



ISWAVLD 2023

International Symposium of the World
Association of Veterinary Laboratory
Diagnosticians

29 JUNE-1 JULY
2023
Congress Centre
Lyon

Towards
the veterinary
diagnostics
of the
future

Main topic : Animal Health

First description of *Streptococcus ruminantium* from diseased ruminants in France

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Introduction

Streptococcus suis, a major swine bacterial pathogen, has been frequently isolated from ruminants. Although its pathogenicity still remains unclear in ruminants, *S. suis* has been considered as the etiological agent in cases of pneumonias, arthritis and endocarditis (1). A new species described as *Streptococcus ruminantium*, previously *S. suis* serotype 33 (2) has been recently described in Japan (3) and Canada (4). To our best knowledge, isolation of *Streptococcus ruminantium* has never been described in France. This study describes for the first time the isolation of *S. ruminantium* from 16 diseased ruminants in France.

First isolation

7 cases of clinical arthritis from young goats were detected by a veterinarian in a herd of 200 goats located in Eastern Brittany (France) in 2018. No mortality was reported. A joint sampled from a dead 15-day-old goat following necropsy at farm was submitted at LABOCEA for macroscopical examination and bacteriological investigation.

Alpha-hemolytic colonies in pure and abundant culture was isolated after 24 hours of incubation on Columbia Blood Agar. Colonies from Columbia Blood Agar showed following results in identification tests : Gram positive cocci, catalase -, *Streptococcus* sp. by MALDI-TOF Mass Spectrometry (Biotyper, Bruker) : oralis (score 1.7), *suis* (1.69) or *mitis* (1.65). Further investigations at LABOCEA were conducted : *S. suis* (confidence scores 98 to 99.9 %) by MALDI-TOF Mass Spectrometry (VITEK MS, Biomérieux) and Api 20 Strep (Biomérieux), no agglutination with specific *S. suis* antisera (1 to 12) but a strain typed as *S. suis* serotype 33 by PCR (internal LABOCEA method). As *S. suis* serotype 33 was reclassified as *S. ruminantium*, the strain was sent to the *Streptococcus* National Reference Center (APHP-Paris) to confirm the identification to the species level. Sequencing of the *sodA* gene according confirmed a 99% homology with the reference sequence of *S. ruminantium*.

Further investigations : methods

The 15 available and non-redundant strains isolated since 2015 from ruminants (ovine, goats and cattle) and identified as *S. suis* but non-typable by antisera-agglutination at LABOCEA were sent to the *Streptococcus* National Reference Center for expertise : identification by VITEK 2 (Biomérieux), MALDI-TOF Mass Spectrometry (Biotyper, Bruker), *sodA* gene sequencing, antimicrobial susceptibility testing by disk-diffusion according to EUCAST recommendations and PCR identification of resistance determinants according to (5).

Further investigations : results

The 15 additional strains were all confirmed as *S. ruminantium* by *sodA* sequencing. Strains were isolated from various clinical presentations : arthritis, mastitis and respiratory infections. Strains were frequently resistant to tetracyclin and macrolides and mainly associated with *tet(M)*, *tet(O)*, *erm(B)* resistance genes.

Conclusion

In this study are described for the first time in France cases of isolation of confirmed *Streptococcus ruminantium* from clinical samples. Identification to the species level remains challenging without specific implementation of MALDI-TOF current commercial databases. As *S. suis* is considered as a zoonotic pathogen, further investigations would be necessary to clarify the potential zoonotic role of the closely related *S. ruminantium* species.