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Unlocking success: the crucial role of good clinical practices in veterinary practice for antimicrobial resistance control

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Abstract

Background: Antimicrobial resistance (AMR) poses a global health challenge, impacting both humans and animals [1]. The emergence and spread of antibiotic-resistant bacteria among pets heighten the risk of transmission to humans or animals, given their close interaction [2]. **Objective:** This study aimed to underscore the importance of implementing good clinical practices in veterinary medicine, using a clinical case of a dog exhibiting purulent rhinorrhea diagnosed with extended-spectrum β-lactamase (ESBL)-producing *Klebsiella pneumoniae* (*K. pneumoniae*). **Methods:** A retrospective analysis was conducted on cases admitted to the Veterinary Hospital (UPVet) of ICBAS, University of Porto, throughout 2022. A clinical case was selected based on the isolation of a multidrug-resistant bacterial strain considered clinically relevant for public health. Antimicrobial resistance profiling and Whole Genome Sequencing (WGS) were conducted on the isolated strains [3]. **Results:** A 1-year-old dog presenting signs of vomiting and mucopurulent rhinorrhea was brought to UPVet for an emergency appointment. During the examination, a nasal sample was taken, revealing a pure culture of ESBL *K. pneumoniae*. Amikacin was chosen for treatment and the animal was promptly placed in isolation with appropriate biosafety measures. After seven days, methicillin-resistant (MRSP) *Staphylococcus pseudintermedius* was also isolated in a nasal swab. Genotypic analysis showed similarities between ESBL-producing *K. pneumoniae* strains, while the MRSP strains differed: the first MRSP exhibited resistance to aminoglycosides and the second carried the *aac(6')-aph(2")* gene, heightening its resistance to amikacin. After antibiotic treatment, neither ESBL-producing *K. pneumoniae* nor MRSP were isolated. Within 6 months post-case, no similar *K. pneumoniae* from UPVet was found. **Conclusions:** The emergence of MRSP strains may have been favored by ongoing antibiotic therapy. Nevertheless, veterinary intervention focused on identifying the potential causative agent and selecting the optimal antibiotic choice likely contributed to resolving the infectious process. The implemented biosafety measures may have played a crucial role in containing the spread of *K. pneumoniae* throughout hospital facilities. Hence, targeted therapy, alongside proper clinical practices, improves treatment success rates and mitigates antimicrobial resistance, safeguarding the health of animals, humans, and the environment.

Keywords: antimicrobial resistance; clinical practice; antibiotherapy; veterinary medicine

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