FACULTY OF VETERINARY MEDICINE
accredited by EAEVE

DEPARTMENT OF LARGE ANIMAL INTERNAL MEDICINE

NEONATAL SEPSIS CAUSED BY *RAOULTELLA ORNITHINOLYTICA* IN A CALF

Mathilde L. Pas[1], Jade Bokma[1], Laura Van Driessche[1], Kevin Vanneste[2], Sigrid De Keersmaecker[2], Nancy Roosens[2], Filip Boyen[3], Bart Pardon[1]

1 Department of Large Animal Internal Medicine, Faculty of Veterinary Medicine, Ghent University, Belgium
2 Sciensano, Elsene, Belgium
3 Department of Pathology, Bacteriology and Poultry diseases, Faculty of Veterinary Medicine, Ghent University

Introduction

Raoultella ornithinolytica is an encapsulated, aerobic, Gram-negative bacillus, formerly classified as a *Klebsiella* species. Bacteraemia with this bacterium has been described in humans in various reports. This is a first case describing *Raoultella ornithinolytica* septicaemia in cattle.

Case presentation

A Belgian Blue, ♂, 2 days old calf was presented December 2018. Clinical signs were dyspnoea, pyrexia (40,8°C) and lateral decubitus. Lung ultrasound showed diffuse comet tails and multiple small consolidations. Arterial oxygen pressure was 32 mmHg and hypercapnia was present. Failure of passive transfer was excluded with a glutaraldehyde test. Empiric treatment with enrofloxacin was successful.

Table 1: Antibiotic resistance genes possibly linked with observed phenotypic resistance in *Raoultella ornithinolytica* strain obtained from a calf with septicaemia.

	Susceptibilty	BLAST-based detection AMR genes	
		locus	% identity
Amoxicillin	RESISTENT	blaPLA1a	94,41
		blaTEM-1B	100,00
Amoxicillin + Clavulanic acid	Intermediate	blaPLA1a	94,41
		blaTEM-1B	100,00
Apramicin	Susceptible		
Cephalexin	Susceptible		
Cefquinome	Susceptible		
Ceftiofur	Susceptible		
Doxycycline	RESISTENT	tet(D)	100,00
Enrofloxacin	Susceptible	qnrS1	100,00
Florfenicol	Susceptible		
Flumequine	RESISTENT	qnrS1	100,00
Gentamicin	RESISTENT	aac(3)-IIa	100,00
Kanamycin	Susceptible	aph(3")-Ib	99,88
Marbofloxacin	Susceptible	qnrS1	100,00
Paromomycin	Susceptible		
Spectinomycin	Susceptible		
Sulfa-trimethoprim	RESISTENT	sul2	100,00
		dfrA14	100,00
Fosfomycin	Not tested	FosA	99,52

Figure 1: Pure culture of *Raoultella ornithinolytica* acquired from sepsis-suspected calf.

Laboratory analysis

Blood culture samples (BD BACTEC™) were taken sterile out of the jugular vein, which resulted in the isolation of a pure culture of a gram negative bacterium (figure 1). Identification of the isolate was performed with MALDI-TOF MS (Bruker Daltonik GmbH, Bremen, Germany). The best hit was obtained with *Raoultella ornithinolytica* MB_18887 CHB with a score value of 2.32. Antimicrobial susceptibility testing was determined with the disk diffusing test, showing that the isolate was multidrug resistant (table 1). Whole genome sequencing (Illumina MiSeq) was used to confirm identification and identify antimicrobial resistance genes (table 1). The combination of 16S analysis, k-mer based analysis and read mapping analysis highly supported classification as *Raoultella ornithinolytica*. In addition, nine different antimicrobial resistance genes were detected, including the plasmid-mediated quinolone resistance (PMQR) gene qnrS1.

Conclusion

As in humans, multidrug resistant *Raoultella ornithinolytica* strains can cause septicaemia in calves. Whether *R. ornithinolytica* should be considered as a hospital-acquired or on farm infection remains to be determined. Therapeutic failure in such multidrug resistant strains might occur. Rapid antibiotic susceptibility testing can increase therapeutic efficiency in similar cases.

Contact

mathilde.pas@ugent.be

GHENT UNIVERSITY