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Investigation *Mycobacterium sp.* prevalence in the local birds in Baghdad

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Abstract

Tuberculosis(Mycobacteriosis) is a global disease, which has been reported broadly in poultry, free-living and captive wild birds and pet birds. According to World Organization for Animal Health, tuberculosis is classified within a List B of diseases. The current study was intended to focus on incidence *Mycobacterial* in local birds in Baghdad governorate. A hundred rectal swabs were collected from a pigeon (70), chickens (5), and pet birds (25) from local birds markets in Baghdad. The swabs were cultured on Lowenstein- Jenson media and incubated at 42 C° for eight weeks. The diagnosis was based on the rate of growth, characteristics features of colonies, acid fast stain in the direct microscopic examination and the ability of production of chromogens. *Mycobacterium* isolation rate was (35%). Meanwhile, the reality of isolation numbers were 1, 6, 28 in chicken, pet bird and pigeon respectively. All isolated bacteria appeared as acid-fast bacilli with acid-fast staining, and the colonies appeared within (2-8) weeks. In conclusion, this study reported the prevalence of *Mycobacterium sp* from local domestic birds in Baghdad governorate. These Mycobacterial infections act as important zoonotic disease, and the infected local domestic birds might play important source to disseminate the disease to humans. The author recommends taking precautions from these local birds mainly house birds.

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Introduction

Tuberculosis is reported around the world. This disease occurs practically in all mammals, causing a general condition of illness, coughing and eventual death (OIE Technical Disease Card). Avian tuberculosis is a chronic disease affecting all species of birds, domestic and wild animals, rabbits, swine, cats, dogs, horses and human especially infected with HIV (Fulton *et al.*, 2008; Quinn *et al.*, 2006). Various *Mycobacterial species* implicated in the etiology of avian tuberculosis. "Avian mycobacteriosis," that formerly called "avian tuberculosis" (AT), is a bacterial disease of birds. It is commonly caused by slow-growing non-chromogenic acid-fast bacilli, *Mycobacterium avium*,

and*Mycobacterium intracellular*. These bacteria are usually the form of the *Mycobacterium avium complex (MAC)* group 1, 2 (serotypes 1, 2 and 3; containing specific gene segment IS901 and nonspecific segment IS1245). While, *M genavense, M. avium sub sp. Hominissuis, M. intracellular, M. scrofulaceum, M. fortuitum , M. tuberculosis* and *M. bovis* occur less frequently (Pavlik *et al.,* 2000; Dvorska *et al.,* 2004; Mijs *et al.,* 2002; Thorel *et al.,* 1997; Hejlicek and Treml, 1994). Poultry, wild birds, and turkeys are commonly infected by avian tuberculosis. However, duck, geese, and water birds are resistant. The water and soil are the main source of infection (Dvorska *et al.,* 2007; Kazda *et al.,* 2009; Shitaye *et al.,* 2008). In birds, mycobacteriosis causes chronic illness that distinguished by diarrhea, dyspnea, weight loss, lameness and meager feathering. Moreover, significant numbers of bird die with acute mycobacteriosis and without showing any specific symptoms (Tell *et al.,* 2001). Alimentary tract is the most common route of infection. However, *MAA* has also been discovered in eggs from an infected flock of domestic birds. Most tuberculous lesions caused by *MAA* develop in the intestinal tract, liver and spleen but occasionally also in the heart and ovaries or testes. Sometimes, avian pulmonary tuberculosis is seen in the central nervous system (Tell *et al.,* 2001; Hines *et al.,* 1995). Moreover, deep ulcers of the intestinal tract appear as the caseous material containing mycobacterial cells and excreted in the faces. Typical caseous lesions always found in the liver and spleen. At the same time, these organs become enlarged because the formation of new tuberculous tissue. Infected animals contaminate their surrounding environment and consequently represent a grave risk of spreading. Transmission of this disease particularly risky in domestic pigeons. It is frequently found in zoological gardens, which could spread the diseases as well (Thorel *et al.,* 2001; Hejlicek and Treml, 1995). A previous outbreak of avian tuberculosis in a poultry farm in Wassit province/ Iraq has been reported, in addition, significant pathological changes were described (Majeed *et al.,* 2014). Review of literature revealed scarce publications regarding avian mycobacteriosis in Iraq. So this study intends to investigate the prevalence of *Mycobacteria sp.* in local birds in Baghdad governorate.

