

ATYPICAL TUBERCULOSIS IN PIGEONS

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A *Mycobacterium avium* infection in a not typical form in domestic pigeons of four flocks was established by microbiological and histological methods. The tuberculosis alterations were localised mainly in the area of the first and elbow joints. Microbiological investigations show that *M. avium* is concerned.

The data suggest probability of increasing of avian tuberculosis in our country and a possibility of its spreading by infected pigeons.

INTRODUCTION

In the recent years an increase of tuberculosis rate with people as well as with agricultural animals and fowls is recorded in Bulgaria. Pigeons have a higher resistance to tuberculous bacterium than the other granivores. Anorexia, torticollis and a growth of cutaneous knots are observed clinically with them [Pond and Rush, 1981; Hejlícek and Tremel, 1994, 1995]. Morita *et al.* (1994) found caseous knots around cloaca of two male pigeons suffering from tuberculosis. According to data by Tyagunenko *et al.* (1993) and Arsov *et al.* (1992) besides the visceral organs, likewise the serous covering of pleuroperitoneal cavity, the joint cartilages, the tendon sheaths and the cutis are affected pathomorphologically in pigeons. Pond and Rush (1981) report also about changes in the medulla. The authors ascertained histologically acid-resistant bacteria, caseous masses, lymphocytes, epithelial and gigantic cells.

Recently pigeon-breeders complaints about cutaneous and joint thicks, weakness, and impossibility of flying of their flocks.

In this research we put an aim to determine the aetiological agent and the pathomorphological changes in the frequented cases of sick rates with pigeons, which are connected with changes in joints and cutis.

MATERIAL AND METHODS

Four flocks with more than 1200 pigeons from different parts of Bulgaria were observed for the period from 1995 to 1997. A microbiological examination of biopsical material from cutis, joints and internal organs was made on 25 birds. We coloured the smears microscopically acc. to Zil-Nilsen method. We made culture examinations by growing the material in a 4% glycerine medium, Soton medium and on glycerinized potatoes [acc. to Kamburov, 1986], and by a continuous cultivating under aerobic conditions. 8 dead and 10 euthanased pigeons were checked up pathoanatomically and a material for pathohistological examination was taken out of them. The samples were fixed in 10% solution of formaldehyde and then were taken in paraffin. The so-obtained cuts were coloured by the help of haematoxiline-eosin.

RESULTS

We ascertained this disease most commonly with decorative breeds of birds raised free. There was a lesser sick-rate with carrier-pigeons used for sports. The illness was observed all the year round with a certain acuteness during the autumn-winter period. 1 to 3% of the adult birds were affected. The first clinical symptoms of the disease that we examined were weakness of birds, refusal or impossibility of flying, appetite lessening, and losing weight. The pigeons wings had joint swellings, they were drooping (one-sided, or two-sided). Rarely the pigeons limped and lay sick for a long time. The observed clinical and morphological symptoms led us at first to the searching of a staphylococcus infection. However, the cultures and subcultures, that were sown in grapes and ordinary meat-peptone bouillon and agar, remained sterile. Then arose suspicion about pigeon pox infection. We investigated microscopically a smears of the biopsical materials, coloured acc. to May-Grunwald-Giemsa method. Cytoplasmatic viral inclusions were not established and the possibility of pox infection was rejected. Continuing our investigations we recorded pathoanatomically bad sleeking of pigeons and a presence of swellings upon the joints of the fore and hind limbs. The wrist and elbow joints were the most commonly affected ones, rarely affected were the finger joint of fore limb and the tarsal joint of the hind one (fig.1). When the disease was at its opening stage, we found reddened and diffusive joint thicks. Later the integrity of the cutis was getting damaged, and greyish-yellow caseous foci as big as a lentil up to a hazelnut. The formings were oval, shaftlike edges and protruding centre. After removing the necrotic areas, we observed bleeding bottomed ulcers. The necrosis covered the skin, muscles, their aponeuroses and tendons, joint capsules and cartilages. We also found out changes in the internal organs of four of the examined pigeons. We ascertained grayish yellow pea-big caseous foci at the bottom of the oesophagus-gullet with two of the pigeons. We noticed yellow-cheeselike oval formings as big as a pea up to a bean on the serosa and the mucosa of the trachea, the rib wall, the pericardial sac, the mesentery and the spleen (fig.2). We found sublimated necroses in the lungs and the liver. We discovered small, straight and a bit bowed, tender, crimson, granulated rodlets measured about 2-5/0,5 μ m in the preparations coloured acc. to Zil-Nilsen (fig.3a). In some of the preparations the small rods were hard findable, rare and few in number. In material smears from other pigeons the bacteria were more, they even could be find in groups, and some of them with the typical for tuberculosis bacteria mutual disposition in two or three, at an angle (X and Y shaped). This microscopical find speaks about mycobacteria. We found out single mycobacteria in the liquid cultures (Zil-Nilsen coloured) as early as the eight day. In about a week we observed a visible growth in the form of dustlike sediment, and in some of them there was hardly noticeable sleazy diaper on the surface while the middle remained clear. Under the microscopical examination of culture smears we observed a large quantity of mycobacteria (fig.3b). The growth of the various samples had various intensity (table 1). In some of the cultures sown upon potato after about two weeks time there appeared small, mucous, whitish blending colonies. The catalase sample was negative.

