

Infectious Laryngotracheitis (ILT) targets broilers

//03 Feb 2010

Infectious Laryngotracheitis is a viral disease most commonly found in chickens, but is also seen in other fowl. In broilers, the vast majority of outbreaks occur in flocks over 45 days of age, but the disease has been diagnosed in flocks of a younger age.

By Dr Tahseen Aziz, Avian pathologist, Rollins Animal Disease Diagnostic Laboratory, North Carolina Department of Agriculture and Consumer Service, Raleigh, NC, USA

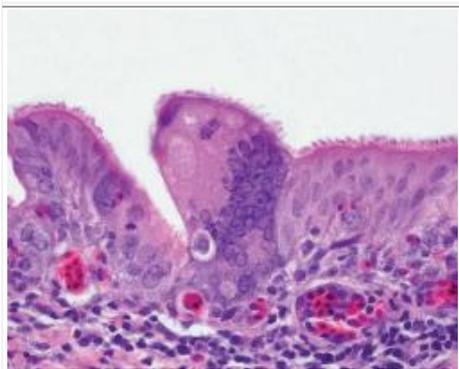
Infectious laryngotracheitis (ILT) is a viral respiratory disease caused by a herpes virus. Natural infections with ILT virus occur mainly in chickens, and both young and adult chickens are susceptible to infection. In broilers, for uncertain reasons, the vast majority of outbreaks occur in flocks over 45 days of age. However, ILT has been diagnosed in broiler chickens as young as three weeks. Natural ILT virus infections rarely affect pheasants and peafowl, but have recently been reported for the first time in turkeys.



This broiler chicken has ILT and can be seen by a watery eye. Dried ocular discharge is caked on the eyelid and on the skin around the eye.

Clinical picture

Typically, there is a sudden increase in daily mortality in a single house on a farm. Often, birds in one area of the house show clinical signs and die, and the disease spreads relatively slowly through the other birds in the house. Daily mortality progressively increases and can affect hundreds of birds each day. Severity of clinical signs and mortality rates vary widely among outbreaks depending on the immune status of the flock, initial exposure dose, age of the birds, virulence of the viral strain, co-infections with other respiratory pathogens, and environmental factors that adversely affect the respiratory system. Outbreaks are generally more severe in older rather than younger broiler flocks.



Infected epithelial cells of the trachea

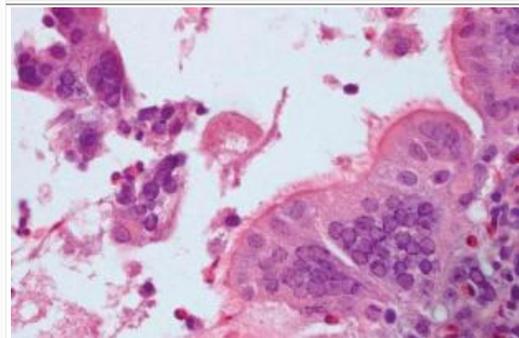
have fused to form large syncytial cells with intranuclear inclusion bodies. This is seen early in birds with ILT virus infection. Note the cilia on the surface of the syncytial cell and adjacent normal epithelium.

Infected birds are lethargic and have swollen eyelids, reddened conjunctivae, and watery eyes. In severe cases, eyelids may be adhered with dry, crusty, ocular discharge sticking to the eyelids and skin around the eye. Severely infected birds exhibit mouth breathing, coughing, and gargling respiratory noises. Some birds stretch out their neck while trying to breath. Coughing

up bloody mucus is a characteristic clinical sign that occurs in birds with badly damaged tracheas; bloody mucus may be found on and around the beak, and in the oral cavity. Spots of dried bloody exudate may be found in the bird's environment on sidewalls and equipment when flocks are severely affected.

Gross lesions

Lesions in the tracheas of infected birds vary in type, which reflect the severity and stage of infection. In some cases, the laryngeal and tracheal mucosa is only slightly reddened or has a rough appearance, and the tracheal lumen may contain a small amount of yellow exudate. In other cases, the laryngeal and tracheal mucosa is hemorrhagic, with yellow, bloody, frothy, or thick exudate on the mucosal surface and in the lumen. Exudate may partially or totally occlude the laryngeal glottis or tracheal lumen resulting in death from suffocation. It is common to find lesions in one or both lungs of infected birds; lungs are reddened and their cut surfaces may reveal white or yellow exudate within large airways (bronchi).



