



AVIAN MYCOBACTERIOSIS

ANIMAL GROUP AFFECTED	TRANSMISSION	CLINICAL SIGNS	FATAL DISEASE ?	TREATMENT	PREVENTION & CONTROL
All Avian species	Primarily ingestion, also aerogenous	Wasting, dyspnea, dermal nodules	Yes	Not recommended	Quarantine and fecal cultures of new birds.

<p>Fact sheet compiled by Scott D. Fitzgerald, Diagnostic Center for Population and Animal Health, College of Veterinary Medicine, Michigan State University, East Lansing, Michigan, USA</p>	<p>Last update April 2009</p>
<p>Fact sheet reviewed by J.G. Sikarskie, Department of Small Animal Clinical Sciences, College of Veterinary Medicine, Michigan State University, East Lansing, Michigan, USA A.Lécu, DVM. Paris Zoo L. Woods, California Animal Health and Food Safety Laboratory System, School of Veterinary Medicine, University of California – Davis, Davis, California, USA.</p>	
<p>Susceptible animal groups All avian species; porcine, bovine and other mammals subclinically infected.</p>	
<p>Causative organism Mycobacterium avium spp. avium; also M. intracellulare and M. genavense.</p>	
<p>Zoonotic potential Yes. Particularly immunocompromised individuals. M. genavense of greatest zoonotic concern.</p>	
<p>Distribution Worldwide.</p>	
<p>Transmission Primarily ingestion of fecal contaminants, also by aerosol droplet. Environmental reservoirs (enclosure soil,..) remain the major source of infection of birds in captivity.</p>	
<p>Incubation period Weeks to months for clinical signs.</p>	
<p>Clinical symptoms Asymptomatic for long periods; chronic wasting, weakness, labored respiration, diarrhea, skin granulomas, lameness, and death.</p>	
<p>Post mortem findings Disseminated nodules in any tissue; intestinal tract, liver, and spleen most frequently affected; other tissues including lungs, kidney, gonads, bone marrow, joints, heart and skin less frequently affected. Intestinal form may also include diffuse mucosal thickening (“shag carpet” appearance), seen most frequently in M. genavense infection. Nodules vary from small pinpoint pale lesions to large, firm, pale nodules with central caseation. Also, hepatomegaly and splenomegaly. Microscopically, epithelioid macrophages and lymphocytes most common, multi-nucleated giant cells less common; partial mineralization of granulomas much less frequent than in mammals with tuberculosis. Acid-fast bacilli are common to numerous.</p>	
<p>Diagnosis 1) Clinical signs, 2) fecal culture, 3) intradermal injection of tuberculin in gallinaceous birds (in wattles), 4) ELISA (chickens, quail, waterfowl), 5) laparoscopy for coelomic lesions, 6) Mycobacterial isolation and identification from biopsy or necropsy materials, 7) PCR, preferred method for M. genavense, 8) Histopathology of formalin-fixed tissues. 9) Microscopy / Ziehl Nielsen stain on fresh feces.</p>	
<p>Material required for laboratory analysis Clinical materials: feces for isolation, skin nodule biopsies. Necropsy materials: intestinal tract, liver, spleen bone marrow and other tissues exhibiting granulomas; fresh for culture or PCR; fixed for histopathology.</p>	



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Relevant diagnostic laboratories AFSSA - Mycobactéries 22 rue Pierre Curie, BP 67, 94703 Maisons-Alfort Cedex, France Tel: 01 49.77.13.21 Fax: 01 49.77.13.44 Email: ml.boschioli@afssa.fr Many human medical laboratories can isolate <i>M. avium</i> and <i>M. genavense</i> .
Treatment Not recommended except for valuable and endangered species. <i>M. avium</i> is resistant to common antituberculosis drugs, however combination therapy (isoniazid, ethambutol and rifampicin) for extended periods (up to 18 months) has resulted in clinical remission in some exotic birds.
Prevention and control in zoos Obtain birds from tuberculous-free sources. Strict quarantine of new birds; multiple (3) negative fecal cultures for <i>Mycobacterium</i> prior to introduction. Quarantine or euthanasia of culture positive birds. May require depopulation of entire exhibit or aviary if infection spreads to multiple birds. Control of exposure to wild birds and their feces is critical, as wild birds are endemic reservoir. Vaccines are not currently available.
Suggested disinfectant for housing facilities 5% Phenol compounds, 1% Sodium hypochlorite, formaldehyde, quaternary ammonium compounds, or high concentrations of iodine compounds; requires removal of organic material and specific contact times on surfaces.
Notification
Guarantees required under EU Legislation
Guarantees required by EAZA Zoos
Measures required under the Animal Disease Surveillance Plan
Measures required for introducing animals from non-approved sources
Measures to be taken in case of disease outbreak or positive laboratory findings
Conditions for restoring disease-free status after an outbreak
Contacts for further information
References <ol style="list-style-type: none">1. Bercovier, H., and V. Vincent. 2001. Mycobacterial infections in domestic and wild animals due to <i>Mycobacterium marinum</i>, <i>M. fortuitum</i>, <i>M. chelonae</i>, <i>M. porcinum</i>, <i>M. farcinogenes</i>, <i>M. smegmatis</i>, <i>M. scrofulaceum</i>, <i>M. xenopi</i>, <i>M. kansasii</i>, <i>M. simiae</i>, and <i>M. genavense</i>. <i>Rev. sci. tech. Off. int. Epiz.</i> 20:265-290.2. Converse, K. A. 2007. Avian Tuberculosis, In: <i>Infectious Diseases of Wild Birds</i>, N. J. Thomas, D. B. Hunter, and C. T. Atkinson (eds.). pp. 289-302. Blackwell Publishing, Ames, Iowa, USA.3. Fulton, R. M., and S. Sanchez. 2008. Tuberculosis, In: <i>Diseases of Poultry</i> (12th ed.), Y. M. Saif, A. M. Fadly, J. R. Glisson, L. R. McDougald, L. K. Nolan, and D. E. Swayne (eds.). pp. 940-951. Blackwell Publishing, Ames, Iowa, USA.4. Holsboer, B. C., L. Bacciarini, N. Robert, T. Bodmer, and J. Nicolet. 1997. Occurrence of <i>Mycobacterium genavense</i> in birds. <i>Schweiz Arch Tierheilkd</i> 139: 397-402.5. Portaels, F., L. Realini, L. Bauwens, B. Hirschel, W. M. Myers, and W. de Meurichy. 1996. Mycobacteriosis caused by <i>Mycobacterium genavense</i> in birds kept in a zoo: 11-year survey. <i>J. Clin. Microbiol.</i> 34: 319-323.6. Sanchez, S. and R. M. Fulton. 2008. Tuberculosis, In: <i>A Laboratory Manual for the Isolation and Identification of Avian Pathogens</i> (5th ed.), L. Dufour-Zavala, D. E. Swayne, J. R. Glisson, J. E. Pearson, W. M. Reed, M. W. Jackwood and P. R. Woolcock (eds.). pp. 53-58. American



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