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Avian Diseases Transmissible to Humans [1]

Jacqueline P. Jacob, Jack M. Gaskin, Henry R. Wilson, and F. Ben Mather[2]

Introduction

Bird-keepers (pet bird owners and poultry producers) should be aware that some avian diseases can be transmitted to humans. It is important to note, however, that such diseases are uncommon enough that they should not discourage bird-keeping. For most people avian diseases do not pose a serious threat, but bird-keepers should be aware of them and seek medical assistance if necessary.

Zoonoses refer to infectious animal diseases that are communicable to humans. The infectious agents can be protozoal, fungal, bacterial, chlamydial or viral. Individual susceptibility and the seriousness of these various microbial infections varies with age, health status, immune status (immunodeficient or immunosuppressed), and whether early therapeutic intervention is sought. The ability of a microorganism to make a person sick varies with the virulence of the organism, the dose to which the person is exposed, as well as route of infection.

Chlamydiosis, salmonellosis, arizonosis, and colibacillosis are the most common of these infections. Chlamydiosis, salmonellosis, eastern equine encephalitis and avian tuberculosis may be serious and even life- threatening.

Chlamydiosis

Chlamydia psittaci , an unusual bacteria-like organism, occurs worldwide and affects more than 100 avian species. It causes a disease called psittacosis or parrot fever when it occurs in psittacine birds (curve-beaked, like parrots, parakeets, etc.)and the disease is called ornithosis when diagnosed in all other birds or in humans.

In the U.S., chlamydiosis is a major problem with turkeys, pigeons, and psittacines. In Europe, the main avian species affected are ducks and geese. Some birds (turkeys) are extremely susceptible to chlamydiosis, while others (chickens) are more resistant.

Chlamydiosis is primarily transmitted by inhalation of contaminated fecal dust and is spread by carrier birds, which act as the main reservoirs for the disease. The organism is excreted in both the feces and nasal secretions. Shedding is sporadic and is usually induced by stress. A carrier state can persist for years. The organism survives drying, which facilitates oral spread and allows transmission on contaminated clothing and equipment. Chlamydiosis can be transmitted bird to bird, feces to bird, and bird

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2. Jacqueline P. Jacob, poultry extension coordinator with Dairy/Poultry Sciences, Jack M. Gaskin, associate professor with Veterinary Medicine-Pathobiology, Henry R. Wilson, professor with Dairy/Poultry Sciences, and F. Ben Mather, poultry extension specialist with Dairy/Poultry Sciences, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

to human. Human to human transmission can occur, mainly by exposure to patient's saliva.

Chlamydiosis is an occupational hazard for persons working with psittacines (parrots, parakeets, etc.) and pigeons, or for people working in turkey slaughter plants and avian diagnostic laboratories.

The incubation period for chlamydiosis is 4-15 days, although 10 days is most common. In affected birds, diarrhea, coughing, and ocular and nasal discharges are common signs. There may be a high mortality rate if the disease is unrecognized or untreated. With turkeys there is a drop in egg production. In humans, chlamydiosis manifests itself as a feverish respiratory disease. There is usually a sudden onset with chills, muscle and joint pains, headache, cough, loss of appetite, and chest pains. Complications may result from an enlarged spleen, inflammation of the heart muscle, and a reduced heart rate.

Affected birds must be treated with chlortetracycline or other similar broad-spectrum antibiotics for up to 45 days to clear the infection. Pigeons and turkeys may require long- term flock therapy to eliminate carriers.

Affected humans are treated with tetracycline for at least 21 days. Because this antibiotic may become irreversibly bound to certain minerals, the calcium content of food needs to be kept low during treatment.

In Florida, chlamydiosis is a reportable zoonotic disease for both health and livestock officials. The Department of Agriculture and Consumer Services must be notified of any birds found to be infected with *Chlamydia psittaci* . If a person is suspected of having ornithosis, the county public health office must be notified within 48 hours.

Salmonellosis

There are approximately 200 different serotypes of *Salmonella* species. Most animals are susceptible to salmonella infection. This bacterial disease occurs most frequently in stressed individuals. Many infections are subclinical. Common clinical symptoms in all species include diarrhea, vomiting, and a low-grade fever. Infections can progress to dehydration, weakness, and sometimes, especially in the very young or very old, death. In severe cases there can be a high fever, septicemia (blood poisoning), headaches, and an enlarged painful spleen. Focal infections may occur in any organ, including heart, kidney, joints, meninges (membranes which surround and protect the brain and spinal cord), and the periosteum (fibrous membrane of connective tissue which closely surrounds all bones except at the joints).

The incubation period is 6-72 hours, although 12-36 hours is most common. Salmonella are transmitted by ingestion of food contaminated by fecal matter (fecal-oral route). Excretion of the bacteria commonly varies from a few days to weeks. In some instances (e.g., S. *typhi*, typhoid fever) infected persons can shed bacteria for life. *S. enteriditis* in avian fecal material is able to penetrate eggshells, and may be present in uncooked eggs.

