Multiresistant *Gallibacterium anatis* in a clinical outbreak of infectious bronchopneumonia in beef cattle

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Introduction

- Infectious bronchopneumonia:
  - Major economical impact in cattle production systems worldwide
  - Bacterial pathogens:  
    - Pasteurella multocida
    - Histophilus somni
    - Mannheimia haemolytica
    - Mycoplasma bovis
  - Leading cause antimicrobial use in calves
  - Pressure intensive antimicrobial consumption food producing animals
Introduction

• Reduction and rational antimicrobial use
  => TOP PRIORITY!
• Formularies
  ✓ 1st choice products
  ✓ Certain classes: identification and susceptibility test requested
Introduction

- Sampling: non-endoscopic bronchoalveolar lavage (BAL)
**Introduction**

**Gallibacterium anatis:**

- Genus within *Pasteurellaceae*
- **Chickens:**
  - opportunistic pathogen upper respiratory tract, lower genital tract
  - salpingitis and peritonitis, egg production, mortality
- **Humans:**
  - severely immunocompromised individuals
  - sepsis
Describe a clinical outbreak of infectious bronchopneumonia in beef calves associated with multiresistant *Gallibacterium anatis* strains
Anamnesis

- 6 different beef herds suffering from infectious bronchopneumonia (2017-2018)
- 9 calves:
  - Aged 22 days-4 months
  - 5 calves presented at 2 different farms (farm 1: 4; farm 2:2) suffering from an acute clinical outbreak of infectious bronchopneumonia
  - 4 calves from different herds presented at the clinic with signs of infectious bronchopneumonia
Clinical signs

• 9 calves:
  ✓ Fever (>39.3°C), cough, nasal discharge, auscultation and ultrasound: pneumonia

✓ 4 calves presented at the clinic: no improvement with first-second line antimicrobials (penicillin, trimethoprim-sulphonamides, tetracycline, ampicillin)
Diagnosis

• Non-endoscopic BAL
• Identification:
  ✓ Columbia blood agar + PPLO broth
  ✓ MALDI-TOF MS
  ✓ 16S rRNA gene sequencing
  ✓ 1 herd with clinical outbreak (4 calves): PCR

<table>
<thead>
<tr>
<th>Corona</th>
<th>PI3</th>
<th>BRSV</th>
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<tbody>
<tr>
<td><em>Histophilus somni</em></td>
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<td><em>Mycoplasma bovis</em></td>
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Results

• Identification: *Gallibacterium anatis*
  ✓ MALDI-TOF MS: score >2.0
  ✓ 16S rRNA gene sequencing: 94-99% identification
  ✓ 6 pure cultures
  ✓ 1 dominant culture + *Trueperella pyogenes*
  ✓ 2 polybacterial cultures with *G. anatis*
  ✓ No isolation *Mycoplasma bovis*
  ✓ PCR: positive for

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• Susceptibility testing:

- Disk diffusion: Ceftiofur
- MIC-gradient strip test: Amoxicillin-clavulanic-acid, Doxycycline, Enrofloxacin
- Broth-dilution:

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<tr>
<th>Ampicillin</th>
<th>Florfenicol</th>
<th>Gentamycin</th>
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<tr>
<td>Oxytetracycline</td>
<td>Penicillin</td>
<td>Spectinomycin</td>
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<td>Tilmicosin</td>
<td>Trimethoprim-Sulfamethoxazole</td>
<td>Tulathromycin</td>
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<td>Tylosin</td>
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Results

Susceptibility testing results for Gallibacterium anatis isolates


Legend: Susceptible, Intermediate, Resistant.
Comparison with isolates from chickens

From: Jones et al., 2013
• 65% of the isolates are multidrug resistant
  ✔ \ Susceptibility against 4-9 antimicrobials
  ✔ Especially sulfamethoxazole, tetracycline, tylosin, lincosamide, penicillin (El-Adawy, 2018; Bojesen, 2011; Jones, 2013)

• Isolates retrieved from calves:
  ✔ 100% multidrug resistant (minimum of 6 antimicrobial classes)
  ✔ Only susceptible for amoxicillin-clavulanic acid and ceftiofur
Conclusion

• *Gallibacterium anatis* could play a role in infectious bronchopneumonia in calves

• **Multiresistance** is frequent in *Gallibacterium anatis*, potentially causing therapy failure
Discussion

• *Gallibacterium anatis* already described in cattle (joint, unknown origin: Christensen, 2003), first time associated with clinical outbreak

• Secondary pathogen causing pneumonia associated with viruses (f.e. Moraxella ovis, Catry, 2006)?

• No clinical breakpoints, interpretation susceptibility testing?
Thank you for your attention