

## ENTEROCOCCAL-ASSOCIATED VERTEBRAL OSTEOARTHRITIS (EVOA) IN BROILER CHICKEN IN MALAYSIA: A CASE REPORT

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### ABSTRACT

*Enterococcus cecorum* infection is an emerging pathogen of poultry causing femoral head necrosis and spondylitis increasingly been described in various countries over the past decade. This case report describes the first outbreak of clinical enterococcal related osteoarthritis in chicken flocks in Malaysia. In May, 2015, a 4-week-old broiler chicken flock in Kelantan, Malaysia displayed a variety of clinical signs, including swollen, inflamed hocks, hock sitting, lameness, paresis or complete paralysis, with greenish white diarrhoea and mortality rate of 5% at day 36 post hatch. Necropsy examination of the culled birds revealed nodular mass on caudal thoracic vertebrae with vertebral osteomyelitis and brittle, hemorrhagic and necrotic femoral head. In addition to the skeletal lesions, the liver was enlarged and congested, the kidney showed enlargement with urate deposition. Cecal tonsils were hemorrhagic. *Enterococcus* sp. has been isolated in pure culture from the femur and vertebral osteomyelitis lesions based on their cultural characteristics, Gram stain morphology and negative catalase reaction. Complete blood count of the five affected birds showed Leucocytosis, lymphocytosis, monocytosis, granulocytosis, macrocytosis, and thrombocytopenia. Histopathologically, the liver showed hepatitis with multifocal necrotic foci composed of necrotic hepatocytes, congested vessels and mononuclear cell infiltration. The kidney showed necrosis of the renal tubule, some basement membrane detachment of the renal tubular cells, pyknotic cells and lymphocytic infiltration. Bursa of fabricius showed hyperplasia of the interfollicular epithelium covering the surface of the bursa, and the lamina propria is expanded by edema and an inflammatory cellular infiltrate.

**Keywords:** enterococcosis, osteoarthritis, chicken

### INTRODUCTION

*Enterococcus cecorum*(EC) infection is an emerging pathogen of poultry after its first report of outbreaks in broilers in 2002 (Wood *et al.*, 2002). It may result in femoral head necrosis and spondylitis which has been increasingly described in various countries over the past decade (Wood *et al.*, 2002; Stalker *et al.*, 2010; Jung and Reutenschlein, 2014). Recurrent outbreaks of lameness in affected broiler farms with subsequent flocks have exacerbated the impact of this disease (Jansson *et al.*, 2012; Gregersen *et al.*, 2010). Herein, we described the first case report of enterococcal-associated vertebralosteoarthritis(EVOA)in chicken flocks in Malaysia.

### CASE PRESENTATION

In May 2015, a 4-week-old broiler chicken flock located in Kelantan, Malaysia, which practicing open housing system, displayed a variety of clinical signs, including swollen, inflamed hocks, hock sitting (Fig. 1), lameness, paresis or complete paralysis, with greenish white diarrhoea and up to 5% mortality rate of at day 36 days of age. Chicks suffering from these signs were often no longer able to move towards the feed and water supplies, because of which they rapidly dehydrated and died. The similar problem has been observed in the previous flocks.



Figure 1. Hock sitting posture of the 36 days old broiler

### DIAGNOSIS

Necropsy examination of the culled birds revealed nodular mass on caudal thoracic vertebrae (T5–T7) with vertebral osteomyelitis and brittle, hemorrhagic and necrotic femoral head (Fig. 2).

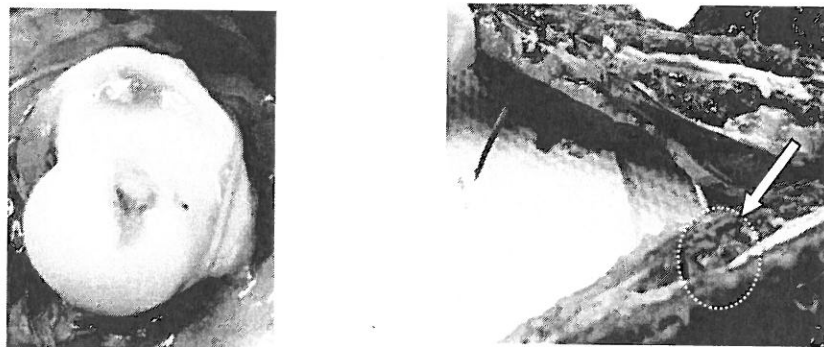


Figure 2. Hemorrhagic and necrotic femoral head (left), caseous exudate in the caudal thoracic vertebra (arrow), spinal cord is pressed toward one side (dotted circle)

In addition to the skeletal lesions, the liver was enlarged and congested, the kidney showed enlargement with urate deposition. Cecal tonsils were hemorrhagic. Swab samples were collected aseptically from spondylitis lesions, as well as femoral-head lesions, and submitted for culture. *Enterococcus sp.* has been isolated in pure culture from the femur and vertebral osteomyelitis lesions based on their cultural characteristics, gram stain morphology and negative catalase reaction (Fig. 3).

