefore widespread resistance to it in pathogenic bacteria is of great public health significance. The study concludes that antibiotic resistance in bacteria from food animals is on the increase in Nigeria. The National Food and Drug Administration and Control (NAFDAC) agency in Nigeria should implement the World Health Organization (WHO) global action plan on antimicrobial resistance. A good starting point can be coordinating the WHO, Office of International Epizootics (OIE), Food and Agricultural Organization (FAO) tripartite draft antimicrobial resistance monitoring and evaluation (M&E) framework in Nigeria.

Keywords : Fluoroquinolone, Nigeria, resistance, Staphylococcus aureus

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