Increased mortality and cyanosis in weaned piglets due to valvular endocarditis caused by *Streptococcus suis* ?

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Overview

- Herd description
- Herd health program
- Anamnesis
- Herd visit
- Differential diagnoses
- Necropsy
- Diagnostic samples
- Results
- Discussion

Herd description

- 220 sows for breeding of Topigs Norsvin 70 hybrid gilts
- Three-week interval, 32 sows per batch, in total seven groups of sows
- All in – all out, thorough washing, disinfection and dry-up between each batch in farrowing, nursery and gilt-units
- Weaning at five weeks of age

Production records 2021-08-28 – 2022-02-28:

- Live born: 14,6
- Weaned per sow per year: 27,6
- Pre-weaning mortality: 15,7 %
- 1-2% mortality among weaners

Herd description

- WEDA non-residue feeding-system (WEDA; Lutten, Germany)
- Produced their own liquid feed for sows, growers and gilts
    - home-grown grain (Triticale and barley)
    - concentrate that was mixed with water, soy and Distillers dried grain with soluble (DDGS).
- Suckling piglets until two weeks after weaning: commercial creep feed
- There after gradually switched to the farmer's own mix
- Straw for bedding material

Herd health program

Sows:

- *Porcine parvovirus* and *Erysipelothrix rhusiopathiae*
- *Escherichia coli*
- *Glaesserella parasuis*
- Deworming of sows before farrowing

Piglets:

- i.m. injection with combined iron and toltrazuril product
- *Porcine circovirus type 2*
- *Mesomycoplasma hyopneumoniae*

Anamnesis

- The farmer called and reported an increase in mortality in a group of pigs that were weaned seven weeks ago.
- Four pigs had died during the last week (1%)
- Lethargic with cyanotic discoloration of the ears, snout and distal limbs

Herd visit

- 342 pigs at weaning with a mortality of 2 % during the first month after weaning, considered as normal for the herd
- Within the last week four pigs had died, all from different pens – adding up to 3,5 % mortality
- Two of the pigs had been treated with individual i.m. injection with penicillin-G-procain and NSAIDs prior to death. The pigs had not responded to the treatment.

- One new case in the affected unit
- No changes in feed and temperature according to the computer
- No similar cases in other parts of the herd

Differential diagnoses

Cyanosis and increase in mortality

Erythema or cyanosis occur with sepsis or systemic disease including disease with bacterial, viral, metabolic, toxic or parasitic involvement and needs thorough investigation.

Infectious

Streptococcus suis

Salmonella Choleraesuis

Erysipelothrix rhusiopathiae

Actinobacillus pleuropneumoniae

Trueperella pyogenes

Actinobacillus suis

Streptococcus dysgalactiae subsp. equisimilis

Staphylococcus aureus

Pasteurellosis

Porcine Circovirus type 2

Notifiable diseases/diseases not present in Sweden

African swine fever

Classical swine fever

PRRSV

Aujeszky's Disease

ECM

Non-infectious

Mulberry heart disease – weakness and cyanosis on rare occasions

Intestinal torsion

Hydrogen sulphide poisoning (sudden death and tetanic convulsions)

(Robinson and Loynachan 2019; Torrison and Cameron 2019)

Necropsies

Macroscopic findings:

Vegetative valvular endocarditis

Enlarged, hyperaemic lymphnodes

Fluid and blood in the abdomen of the two pigs that had died - Not in the culled pig

Petechial bleedings in the kidneys in one of the pigs that died

Diagnostic samples

- Swabs for bacterial culture from all three endocarditis

- Samples from lung, liver and spleen for *Salmonella*-testing

Results

- Bacteriological swabs from endocarditis:

  Non-treated pig: *Streptococcus suis*

  Antibacterial susceptibility: Susceptible to penicillin (MIC: ≤0,03 mg/L)

- From treated pigs an unspecified mixed flora was grown
- *Salmonella spp.* – not detected

(National Veterinary Institute, Uppsala, Sweden)

Discussion

- Valvular endocarditis is a commonly acquired lesion of the porcine endocardium (Robinson and Loynachan 2019)
- Common agents are:

  Streptococcus suis, Erysipelothrix rhusiopathiae, Trueperella pyogenes (Jensen *et al* 2010; Robinson and Loynachan 2019)
- Tissue infarction can also result when vegetative nodules break free from the endocardium and form thromboemboli (Robinson and Loynachan 2019)

- Insufficient diagnostics
  - Histology of heart muscle
  - Bacterial culture from other organs

Discussion

- Reside in tonsils, nasal cavity and/or genital tract of clinically healthy pigs (Clifton-Hadley 1983)
- Haematogenous and/or lymphogenous dissemination→ invading organs and tissues leading to septicaemia, acute death, meningitis, polyarthritis, polyserositis and valvular endocarditis (Segura *et al* 2017)
- An important zoonotic agent (Lun *et al* 2007)
- 35 different serotypes, majority strains isolated from diseased swine belong to serotype 1-9 (Gottschalk and Segura 2019)

Discussion

- In a recently performed Swedish study *S. suis* was isolated from 95% of the sampled pigs in both case and the control herds (Werinder *et al* 2020)
- Virulence of involved strains

  immune status of the herd, mixing of infected and naive uninfected pigs, concurrent infections and immunosuppression

  Overcrowding, poor ventilation, excessive temperature fluctuations, and mixing of pigs with an age spread of more than 2 weeks (Dee and Corey 1993; Robinson and Loynachan 2019)

- No new cases in the herd with similar clinical signs

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Thank you for your kind attention