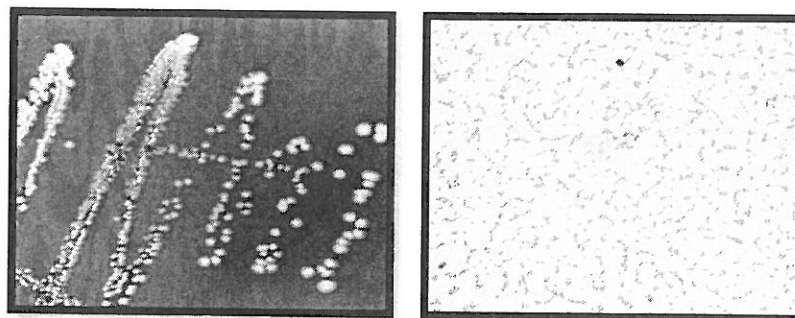
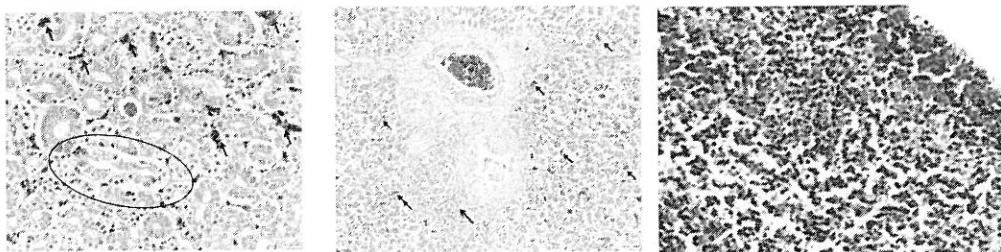


Figure 3. Colony morphology and gram staining of the swab taken from vertebral nodule and femoral head

Complete blood count of the five affected birds showed leucocytosis, lymphocytosis, monocytosis, granulocytosis, macrocytosis and thrombocytopenia. Histopathologically, the liver showed hepatitis with multifocal necrotic foci composed of necrotic hepatocytes, congested vessels and mononuclear cell infiltration. The kidney showed necrosis of the renal tubule, some basement membrane detachment of the renal tubular cells, pyknotic cells and lymphocytic infiltration. Bursa of fabricius showed hyperplasia of the interfollicular epithelium covering the surface of the bursa, and the lamina propria is expanded by edema and an inflammatory cellular infiltrate (Fig. 4).



**Figure 4.** Histopathological changes in kidney, liver and bursa showing infiltration of inflammatory cells and evidence of necrosis

## DISCUSSION

The pathogenesis of EVOA is not well understood, common features in epidemiology and clinical presentation have led to several authors to suggest mechanisms. Currently, the most widely accepted theory is that *E. cecorum*, which is normally present in the gut, enters the blood stream in immunosuppression chicken and localises the caudal thoracic vertebrae and the hock joints seem to be predilection places for multiplication of the bacteria, leading to clinical signs (Stalker et al., 2012; Martin et al., 2011). The hock sitting posture, lameness and paralysis has been seen in our study as previous been observed by other researchers (Jung and Reutenschlein, 2014; Aitchison *et al.*, 2014; Armour *et al.*, 2011).

We have isolated the enterococcus both from the vertebral nodular lesion as well as femoral head while Aitchison et al. 2014 could not isolate the bacteria from femoral head. There was evidence of bursal damage, probably as a result of infectious bursal disease (IBD) virus infection in the chickens described here. Consequent immunosuppression would impair the ability of the immune system to respond to bacterial infection. The bursal lesion in enterococcal-related vertebral arthritis has also been observed by Armour *et al.*, (2011).

## CONCLUSION

This case report describes for the first time an investigation of an EVOA in broiler flock in Malaysia. EVOA results not only high flock mortality in broiler but also higher condemnation rates at the slaughterhouse which impacts the farmers economically. More research is needed to understand the epidemiology and pathogenesis of EVOA in broiler and breeder flocks in Malaysia because the environmental factors are very important in spreading pathogenesis of the disease.

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