Materials and methods

Collection of samples

Hundred rectal swabs including pigeon (70), chickens (5) and pet birds (25), were collected from popular local bird Markets in Baghdad governorate. Rectal swabs were collected randomly from birds. All samples were transported to the laboratory and kept in the refrigerator at (4°C). All rectal swabs were cultured within (2-4) hrs on Lowenstein- Jenson media and incubated at 42°C for eight weeks. Diagnosis of mycobacteria was based on the rate of growth, characteristics features of bacterial colonies, direct microscopic examination by acid fast stain and the ability of production of chromogenes (Kent & George, 1985).

Result and Discussion

The results of bacterial isolation in the current study revealed that the *mycobacteria* were detected in 35 (35%) out of 100 rectal samples that collected from birds. At the same time, the reality of isolates numbers were 1, 6 and 28 from chicken, pet birds and pigeon respectively. The colonies of the isolated strains appeared within (2-8) weeks.

Moreover, smears from colonies stained with Ziehl-Neelsen (ZN) technique revealed the presence of acid-fast rods (AFR). According to WHO, "World health organization (2013), tuberculosis is an important disease that infected about one-third of People (WHO, 2013). Previous research approved that avian tuberculosis excreted through the feces of infected animals and this may act as a source of infection for other birds, vertebrates and lead to spreading avian tuberculosis (Fischer *et al.,* 2015). *Mycobacterium avium subsp. avium (MAA)* can survive for a long time in fresh fecal samples (400 days), as well as, in dried feces (308 days). Besides, aviaries infected with members of *Mycobacterium avium complex (MAC)* could cause infection (Matlova *et al.,* 2005; Matlova, 2004).

Previous studies reported the diagnosis of avian tuberculosis. These studies also approved that all the investigated 52 isolates carried IS901 insertion sequence that determines the pathogenicity, and also IS1245 locus. Such isolates belong to serotypes1, 2 and 3 of *Mycobacterium avium,* are considered as the most pathogenic strains in birds (Tell *et al.,* 2001; Dvorska *et al.,* 2003). Many factors boost the progress of avian tuberculosis in pigeon room on the upper floor such as stress, due to keeping in a small area (Lofts), and poor health conditions (Dvorska *et al.,* 2007). Avian tuberculosis acquired by ingestion, however, aerogenic pulmonary infection occurs occasionally. Moreover, the transmission of *Mycobacterium avium* infection through eggs has also been described (Shitaye *et al.,* 2010). The results of this study revealed higher isolation rate (35%) of *mycobacteria*. This result is in agreement with a previous study (Mayahi *et al.,* 2013). Mayahi *et al.,* (2013) isolated 51 *Mycobacterium avium subs. Avium* isolated from pigeons and one from eggs. They studied avian tuberculosis in naturally infected Lofts of domestic pigeons. In addition, they also determined the molecular features of the isolated bacteria and studied the necropsy finding of the infected pigeons. Mayahi *et al.,* (2013) described avian tuberculosis in 80 out of 600 pigeons that showed poor health conditions and 10 pigeon eggs, which were laid by these birds. The result of the present study also revealed that all isolated bacteria appeared as acid-fast bacilli with Ziehl-Neelsen staining. This result is compatible with previous observation reported by Hasan *et al.,* (2016) regarding avian mycobacteriosis in Turkey. According to, Hejlicek and Treml, (1995), infected pigeons, peafowl and pheasants chickens were classified according to its susceptibility to the disease as follow: highly susceptible, less susceptible, moderately resistant and highly resistant. These observations were also reported by other researchers (Kul *et al.,* 2005; Terim *et al.,* 2010). The histopathological features of avian tuberculosis in poultry farm containing a total of 500000 layer hens were reported in Iraq (Majeed *et al.,* 2014). Waffa *et al.,* (2011) isolated *Mycobacteria* in a different area of Baghdad and included 107 rectal swabs samples (86 and 21) from pigeon and chickens respectively. Positive samples for pathogenic *Mycobacteria* found in (10.3%). This study revealed variation in the prevalence of *mycobacteria* during the months of the year. The isolation rate was (1) (5%), (5) (29.4%), 2 (14.2%), and (2) (13.3%) isolates during December, February, April and May respectively. Stepień-Pyśniak *et al.,* (2016), were also isolated *Mycobacterium avium* strains from the affected

birds. The study revealed that fecal samples from 60 other birds were positive for *M. avium subsp. avium*, moreover, one was -positive for *M. chelonae*. Avian tuberculosis was also detected in different countries such as Greece and Iran (Bolfion *et al.,* 2010; Fragkiaelaki, 2005).

In conclusion, this study determined the prevalence of *Mycobacterium* in local domestic birds. These infected birds act to contaminate their surrounding environment. Therefore, the author recommends the awareness from a serious risk of bacterial spreading.

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