Avian tuberculosis in naturally infected lofts of domestic pigeons, different diagnostic approaches and its zoonotic significance

Kaveh Parvandar Asadollahi (DVM, DVSC)
History

Tuberculosis one of the most ancient common diseases between human and animals…
• Based on statistics this disease is one of the most significant infectious diseases …
• It kills nearly 1.5 million people per year…
• Almost 1/3 of people of the world are infected by these bacteria...
• World Tuberculosis Day-24 March
Avian tuberculosis

• It was first described in 1884…
• It is one of the most important diseases that affect most species of birds
• The primary target of the disease is domesticated…
• Several mycobacterial species can be involved…,
• The disease is most often caused by *mycobacterium avium* and *mycobacterium genavense*
In Human

- The first case of avian tuberculosis in humans in 1930.
- In immune competent humans, mostly cause chronic pulmonary infections and lymphadenitis...
- In HIV infected and AIDS patients, or in other immuno-compromised persons…
**Samples**

Eighty pigeons, from 10 pigeon lofts with 600 pigeons
Clinical signs
The most important clinical signs

• Swollen joints in legs and wings
• Atrophy of breast muscles
• Granuloma on conjunctiva and tubercle formation on breast muscles and subcutaneous tissues
Necropsy Findings
Liver and intestines were the most affected organs…
The lungs were the least affected…
No macroscopic necrotic lesion in the gonads, kidneys and CNS.
No macroscopic mineralization…
Diagnosis

- To make a presumptive diagnosis, we relied on clinical and necropsy findings with demonstration of acid fast bacilli.
- Culturing: For definitive diagnosis and identification.
- Also for finding more...
  - Histopathology
  - Hematological values
  - Serum protein profiles
  - Radiology
Culturing

- The samples were cultured on 4 culture media including
  - Glycerinated Lowenstein-Jensen medium…
  - Pyruvate-enriched Lowenstein-Jensen medium
  - Mycobactin J-supplemented Herrold egg yolk medium
  - Plain Herrold-egg yolk medium.
- Incubated at 41 ºC for 8 to 12 weeks…
Isolation and Identification

• Fifty one acid fast bacilli isolated from the pigeons
• These AFB isolated were examined by PCR targeting 16S rRNA, IS1245 and IS901
Histopathology findings

- In H& E staining, Granulomatous lesions, with uncalcified caseous necrosis with numerous giant cells...
- In Ziehl-Neelsen’s staining, a large number of acid-fast bacilli within giant cells …
- In Congo red staining, in liver and kidney sections amyloid deposit...
Hematological values

- Total WBC, heterophils, lymphocytes and monocytes were significantly higher.
- The PCV, HGB, MCH and MCHC were significantly lower.
- A significant leucocytosis and anemia in the infected birds were observed.
Serum Protein Profiles

• Six protein fractions were identified…
  o prealbumin
  o albumin
  o alpha-1
  o alpha-2
  o beta globulins
  o gamma globulins
• Concentrations of total protein, beta globulins and gamma globulins…
Radiographic findings

- Osteolysis especially in Tibia and Ulna
- No joint affected
- No osteolysis in Humerus
• Pigeons are extensively kept in urban and rural areas…
• They can fly and infecting many areas and transmit…
• So there is a specific and more attention regarding this disease needed.
If we knew what we were doing, it wouldn’t be called Research.

"A.Einstein"