

High levels of antibiotic resistance in isolates from diseased livestock

ABSTRACT

Overuse of antimicrobials in livestock health and production beyond therapeutic needs has been highlighted in recent years as one of the major risk factors for the acceleration of antimicrobial resistance (AMR) of bacteria in both humans and animals. While there is an abundance of reports on AMR in clinical isolates from humans, information regarding the patterns of resistance in clinical isolates from animals is scarce. Hence, a situational analysis of AMR based on clinical isolates from a veterinary diagnostic laboratory was performed to examine the extent and patterns of resistance demonstrated by isolates from diseased food animals. Between 2015 and 2017, 241 cases of diseased livestock were received. Clinical specimens from ruminants (cattle, goats and sheep), and non-ruminants (pigs and chicken) were received for culture and sensitivity testing. A total of 701 isolates were recovered from these specimens. From ruminants, *Escherichia coli* (n = 77, 19.3%) predominated, followed by *Staphylococcus aureus* (n = 73, 18.3%). Antibiotic sensitivity testing (AST) revealed that *E. coli* resistance was highest for penicillin, streptomycin, and neomycin (77–93%). In addition, *S. aureus* was highly resistant to neomycin, followed by streptomycin and ampicillin (68–82%). More than 67% of *E. coli* isolates were multi-drug resistant (MDR) and only 2.6% were susceptible to all the tested antibiotics. Similarly, 65.6% of *S. aureus* isolates were MDR and only 5.5% were susceptible to all tested antibiotics. From non-ruminants, a total of 301 isolates were recovered. *Escherichia coli* (n = 108, 35.9%) and *Staphylococcus* spp. (n = 27, 9%) were the most frequent isolates obtained. For *E. coli*, the highest resistance was against amoxicillin, erythromycin, tetracycline, and neomycin (95–100%). *Staphylococcus* spp. had a high level of resistance to streptomycin, trimethoprim/sulfamethoxazole, tetracycline and gentamicin (80–100%). The MDR levels of *E. coli* and *Staphylococcus* spp. isolates from non-ruminants were 72.2 and 74.1%, respectively. Significantly higher resistance level were observed among isolates from non-ruminants compared to ruminants for tetracycline, amoxicillin, enrofloxacin, and trimethoprim/sulfamethoxazole.

Keyword: *Escherichia coli*; Antimicrobial resistance; Cattle; Clinical; Livestock; Pigs