In most cases, treatment of salmonellosis simply involves treatment of the symptoms with fluids and electrolytes. Antibiotics such as chloramphenicol, nitrofurans, or ampicillin are only indicated when the bacteria has localized in areas of the body peripheral to the intestinal tract.

In Florida, salmonellosis is a reportable zoonotic disease for both health and livestock officials. The Department of Agriculture and Consumer Services must be notified of any birds found to be infected with *Salmonella* species. If a person is suspected of having salmonellosis, the county public health office must be notified within 48 hours.

Colibacillosis

Colibacillosis is caused by *Escherichia coli* infection. *E. coli* is a bacteria which normally inhabits the intestinal tract of all animals. There are a number of different strains, many species-specific. Not all strains are pathogenic. In poultry, *E. coli* infections may cause septicemia, chronic respiratory disease, synovitis (inflammation of the joints which can lead to lameness), pericarditis (inflammation of the sac around the heart), and salpingitis (inflammation of the oviduct). Humans with colibacillosis usually manifest diarrhea which may be

complicated by other syndromes depending on the *E. coli* serotype. These complications may include fever, dysentery, shock, and purpura (multiple small purplish hemorrhages in the skin and mucous membranes).

The incubation period is 12 hours to 5 days, although 12-72 hours is most common. Transmission is via the fecal-oral route. Colibacillosis is often food- or water-borne.

In most cases, symptomatic treatment (fluids, antidiarrheals) is all that is required. In more severe infections, antibiotics such as tetracycline and chloramphenicol may be necessary.

In Florida, colibacillosis is not a reportable zoonotic disease.

Arizona Infections (Arizonosis)

Arizona infections are caused by the bacteria *Salmonella arizona* . *S. arizona* occurs worldwide. It occurs most frequently in reptiles and birds, but all animals are probably susceptible. The young are at greatest risk.

In most poultry species *S. arizona* infection results in reduced egg production and hatchability. Poults and chicks show weakness, anorexia, and shivering. Outbreaks in turkeys, chickens, and canaries can have up to 60% mortality. In humans, diarrhea is most common. Many infections are subclinical. Septicemia can occur in immunocompromised individuals.

The incubation period is 6-72 hours, although 12-36 hours is most common. Transmission is by the fecal-oral route. There is some transmission through eggs. Infected birds can become long-term intestinal carriers. Numerous antibiotics reduce case fatality, but do not clear intestines of the carrier state. *S. arizona* is somewhat less hardy than most salmonella but can survive for months in soil, feed and water.

Arizona infection is not a reportable zoonotic disease in Florida.

Eastern Equine Encephalitis

Eastern equine encephalitis (EEE) is caused by a RNA virus in the genus *Alphavirus* , family Togaviridae. Outbreaks can occur in commercially raised pheasants, chickens, bobwhite quail, ducks, turkeys, and emus. Abdominal distress and dysentery are the most obvious signs.

EEE is mosquito-borne. The virus circulates in a mosquito-bird cycle in which passerine birds (i.e., song birds such as swallows, starlings, jays, and finches) are the most common reservoir. The mosquitoes become infected and feed on birds, horses, and humans, further spreading the infection. In pheasants, initial infection is mosquito-borne, but additional dissemination occurs by pecking and cannibalism.

Most epidemics occur between late August and the first frost. Cases may occur year-round in areas like Florida which have a prolonged mosquito season.

EEE usually affects persons under 15 or over 50 years of age. In adults there is a sudden onset of high fever, headache, vomiting, and lethargy, progressing rapidly to neck stiffness, convulsions, spasticity, delirium, tremors, stupor and coma. In children, EEE is typically manifested by fever, headaches and vomiting for 1-2 days. After an apparent recovery, encephalitis (inflammation of the brain) is characterized by quick onset and great severity follows. Retardation or other permanent neurologic consequences are common in survivors.

EEE is not a reportable zoonotic disease in Florida.

Avian Tuberculosis

Avian tuberculosis is caused by the bacteria *Mycobacterium avium* which is closely related to the human and bovine tuberculosis bacteria. In birds, *M. avium* causes a chronic debilitating disease with tubercular nodules. In humans, *M. avium* infections can cause local wound infections with swelling of regional lymph nodes. The infection is most severe in immunocompromised individuals. *M. avium* is spread by ingestion of food or water contaminated by feces from shedder birds. Tuberculous poultry flocks should be depopulated.

While most *Mycobacterium* infections are treatable with antibiotics, *M. avium* infection is the exception. *M. avium* is highly resistant to antibiotics. Surgical excision and lymph node removal are often necessary to eliminate infection.

In Florida, avian tuberculosis is a reportable zoonotic disease for both health and livestock officials. The Department of Agriculture and Consumer Services must be notified of any birds found to be infected with *Mycobacterium avium* . If a person is suspected of having tuberculosis, the county public health office must be notified within 48 hours.

Histoplasmosis

Certain fungi prefer to grow in soils enriched with avian manures. *Histoplasma capsulatum* is one of these. The fungus is also associated with construction sites and caves. Birds are not susceptible to infection, but histoplasmosis can affect humans, dogs, cats, cattle, sheep, horses, and many wild mammals.