Intraepithelial syncytial cells in the trachea with several nuclei containing intranuclear inclusion bodies are diagnostic for ILT. Note cilia on the surface of the syncytial cell indicating this bird was in the early stages of the disease. Other epithelial cells are swollen and disorganised and there are sloughed epithelial cells with intranuclear inclusions in the lumen.

Histopathology

Infectious laryngotracheitis virus has a tropism for respiratory and conjunctival epithelium. Histopathological examination of tracheas, eyelids, and less commonly lungs, is the most commonly used laboratory method and it serves as the gold standard for ILT diagnosis. Tissues must be collected from both freshly dead and euthanised birds that exhibit signs of varying severity. Optimal histopathological evaluation is impossible in tissues with postmortem autolytic changes. In commercial broiler flocks, it is recommended to collect tissues from at least eight birds.

The type of lesions in the tracheas, eyelids (conjunctivae), and lungs of infected birds varies greatly depending on the stage and severity of infection. Infectious laryngotracheitis virus characteristically causes fusion of infected epithelial cells, resulting in the formation of large syncytial (multinucleated) cells, many of which have intranuclear inclusion bodies. Infectious laryngotracheitis is only definitively diagnosed when syncytial epithelial cells with intranuclear inclusion bodies are identified microscopically in tracheas, eyelids (conjunctivae), or lungs. Inclusion bodies may be basophilic or eosinophilic and either fill the entire nucleus or be surrounded by a halo.

Histopathologic lesions in tracheas

In the early stages of infection, focal to multifocal infected areas of mucosal epithelial cells are swollen, disorganised, and fuse to form syncytial cells with intranuclear inclusion bodies. The presence of one or a few intraepithelial syncytial cells with intranuclear inclusion bodies in the mucosal epithelium may be the only lesion that is seen. Interestingly, intraepithelial syncytial cells are often still ciliated. As the disease progresses, the normal architecture of the mucosal epithelium undergoes disarray. Additionally, several syncytial cells with intranuclear inclusion bodies are present in the mucosa or sloughing into the lumen. The mucosa and sub-mucosa may or may not be infiltrated by lymphocytes and plasma cells.

Further progression of the disease leads to patchy or diffuse loss of mucosal epithelium, with hyperemia and infiltration of the mucosa and submucosa by inflammatory mononuclear cells. Syncytial cells with intranuclear inclusion bodies may be present or absent in histologic sections of severely damaged tracheas in which epithelial cells are lost. Varying amounts of exudate composed of fibrin, heterophils, inflammatory mononuclear cells, sloughed epithelial cells, syncytial cells, and red blood cells are present on the mucosal surface and in the lumen. Exudate in the tracheal lumen is a good place to find syncytial cells with intranuclear inclusion bodies. In birds that survive the acute phase of infection, the tracheal mucosal epithelium regenerates by the proliferation of remaining basal cells. In the subacute (healing) stage, the mucosa and mucus glands are lined by several layers of regenerating, undifferentiated, nonciliated epithelial cells, some of which show mitotic figures. These lesions are morphologically characterised as a subacute hyperplastic tracheitis. Eventually, normal ciliated respiratory mucosal epithelium is restored, with some lymphoid cells persisting in the lamina propria and submucosa.

Histopathologic lesions in conjunctivae

Early in the infection, there is hyperemia, and infected conjunctival epithelial cells are swollen and in disarray. A single, few, or several syncytial cells with intranuclear inclusion bodies may be seen in the affected conjunctival epithelium. Exudate composed of fibrin admixed with heterophils and sometimes red blood cells may be present. Varying numbers of heterophils may be seen migrating through the conjunctivae. Later, especially in severely infected conjunctivae, conjunctival epithelial cells are lost, and fibrinocellular exudate is present on the surface of the denuded conjunctiva.

Histopathologic lesions in lungs

Lesions in the lungs, if present, are not spread but rather multifocal or regionally extensive. The normal histologic architecture in affected areas is severely distorted. Focal or diffuse areas of the mucosal epithelium of primary and secondary bronchi are either lost or disorganised. Walls of affected bronchi are usually infiltrated with large numbers of inflammatory mononuclear cells, and exudate composed of fibrin, heterophils, and mononuclear cells in different proportions is usually present in the bronchial lumen. Parabronchi, atria, and capillary beds around affected bronchi typically show marked proliferation, lymphohistiocytic inflammatory response, fibrin admixed with heterophils, and obliteration of air spaces. Syncytial cells with intranuclear inclusions may be seen in the lesions, but large syncytial cells without nuclear inclusions are also commonly encountered. Heterophilic, caseating granulomas may be present.