Vertebral Osteomyelitis associated with *Salmonella enterica* subsp. *enterica* serovar Infantis in broilers

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Introduction

Vertebral osteomyelitis, also known as spondylolisthesis and 'Kinky Back' is a disease of commercial broiler chickens and broiler breeders with a worldwide distribution, commonly caused by an infection with *Enterococcus* spp. or *Escherichia coli*. A typical symmetrical hind limb paralysis occurs by compression of the spinal cord due to abscessation of the free thoracic vertebra. Here we present a case of vertebral osteomyelitis in a commercial broiler flock with a history of lameness and respiratory disease by *Salmonella enterica* subsp. *enterica* serovar Infantis (*S.* Infantis).

Material & Methods

Case: A commercial broiler farm with 20.000 Hubbard animals of 6 weeks of age suffered from locomotory disorders.
Pathology: Routine necropsy, including viral, bacteriologic, histologic and parasitologic examination was performed on 47 selected birds. Samples of two vertebral abscesses were fixed in 4% neutral buffered formalin, decalcified by formic acid, embedded in paraffin, sectioned at 2 µm, and stained with haematoxylin and eosin (HE) for light microscopic examination. Immunohistochemistry was performed with a mouse monoclonal antibody Salmonella A/B/C/D/E (clone 513, Santa Cruz Biotechnology) counterstained with 1% Light Green.

Results

The frequency of the macroscopic lesions and the results of bacteriologic examination are presented in table 1. The macroscopic and histologic appearance of the lesions is shown in figure 1 – 4. The free thoracic vertebra is affected and partially effaced by a fibrinosuppurative and necrotizing inflammation with abundant bacteria. Immunohistochemistry for *Enterococcus* sp. was negative in the affected vertebra. Colonization of the caeca and gall bladder with *S.* Infantis was confirmed for this flock. The *S.* Infantis isolates from the intestinal tract and vertebral lesions had closely related genotypes, as detected by the Multi Locus Sequence Typing (MLST). Phenotypic testing for their susceptibility to 20 antimicrobials with the microdilution method showed multidrug resistancy; resistance was found to aminoglycosides, chinolones, macrolides, phenicols, tetracyclines, and the combination trimethoprim/sulphonamides.
Animals tested negative by PCR for respiratory pathogens (*Avibacterium paragallinarum*, *Mycoplasma gallisepticum*, *Mycoplasma synoviae*, Infectious Bronchitis virus, Avian metapneumovirus and Infectious Laryngotracheitis virus), for REO virus and Marek's disease virus. Negative bacteriology and immunohistochemistry excluded an airsacculitis by *Ornithobacterium rhinotracheale*.

Discussion

Although infections with *E. coli* and *S.* Infantis are regularly found in animals, involvement of extraintestinal organs as the vertebral column has not been reported previously in flocks infected with *S.* Infantis. Since *S.* Infantis is an emerging serotype in poultry and human, this finding warrants further exploration.

References
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Table 1. Frequency of macroscopic lesions in 47 selected birds with locomotory disorders

Lesion	Animals affected (%)	Bacteriology
Suppurative arthritis (knee and hock joints)	13 (28%)	*E. coli*
Fibrinous and suppurative pericarditis	5 (11%)	*E. coli*
Cellulitis	6 (13%)	*E. coli*
Bacterial chondronecrosis and osteomyelitis	4 (9%)	*E. coli* & *S.* Infantis
Vertebral osteomyelitis	3 (6%)	1x *E. coli* 2x *S.* Infantis
Airsacculitis	3 (6%)	

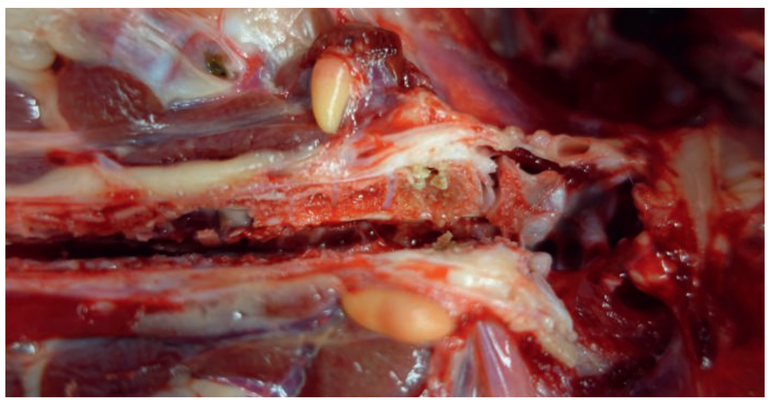

Figure 1. Abces in the free thoracic vertebra

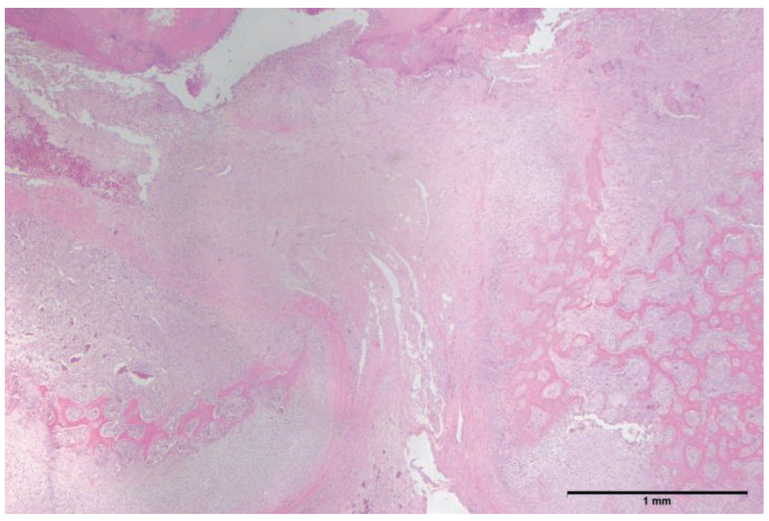

Figure 2. Histology thoracic vertebra with abces (HE)

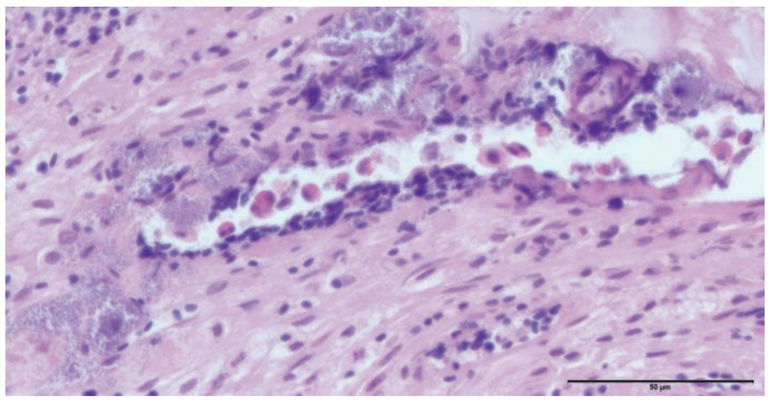

Figure 3. Detail abces wall with abundant bacteria

Figure 4. Immunohistochemistry Salmonella (red), 1% Light Green counterstain

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