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Lecture title: Canine parvovirus

Lecturer Affiliation: Dr. Hadeel basim thanoon *(PhD)*
assist Prof. Department of veterinary pathology College of Veterinary Medicine, University of M
Mosul, Iraq

https://orcid.org/ *0000-0001-8077-0854*

https://www.researchgate. https://www.researchgate.net/profile/Hadeel-Basim

Summary: Canine parvovirus is the most widely recognized cause of transmissible viral diarr
dogs and one of the most common infectious diseases of dogs worldwide. It is caused by variants
canine parvovirus-2 (CPV-2), which are members of the genus Parvovirus.

Neurologic signs in puppies with parvoviral enteritis may result from hypoxia secondary to myoc
hypoglycemia, or intracranial thrombosis or hemorrh

Pathologic Findings

Gross Pathologic Findings

Gross pathologic findings in dogs with CPV enteritis include thickening and discoloration of the
wall with serosal hemorrhage and enlarged, edematous abdominal lymph nodes. The intestine ma
contain bloody liquid contents, and mucosal hemorrhage may be identified. Pale areas may be se
the myocardium of dogs with parvoviral myocarditis.

Histopathologic Findings

The major histopathologic finding is necrosis of the crypt epithelium in the small intestine, with
widespread systemic lymphoid

depletion and necrosis. The crypts can be dilated and distended with cellular debris and mucus .

Proliferation of crypt enterocytes may be observed as part of the

recovery response. Intestinal villi are collapsed, shortened, and fused, with attenuation of the epithelial lining, and there may be mild to severe fibrinous inflammation and hemorrhage.

Parvoviral myocarditis is characterized by myocardial degeneration and necrosis, with a lymphocytic inflammatory infiltrate. Myocardial fibrosis can also be present.

Viral intranuclear inclusions may be visible in some cells, especially the intestinal crypt epithelium. Immunohistochemistry can be

used to detect viral antigen in the gastrointestinal tract, marrow, lymphoid tissues, and rarely in the myocardium.

Canine distemper (sometimes termed hardpad disease)

It is a viral disease that affects a wide variety of animal families, including domestic and wild species of dogs and cats.It is caused by canine distemper virus (CDV), an enveloped, pleomorphic RNA virus that belongs to the genus Morbillivirus (family Paramyxoviridae).

The disease impacts several body systems, including the gastrointestinal and respiratory tracts and the spinal cord and brain, with common symptoms that include high fever, eye inflammation and eye/nose discharge, labored breathing and coughing, vomiting and diarrhea, loss of appetite and lethargy, and hardening of nose and footpads. The viral infection can be accompanied by secondary bacterial infections and can present eventual serious neurological symptoms.

Signs and Their Pathogenesis

CDV is highly contagious and is spread through droplet nuclei and

large-particle aerosol transmission. Dogs are generally exposed to CDV through contact with infected oronasal secretions, which may be shed by subclinically or clinically affected dogs. The virus initially infects monocytes within lymphoid tissue in the upper respiratory tract and tonsils and is subsequently disseminated via the lymphatics and blood to the entire reticuloendothelial system.

Direct viral destruction of a significant proportion of the lymphocyte population, and especially CD4+ T cells, occurs within the blood, tonsils, thymus, spleen, lymph nodes, bone marrow, mucosa-associated lymphoid tissue, and hepatic Kupffer cells , Massive destruction of lymphocytes results in an initial lymphopenia and transient fever, which occurs a few days after infection. Subsequently, there is a second stage of cell-associated viremia and fever (8 to 9 days after infection), after which CDV infects cells of the respiratory, gastrointestinal tract, central nervous system (CNS), urinary tract, and skin, as well as red and white blood cells.

Many dogs experience subclinical infection, whereas others experience rapidly progressive infection followed by death. The incubation period ranges from 3 to 6 days.

Respiratory or gastrointestinal tract signs may be indistinguishable from those caused by other respiratory or enteric viruses and bacteria, or signs may be so mild that they go unnoticed by the owner.

Dogs with respiratory involvement may exhibit fever, bilateral serous and nasal ocular discharges, conjunctivitis, and a nonproductive cough. Secondary bacterial infection, which occurs unhindered as a result of virus-induced immunosuppression, can lead to the development of mucopurulent nasal and ocular discharges and bacterial bronchopneumonia, with tachypnea, productive cough, lethargy, and decreased appetite.

Viral destruction of the gastrointestinal tract epithelium can result in inappetence, vomiting, diarrhea, electrolyte abnormalities, and dehydration.

Infection of the skin can lead to a cutaneous measles-like rash, although this is uncommonly recognized. Persistent infection of the footpad and nasal planum epithelium leads to hyperkeratosis in these regions.

Pathologic Findings

Gross Pathologic Findings

gross pathologic findings in canine distemper include thymic atrophy, pulmonary congestion and consolidation, liquid intestinal contents, and lymph node congestion and enlargement. Less common findings are mild pleural, pericardial, and/or peritoneal effusion and, uncommonly, visceral congestion and ecchymotic hemorrhages and meningeal congestion. In some dogs, gross necropsy abnormalities are minimal. Concurrent external and intestinal parasitic infections may also be identified.

Histopathologic Findings

Histopathologic findings in the brain and spinal cord are variable and depend on the CDV strain, the immune status of the host, the presence of secondary infections, and disease chronicity.Findings in the brain and spinal cord include neuronal necrosis and degeneration, and demyelination with sub acute to chronic infection. Multifocal gliosis, astrocytosis, vacuolization, and lymphoplasmacytic perivascular cuffing may be present.Infection of the lungs leads to a lymphocytic and histiocytic interstitial pneumonia with proliferation of the alveolar epithelium; neutrophilic bronchopneumonia occurs as a result of

secondary bacterial infection. There is often widespread lymphoid depletion and necrosis in all reticuloendothelial tissues , although lymphoid hyperplasia may be observed in dogs with chronic distemper. Epithelial cell necrosis may be noted in the dental ameloblast layer, trachea, and bladder mucosa.