Detection of OXA-244 – Carbapenemase - Producing *Escherichia coli* in companion animals: An emerging resistance threat

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Introduction: The emergence and spread of extended-spectrum beta-lactamases (ESBL), plasmid-mediated AmpC (*p*AmpC), and carbapenemases pose a critical threat to animal, human, and environmental health, underscoring the urgent need for surveillance strategies. In this study, we propose to evaluate and characterize the presence of ESBL/*p*AmpC- and carbapenemases-producing Enterobacterales in fecal samples from companion animals undergoing clean orthopedic surgery.

Material and methods: In 2023, fecal swab samples from companion animals (n=64) undergoing clean orthopedic surgery at Veterinary Hospitals in the Lisbon area were collected and inoculated on MacConkey agar plates supplemented with 1.5 µg/mL cefotaxime and 1.0 µg/mL meropenem. β-lactamases genes were detected by PCR and Sanger sequencing. Antimicrobial susceptibility testing was performed using disk diffusion according to CLSI guidelines, and phylogenetic typing of *Escherichia coli* isolates was conducted using PCR. WGS was performed for carbapenemase-producing strains (Oxford Nanopore Technologies (ONT), United Kingdom).

Results: ESBL/AmpC-producing Enterobacterales were detected in 20.3% (13/69) of the companion animals. Of these, 84.6% (11/13) were identified as *Escherichia coli*, mainly from phylogenetic group B1. Furthermore, 46.1% (6/13) of the Enterobacterales isolates were multidrug resistant (MDR). The *bla*$_{\text{CTX-M-15}}$ gene was the most common. One *E. coli* strain belonging to ST4981 and serotyping O101:H9, also exhibited resistance to carbapenems and harbored the *bla*$_{\text{OXA-244}}$ gene.

Conclusions: To our best knowledge, this is the first report of a companion animal colonized with an OXA–244–producing *E. coli.* These results underscore the importance of early detection and effective infection control strategies. This study highlights the critical need for a One Health approach to mitigate the spread of carbapenems antimicrobial resistance.

Keywords: *Escherichia coli*, ESBL, Carbapenemases, dogs, One-health

Acknowledgments: This work was supported by a Project funded by FMV-ULusófona/ILIND.