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RESEARCH OPINIONS IN ANIMAL & VETERINARY SCIENCES

First report on avian tuberculosis in pigeon in Tripoli, Libya

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Abstract

This report describes an avian mycobacteriosis in pigeon. An adult female pigeon (two years old) was brought for post-mortem examination on the same day of expiry. Granulomatous nodular lesions of various sizes with yellow to grey colours were found in the internal organs. Tuberculous lesions were observed in the spleen and intestine. Mycobacterial infection was confirmed by post-mortem examination and by detection of acid-fast bacilli in these granulomatous nodular lesions. This is the first report of avian tuberculosis in pigeons in Libya.

Keywords: Acid-fast bacilli; Avian mycobacteriosis; tuberculous lesions

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Introduction

The Mycobacterium avium complex (MAC) consists of Mycobacterium avium subsp avium (MAA), Mycobacterium avium subsp silvaticum (MAS), Mycobacterium avium subsp. paratuberculosis (MAP) and Mycobacterium avium subsp. hominissuis (MAH) plus Mycobacterium intracellulare (Mijs et al., 2002; Romano et al., 2005). Avian tuberculosis however, is often the consequence of infection of birds with MAA, MAS (Pavlik et al., 2000; Dvorska et al., 2003) and Mycobacterium genavense (Gray et al., 2008).

Several mycobacterial species can be involved in the aetiology of avian tuberculosis. The disease is most commonly produced by infection with MAC (serotypes 1, 2 and 3) and *M. genavense* (Tell et al., 2001; Romano et al., 2005). Other species, such as *M. intracellulare*, *M. scrofulaceum*, *M. fortuitum*, *M. tuberculosis* and *M. bovis* are less common causes of avian tuberculosis (Tell et al., 2001). Although successful experimental infections with *M. a. paratuberculosis* in poultry have been reported (Larsen and Moon, 1972). There is no evidence that this organism is involved in the aetiology of avian tuberculosis.

Avian tuberculosis has been reported in numerous species of pet, zoo, wild-life and avicultural birds including ring-neck doves (*Streptopelia risoria*) (Gray et al., 2008) and domestic pigeons (*Columbus livia domestica*) (Matthews and McDiarmid, 1979; Tanaka et al., 2005; Bolfion et al., 2010). Tuberculosis in birds is most prevalent in chickens and in wild birds raised in captivity. Turkeys are quite susceptible, but duck and geese are comparatively resistant.

Infected individuals and contaminated environment (water and soil) are the main source of infection (Tell et al., 2001). *Mycobacteria* can survive for several months in the environment (Tell et al., 2001). In most cases, infected birds show no clinical signs, but they may eventually become lethargic and emaciated.

Affected birds are usually older than one year. Some show respiratory signs and sudden death may occur, dyspnoea is less common, and granulomatous ocular lesions (Pocknell et al., 1996) and skin lesions have been reported. Under intensive husbandry conditions, sudden death may occur, often associated with severe lesions in the liver; such lesions are easily observed at post-mortem examination (Tell et al., 2001). The primary lesions of tuberculosis in birds are nearly always in the intestinal tract. In most species of affected bird, tuberculous-like lesions are mostly found

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in the intestinal tract, liver and spleen. Lesions in other organs are less common.

According to Prukner-Radkovic et al. (1998) three forms of disease manifestations have been described: the classic tuberculosis (a disease with widespread tubercle formation in most organs), the intestinal form (intestine with typical intestinal lesions only) and the so-called non-TB form, which is almost macroscopically unrecognizable.

Case Details

A 2-year-old female pigeon was referred to the Department of Poultry Diseases at the Faculty of Veterinary Medicine in Tripoli for postmortem examination. The pigeon had died suddenly with only some strange movements just before death. The pigeon had not suffered any disease during its life, and no symptoms were observed in the days before its death.

Post-mortem examination

Typical case of avian tuberculosis involved emaciated carcass with granulomatous nodular lesions of various sizes and numbers with yellow to grey colors were found in the internal organs. Tuberculous lesions of various sizes and numbers were detected especially in the intestine and spleen (Fig. 1). The size of the tuberculous lesions varied ranging from 1 mm to more than 10 mm, and they were randomly distributed. Granulomatous inflammation was evident in most tissues with tuberculous lesions.

Ziehl–Neelsen's staining method

Tissue smears from the granulomatous nodular lesions were submitted to direct Ziehl–Neelsen staining. Slides prepared from tissue impressions were stained according to the Ziehl–Neelsen technique for the presence of acid-fast bacilli (Fig. 2). At least 200 fields