The incubation period is 7-14 days. Most cases in humans are asymptomatic. Disease may be manifested in three forms: acute pulmonary (most common), chronic cavitary pulmonary, and disseminated. The acute pulmonary form is influenza-like and lasts up to several weeks. It is characterized by chills, chest pain, nonproductive cough, fever, and malaise. The chronic form occurs in people over 40 and resembles tuberculosis. It is characterized by a productive cough, pus-like sputum (material expelled from the respiratory passages), weight loss, and shortness of breath. The disseminated form occurs in the very young or the elderly. Lesions include enlarged spleen and liver, and mucosal ulceration. The disseminated form of histoplasmosis can be fatal if not treated. Amphotericin B has been used to treat histoplasmosis.

Transmission occurs by inhalation of spores produced by growth of the mold. Histoplasmosis is not a communicable disease. The reservoir is the soil, especially when enriched with droppings from birds or bats. Wet the area and wear a face mask or respirator when working in suspect surroundings. Spraying the soil with a formaldehyde solution has been used to kill the fungi.

Although this disease is avian-associated, it is not a zoonotic disease, because the reservoir is soil and not the birds. This is, however, of little consequence to the unfortunates who become infected.

In Florida, histoplasmosis is a reportable disease. If a person is suspected of having histoplasmosis, the county public health office must be notified within 48 hours.

Cryptococcosis

Another fungus that prefers to grow in soils enriched with avian manures is *Cryptococcus neoformans.* The incubation period is probably weeks. Infections are seen in many mammals, but occur most frequently in humans, horses, dogs, and cats. Infections are rare in birds.

Transmission of cryptococcosis is usually by inhalation of this yeast-like fungus, although it can occasionally occur by ingestion. Humans can pick up cryptococcosis from exposure to old pigeon nests or droppings. In humans, cryptococcosis is manifested as meningitis or meningoencephalitis, and it is usually preceded by pulmonary infection with cough, blood-tinged sputum, fever, and malaise. The course of the disease is usually chronic. There is usually fever, cough, chest pain, and spitting of blood from the respiratory tract, followed by headache, stiff neck and visual disturbances.

As with histoplasmosis, this disease is avian-associated, but not a zoonotic disease because the reservoir is soil and not the birds.

In Florida, cryptococcosis is not a reportable disease.

Cryptosporidiosis

Cryptosporidiosis is caused by protozoa of the genus *Cryptosporidium* . There are three known species, *C. baileyi* , *C. meleagridis* and an unnamed species in quail. Cryptosporidiosis normally causes respiratory problems in chickens and turkeys. It can also cause gastroenteritis and diarrhea. In humans, it

causes abdominal pain, nausea, and watery diarrhea lasting 3-4 days. In immunocompromised people, it can cause severe, persistent diarrhea with associated malabsorption of nutrients and weight loss.

The incubation period is 3-7 days, and it is spread via the fecal-oral route by ingestion of infective oocysts.

In Florida, cryptosporidiosis is a reportable disease. If a person is suspected of having cryptosporidiosis, the county public health office must be notified within 48 hours.

Allergic Alveolitis

Allergic alveolitis, also known as pigeon breeder's lung, budgerigar dander pneumoconiosis, and a variety of other complex names, is one of the most significant avian zoonotic diseases. It may occur as an acute, subacute, or chronic problem. Clinical signs are caused by reduced lung capacity due to a hypersensitivity reaction to feathers, dander, or fecal dust. Inflammation of the pulmonary air exchange units (alveoli) is the inciting lesion.

The acute form of the disease is usually precipitated by an overwhelming exposure in a previously sensitized individual, such as that which might occur in cleaning out a pigeon loft. Symptoms occur within a short time, and include cough, difficult respiration, fever, and chills. If exposure ceases at this point, the symptoms resolve and no treatment is necessary. Chronic, low-grade exposure is more serious, and symptoms may be mistakenly attributed to a stubborn cold or flu. Affected individuals have a chronic nonproductive cough, exercise intolerance, and weight loss. Permanent lung lesions may develop, including pulmonary fibrosis that reduces gaseous exchange and lung capacity.

Chronic allergic alveolitis can develop in as little as 2 years, but usually takes 10-20 years. Patients diagnosed with the chronic form of the disease may have no choice except to eliminate all exposure to birds. Exposure to even minute quantities of feathers, dander, or feces may precipitate a recurrence of severe respiratory distress. The severity of the disease can be reduced by wearing face masks while cleaning cages, cleaning cages daily, bathing pet birds frequently, and installing air purification systems.

Conclusions

Bird-keepers should be aware that they can contract certain illnesses from their birds. The frequency of disease transmission from birds to humans is low, but the very young, the elderly, and those with compromised immune systems should be cautious.

Many of these diseases are transmitted by ingestion of food contaminated by fecal matter. Prevention of most of these diseases, therefore, simply involves proper hygiene and sanitation. Wearing a face mask to avoid inhaling bird dust is also recommended.

If you have persistent flu-like symptoms when no one else you know is affected, see a doctor and mention that you raise birds. Such symptoms may be indicative of a disease spread from birds to humans.