Animals as reservoirs of multi-resistant pathogens to conventional antibiotics; is there a risk for public health?

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1. INTRODUCTION
Infectious diseases have represented a threat to human and animal health through history, being an important cause of morbidity and mortality in both groups. The introduction of antimicrobial agents in the 1930s revolutionized human medicine decreasing the rates of mortality and morbility caused by bacterial diseases. However, it was quickly found that bacteria could become resistant to these drugs, and before the introduction of a new drug, resistant strains emerged (Scott, 2009). The emergence and spread worldwide of multi-drug resistant (MDR) microorganisms to conventional antimicrobial treatments is becoming a major global health problem, affecting all levels of health: human, veterinary and environmental (Chambers, 2009).

Livestock and foods of animal origin are discussed to be the main reservoir, but another cofactor for the increase of these MDR bacteria in the community may be the selective pressure induced by antibiotic use in hospitals and outpatient treatment (Dahms et al., 2014).

2. OBJECTIVES
Provide a general knowledge of the antimicrobial resistance concern in animal and human health. Specific objectives:
- Study the transmission routes through which humans can acquire resistant bacteria from animals
- Describe the main multidrug resistant bacteria in animals and how they can become a problem for public health
- Review the recommendations to avoid or minimize the occurrence of antimicrobial resistance.

3. ANTIMICROBIAL RESISTANCE and MECHANISMS OF RESISTANCE
- Is the ability of a microorganism (e.g., a bacterium, a virus or a parasite) to resist the action of an antimicrobial agent (ECDC, 2016)

4. METHODS OF TRANSMISSION OF RESISTANT BACTERIA TO HUMANS

5. MAIN MULTIDRUG RESISTANT BACTERIA

6. RECOMMENDATIONS TO AVOID OR MINIMIZE THE OCCURRENCE OF ANTIMICROBIAL RESISTANCE

Prudent and rational use of antimicrobials:
- Disease prevention as a tool for reducing antimicrobial use
- Accurate diagnosis and antimicrobial susceptibility testing
- Justification of antimicrobial use
- Choice of an appropriate antimicrobial product and administration route
- Appropriate dosage regimen (dose level, dose interval and treatment duration)

Hygienic precautions for the control of cross-transmission of antimicrobial-resistant microorganisms (infection control), including hand hygiene, screening, isolation, etc.

7. CONCLUSIONS

- The presence of zoonotic MDR bacteria in animals is a proven fact and therefore represents a danger to public health, animal health and the environment.
- The two most important ways of acquiring MDR bacteria are through contaminated food and by direct contact with animals.
- We must educate doctors, veterinarians, farmers, etc. of the importance of prudent and rational use of antibiotics.
- We must promote the concept of “One Health” since human health is connected with animal health and the environment.
- The emergence of antimicrobial resistances is a multifactorial problem that requires of a holistic approach and a multidisciplinary assessment.
- In human medicine, major causes of MDR microorganisms are: abuse/use of antimicrobials in the community, hospitals and other healthcare settings and the self-medication.

8. BIBLIOGRAPHY
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