University of Mosul
Lecture No.:
College of Veterinary Medicine
Date:
Unit of Scientific Affairs
Website:

Lecture title: ***Zoonotic diseases in poultry***

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Summary:

Zoonotic diseases in poultry

There is a relatively large number of avian diseases that are potential zoonoses.

Avian zoonoses are of greatest significance to those individuals who are immunologically compromised.

To fulfill this responsibility, the clinician must understand zoonotic diseases and adequately educate

Bacterial, chlamydial, viral, protozoal, and fungal diseases are potentially transmissible to humans

CHLAMYDIOSIS

Chlamydiosis has a variety of other names; this tends to cause some confusion. The disease is called psittacosis when it afflicts humans or psittacine birds; it is called ornithosis when the disease is in any bird other than a psittacine. Parrot fever is another synonym for chlamydiosis in psittacines.

the disease is always caused by the same organism, Chlamydia psittaci. C. psittaci causes disease in a variety of species including humans, birds, cows, cats, goats, sheep, and pigs. Chlamydial infections of animals other than birds are not contagious to birds.

The Disease in Humans acquires the disease from inhalation of aerosolized fecal material and contact with nasal or ocular exudates that are then ingested. The majority of human chlamydial infections involve birds that are clinically ill; Symptoms are flulike and include fever, diarrhea, chills, myalgia, conjunctivitis, and pharyngitis.

SALMONELLOSIS

Salmonella is a common pathogen of birds and has been reported in a large number of species including finches, poultry, budgerigars, conures, cockatiels, Amazon parrots, macaws, waterfowl, and pigeons.

It is believed that birds and rodents are the primary carriers of most of these antigenic variations. Pathogenicity in humans varies depending on the serotypes involved. The majority of avian serotypes are potential pathogens for humans.

Salmonella in Humans Salmonella is extremely pathogenic for people. Clinical symptoms include bloody diarrhea, pyrexia, dehydration, and possibly death. Salmonella in humans is an extremely serious zoonotic disease, and all efforts should be made to protect against infection. Sources of Human Infection More than 90% of human cases of Salmonella are acquired from contaminated food sources, primarily poultry products. Most of the other salmonella infections are due to person-to-person transmission. Transmission from cage and aviary birds composes a small fraction of the cases.

TUBERCULOSIS

There are three species of Mycobacterium that commonly cause tuberculosis in warm-blooded animals: Mycobacterium tuberculosis, M. bovis, and M. avium. M.tuberculosis is the primary etiological agent responsible for tuberculosis in humans, with M. bovis more rarely incriminated Most species of birds are only susceptible to M. avium infections. Psittaciformes are also susceptible to M. tuberculosis and M. bovis. People with tuberculosis should not own psittacine birds because of the potential to reinfect themselves from their birds

Tuberculosis in Humans The disease in humans is characterized by the development of multifocal granulomas, primarily in the lungs, bones, lymphatics, or brain. Humans contract the disease through inhaling or ingesting sufficient numbers of mycobacterial organisms.The diagnosis in humans is achieved through a combination of skin tests, radiographs, and cultures. Treatment involves combined chemotherapeutic agents over extensive period Vaccination is possible but not widely practiced due to successful eradication measures

NEWCASTLE DISEASE

Avian paramyxovirus (PMV) strains are divided into nine groups. PMV group 1 strains cause Newcastle disease (avian distemper, Renikhet disease). Newcastle virus (ND) is further divided into four pathotypes based on virulence and signs: lentogenic, mesogenic, velogenic neurotropic, and velogenic viscerotropic (VVND).

In humans, symptoms include mild to severe conjunctivitis and sinusitis. Recovery is usually spontaneous in 7 to 20 days.54 Most humans that contract ND
are workers in the poultry industry.

INFLUENZA A

Orthomyxovirus causes influenza in animals and humans. Influenza virus is further subdivided into influenza A, B, and C and is responsible for other diseases including avian influenza and equine influenza.

Influenza A has been associated with natural infections of both humans and animals. Influenza A virus of humans and lower animals are antigenetically related. Avian influenza A virus shares V antigens with human influenza A virus, and recombination occurs between strains.

Avian influenza A virus has been recovered from a large number of birds including psittacines, passerines, waterfowl, and poultry and is probably present in all avian species. In birds, the disease is usually asymptomatic. The greatest significance of influenza A virus in birds and other animals is in its ability to recombine **with human strains, producing newly virulent human strains**. Animal influenza A virus is therefore a remarkable reservoir for viral mutation.

ASPERGILLOSIS

Aspergillus spp. are ubiquitous saprophytic fungi. Humans and birds are constantly being exposed to spores. There are 300 species of Aspergillus sp., of which most are harmless. Aspergillus fumigatus is the most common pathogen in humans and animals.