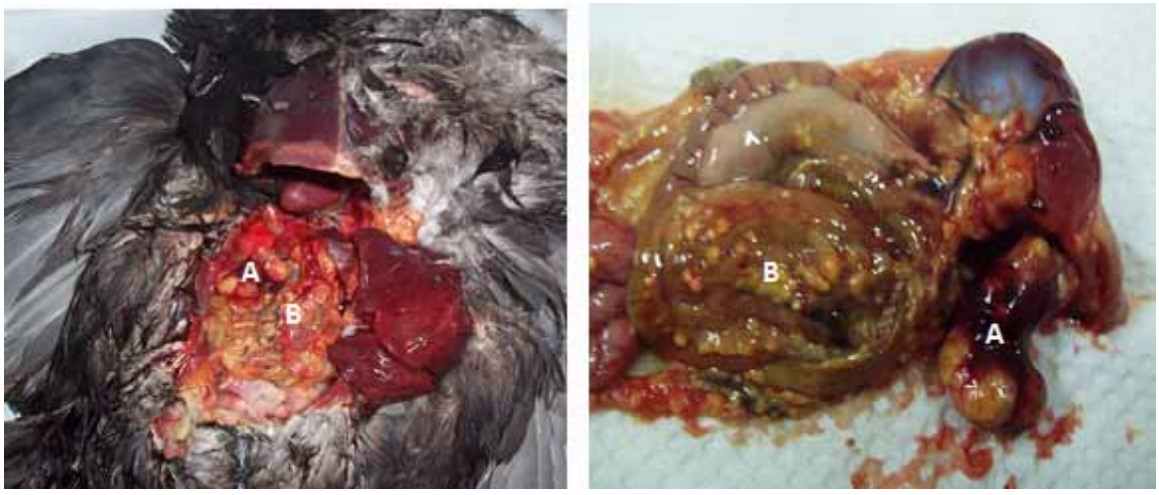

Fig. 1: Granulomatous nodular lesions of various sizes and numbers with yellow to grey colors in the spleen (A) and the intestine (B)

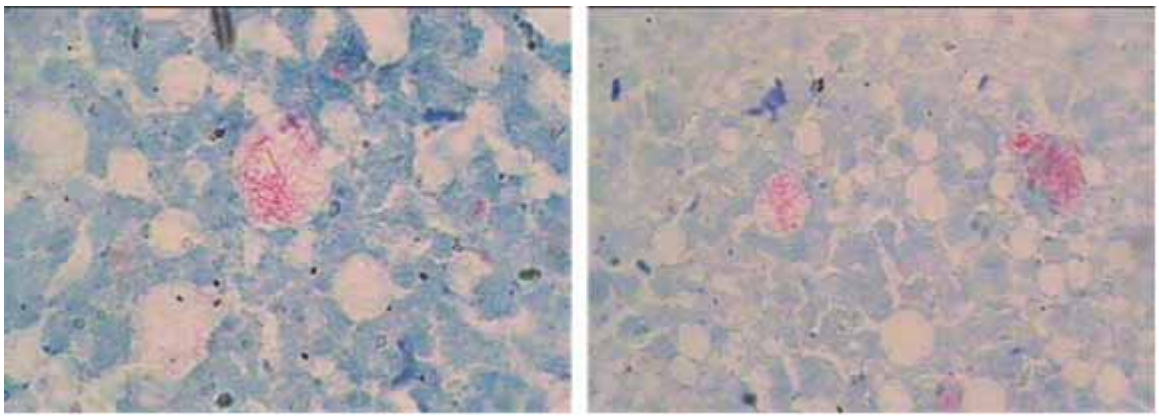

Fig. 2: Presence of acid-fast-bacilli (red color) in slides prepared from tissue impressions that stained with Ziehl–Neelsen technique

of view were examined for each sample and examined by light microscopy using a 100x magnification under oil immersion. Acid-fast bacilli were detected in all prepared smears.

Discussion

There are a number of previous reports on infection of pigeons with MAA in different parts of the world (Matthews and McDiarmid, 1979; Bougiouklis et al., 2005; Tanaka et al., 2005; Bolfion et al., 2010). This is the first report of detection of *M. avium* in pigeons in Libya. Whereas clinical signs of tuberculosis are seen in the flock, or typical lesions of tuberculosis are present in birds at necropsy, the demonstration of acid-fast bacilli in smears or sections made from affected organs is sufficient for a positive diagnosis (OIE, 2008). In the present case, the gross lesions described before (Fig. 1) and the presences of acid-fast bacilli (Fig. 2) are evident for the diagnosis of avian tuberculosis.

M. avium is ubiquitous in the environment and have a wide source range, causing disease in various animal, birds and humans especially that are immunocompromised (Thorel et al., 2001). *M. avium* infection is a significant cause of morbidity and mortality in birds in zoos and breeding establishment (Thoen et al., 1981). Avian tuberculosis in free-living sparrows, blackbirds, wood-pigeons and pheasants was attributed to their contact with farms and domestic poultry (Rankin and McDiarmid, 1968).

The location of primary lesions is an indication of route of exposure. Intestinal lesions suggest ingestion of *M. avium* in contaminated feed or water. In birds, the natural route of infection is widely believed to be fecal-oral which differs from respiratory route commonly described for mammals. Therefore, avian tuberculosis first involves the gastrointestinal tract and liver with subsequent spread to other organs (Dhama et al., 2011), and this is clear in this case as most tuberculous lesions were seen in the intestine.

Advanced disease and clinical signs are seen most often in adult birds because of the chronic, insidious nature of the disease. Infected birds are often emaciated, weak and lethargic and they exhibit wasting of the muscles. These signs are similar to those of lead poisoning and other debilitating conditions.

The zoonotic implication of MAA infection in human beings as a potential risk for those who are immunocompromised in particular is of paramount importance and exposure to this organism may cause infection (Butcher et al., 1990; Thoen, 1997; Martin and Schimmel, 2000). Therefore, animal owners, children and elderly people residing near the aviary should avoid contact with infected birds.

This is the first report of avian tuberculosis infection in pigeons in Libya. Although the infection seems to be sporadic, taking into account that mycobacterium infection can occur in immunocompromised humans, therefore, care should be taken by owners and people manipulating pigeons.

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