Under the cultural investigation there were isolated mycobacteria from the lungs only of pigeons with macroscopic visible changes.

The diagnosed disease was confirmed also pathohistologically. The macroscopically ascertained necroses appeared to be homogeneous amorphous masses with isolated nuclear fragments. Around them we observed piled up gigantic cells of a foreign substance type, epithelial cells, and lymphocytes. The older necrosis were enclosed within a connective-tissue capsule.

Type of sample	Growth
From wing	+++
From wing	+++
From wing	+++
From wing	++
From lung	-
From wing	+
From wing	+
From wing	+
From lung	++

TABLE 1. Intensity of the growth of *M. avium* in the various samples

DISCUSSION

According to Hejlícek and Tremł (1994) even after more than a year living together with hens suffering from tuberculosis, it provokes only isolated cases of this disease in pigeons. The ascertained expanding of the sick-rate with pigeons has probably sprung up from contacts with other sick birds (like hens, turkeys, sparrows). We assume that the continuous overstay through pigeons organism has increased the virulence of *M. avium* for this species of birds. The first clinical tuberculosis symptom that we observed was a paralysis of wings and a disturbed flying ability of the birds; we didn't find any data about this in the available bibliography. Like the data of Tyagunenکو *et al.* (1993) and Arsov *et al.* (1992) we observed pathoanatomically affecting of joints, skin and serose of pleuroperitoneal cavity. In contrast to Marita (1994) necroses in the cloaca region were not ascertained. It is known that the contagion of birds is mainly of alimentary matter. Hejlícek and Tremł (1994), after experimental peroral contagion of pigeons, found out serious changes in intestines, but we didn't find such in our cases. The lack of lymph nodes in birds causes the lymphohaemathogenous dispersing of mycobacteria and affecting of all the visceral organs and the marrow. In our cases only two of the examined pigeons had submiliare necroses in the liver and the lungs. Only one of the pigeons had a badly affected spleen. The appearance of skin and joint changes, mostly in the autumn-winter period, probably is due to the languishing of birds. The possibility of contagion by contact could be rejected or asserted after additional and thorough research works. The pathoanatomical, histological and microbiological examinations that were done on pigeons assert the diagnosis tuberculosis. The cultural and morphological peculiarities under review of the isolated acid-resistant rodlets show that *M. avium* is concerned. As an evidence of this is the comparatively early appearance of growth (about the eight day) typical of this species. The cultural and morphological data including the small measures and polymorphism are also characteristic of *M. avium*, as well as the pathomorphologically ascertained granuloma formations (tubercles). Important to differentiating of atuberculosis mycobacteria, besides their growth, is the examination of catalase [acc. Smirnova, 1979].

The simultaneous determination of tuberculosis cases caused by *M. avium* with birds from various regions of the country show alarming tendency to a expansion of bird tuberculosis and a danger of its spreading by pigeons. Apparently there exist strains with a raised virulence to pigeons, which could be pathogen for highly receptive to tuberculosis domestic granivores, as well as for swine and people.



Fig. 1. Fore limb of pigeon suffering from tuberculosis - caseous knots in the region of the wrist and elbow joints.



Fig. 2. Pleuroperitoneal cavity of pigeon suffering from tuberculosis - caseous knots.

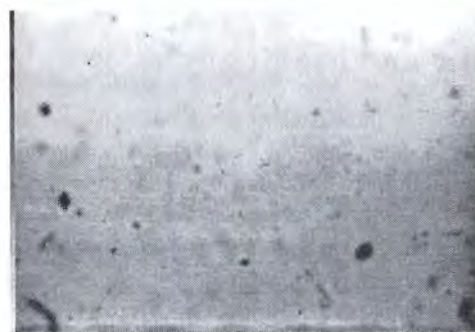


Fig. 3a. Mycobacteria in biopsical material from wing of pigeon - smear coloured acc. to Zil-Nilsen.

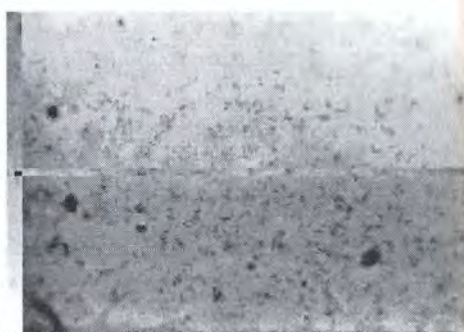


Fig. 3b. Tuberculosis bacteria, isolated in Soton medium from biopsical material from wing of pigeon, coloured acc. to Zil-Nilsen.

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АТИПИЧНА ТУБЕРКУЛОЗА КАЈ ГУЛАБИ

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Инфекција со *Mycobacterium avium* во нетипична форма кај домашните гулаби од четири јата беше потврдена со микробиолошки и хистолошки методи. Туберкулозните промени беа локализирани во пределот на зглобовите на екстремитетите. Микробиолошките испитувања покажаа дека се работи за *M. avium*.

Податоците говорат за можноста за зголемување на зачестеноста на авијарната туберкулоза во нашата земја и нејзиното ширење преку инфицираните гулаби.