The most frequent symptom in humans is otitis externa. Other diseases include bronchopulmonary disease, allergic asthmatic reactions, and rarely systemic aspergillosis, which is rapidly fatal.60 Humans usually contract the disease by inhaling aspergillus spores.

HISTOPLASMOSIS

Histoplasma capsulatum is a common disease of humans that is often benign and self-limiting. Severe cases show granulomatous lung lesions similar to tuberculosis or disseminated histoplasmosis that rapidly result in death.

Humans acquire the disease from inhalation of the organism, usually associated with pigeon roosts, starling roosts, bat caves, and chicken.

The organism is most common in pigeons, starlings, blackbirds, and gulls.Infections involving cage and aviary birds are unknown.

CANDIDIASIS

Candida albicans is a yeast that can infect both humans and birds. **Candidiasis in humans** is usually a disease of the gastrointestinal system or involving superficial moist cutaneous areas. Vaginitis, dermatocandidiasis, thrush, enteritis, ulcers, and otitis externa can occur.

Transmission is usually oral, although respiratory candidiasis has been noted. Candidiasis in all animals is usually secondary to an underlying disease (immunodeficiency disorders) or overuse of antimicrobial agents. People are usually infected by other people, although any animal that carries C. albicans is a potential vector.

CRYPTOCOCCOSIS

Cryptococcus neoformans is a saprophytic yeast that can be an opportunistic systemic mycoses in humans and animals. **The disease in humans** includes ulcers in the face and neck; gelatinous or granulomatous lesions of the lung, kidneys, spleen, and liver; and meningitis.

The vast majority of human infections come from contaminated soil, especially soil containing pigeon droppings.

Cryptococcus infections have been reported in pigeons, canaries, cockatoos,green-winged macaws, African grey parrots, and thick-billed parrots.Signs vary widely and include weight loss,depression, muscle atrophy, dyspnea, nasal exudates, and oral masses.Before death, most of these birds had been given broad-spectrum antimicrobial agents, leading to speculation that antimicrobial therapy plays some role in the pathogenesis of the disease.

Erysipeloid

Erysipeloid, caused by *Erysipelothrix rhusiopathiae*,**in humans** is an occupational disease affecting
butchers, veterinarians, animal caretakers, *etc*.

Staphylococcosis

Staphylococccus aureus produces enterotoxins that cause food poisoning in humans. *Staphylococccus*
aureus strains found on poultry carcasses can be endemic strains or may be transmitted from the hands of the workers. Methicillin-resistant S.aureus also may be of concern in chicken meat.

Zoonoses caused by fleas

Fleas, temporary ectoparasites of **humans** and animals are vectors of diseases. Fleas are found throughout the world. *Ceratophyllus gallinae*, the chicken flea, a relatively pathogenic flea found in tropical and subtropical regions in young birds, can parasitize
humans.

Poultry red mite (Dermanyssus gallinae)

This parasite can also attack poultry growers, causing a pruritic dermatitis or allergic reaction with eczema.

Guidelines to prevent transmission from Birds to Humans

The transmission of zoonotic pathogens from animals to humans could be easily decreased by applying some elementary hygiene principles. A few recommendations could be delivered to the owner by the bird seller:

1- Clean clothing and shoes after any contact with other birds (bird club meeting, bird fair, live poultry). 2- Wash hands before and after handling birds (including cage cleanings).

3- Check cages, food and water every day to be sure they are clean (including perches, feeding cups,etc

4-When giving fruits or vegetables to birds, discard the rotten remainings.

5- Change bath pots every day and make them available to birds only one hour/day (to avoid the bathing waste water to become a reservoir for pathogens).

6-Wash cages once a week.

7- Preserve food in clean and sealed containers.

8- Clean and disinfect every aviary item before use.

Bird origin Traceability

For exotic pet birds issued from importation, laws differ from countries, but in a general view, a vet certificate, a passport and an importation authorization have to be delivered with the birds, the owner's point of view, there are some recommendations to be aware of after buying a new pet bird:

1-If the bird comes from another country, request certification from the seller that these were legally imported (eventually ask for official documents) and were healthy prior to shipment (certified by an official veterinarian).

2-Schedule an appointment with a veterinarian.

3- Isolate new birds from other birds for a quarantine time determined by the veterinarian.

4- Restrict access to birds from people owning birds too.

5-Keep birds away from other birds (e.g. in the gardens).

Quarantine facilities hygienic state

In case of a high level of risk or when a doubt emerges relative to the birds' health state, the following laboratory analyses could be performed:

1. Individual level: necropsy of a dead or a sacrificed sick bird, performed along with bacterial analyses of intestinal content or other organs presenting lesions.
2. Group level: Bacterial analyses of cloacal and/or oral swabs of a bird's sample bunch (one-to-ten, one-to-fifteen…).
3. Vector level: molecular analyses of vectors found on birds and/or in the cages, to specifically detect zoonotic agents: C. psittaci, West Nile fever, etc.