WSC 2012-2013, Conference 14

Case 1. Tissue from a pelican.

MICROSCOPIC DESCRIPTION: Liver: Approximately 80% **(1 pt)** of the liver is replaced by multifocal to coalescing areas of coagulative and lytic necrosis. Centrally, within these areas, the architecture is effaced **(1 pt)** by brightly eosinophilic cellular and karyorrhectic debris **(1 pt)** (lytic necrosis) **(1 pt)**. Peripherally, hepatocellular architecture remains **(1 pt)**, however, hepatocytes are shrunken, brightly eosinophilic, and nuclei are faded and or shrunken and lytic (coagulative necrosis) **(1 pt)**. Within areas of coagulative necrosis, there is infiltration of moderate numbers of heterophils **(1 pt)**, admixed cellular debris and small to moderate amounts of fibrin and hemorrhage **(1 pt)**. Lymphatics are moderately dilated (edema) **(1 pt)**. More peripherally, the sinusoids are expanded by often filled with moderate numbers of heterophils, and histiocytes, with lesser numbers of lymphocytes and plasma cells admixed with abundant cellular debris **(1 pt)**. Remaining hepatocytes are often mildly degenerate **(1 pt)**, with numerous discrete vacuoles within their cytoplasm. Scatttered throughout the section, and most prominently in areas of necrosis, there are numerous pleomorphic **(1 pt)** irregularly round trichomonads **(1 pt)** ranging from 5-25 um in diameter **(1 pt)**, with abundant foamy basophilic cytoplasm **(1 pt)**, and one to multiple red nuclei. There are small amounts of myelopoiesis within portal areas.

MORPHOLOGIC DIAGNOSIS: Liver: Hepatitis, necrotizing, multifocal to coalescing, severe, with numerous trichomonads. **(3 pt)**

CAUSE: *Tetratrichomonas gallinarum* **(2 pt)**

O/C: (1 pt)

WSC 2012-2013, Conference 14

Case 2. Tissue from a Muscovy duck.

MICROSCOPIC DESCRIPTION: Liver: Multifocally , scattered throughout the liver are multiple 1-2mm foci of coagulative necrosis **(1 pt)**. Centrally, hepatocytes retain their architecture, however they are mildly shrunken, occasionally ruptured, and nuclei are not visible. At the periphery, hepatocytes contain more abundant and richly eosinophilic cytoplasm with multiple large discrete vacuoles **(1 pt)**. Sinusoids are mildly dilated and contain numerous erythrocytes, often autolytic, and Kupffer cells occasionally contain a yellow-brown granular pigment **(1 pt)**. Around the periphery, rare degenerate hepatocytes and occasional biliary epithelial cells contain a single 2-3um eosinophilic intranuclear inclusion body **(2 pt)**. There are rare fibrin thrombi within hepatic veins. Throughout the section, sinusoids and occasional Kupffer cells contain small clusters of 2-3um bacilli. Sinuses are diffusely and mildly congested.

Esophagus **(1 pt)**: Multifocally, there is erosion and ulceration of the mucosal epithelium. At one edge of the of the section, there is necrosis of the epithelium which extends into the underlying submucosa. Within this area, epithelial cells are shrunken, deeply granular and eosinophilic (necrotic) **(1 pt)**, and admixed with small low to moderate numbers of heterophils **(1 pt)**, abundant cellular debris, and numerous colonies of 2-3um bacilli. Within eroded areas, epithelial cells at the edges are degenerate, with vacuolated cytoplasm and rarely eosinophilic intranuclear and intracytoplasmic viral inclusions **(1 pt)**. There is infiltration of the underlying submucosa by low to moderate numbers of heterophils where they are admixed with edema fluid, hemorrhage, and cellular debris. The submucosal vessels are congested, and occasionally their walls are brightly eosinophilic and granular (necrosis) **(1 pt)** There are occasional fibrin thrombi within vessels **(1 pt)**. There are variably sized pockets of degenerate epithelium throughout the remainder of the mucosal lining. Submucosal glandular epithelium is often necrotic **(1 pt)**, admixed with cellular debris, and rarely intact glandular epithelium contains a single eosinophilic intranuclear inclusion body **(1 pt)**.

MORPHOLOGIC DIAGNOSIS: 1. Liver: Hepatitis, necrotizing, multifocal, moderate, with intranuclear viral inclusion bodies **(2 pt)**.

2. Esophagus: Esophagitis, necrotizing, multifocal, moderate, with intranuclear and intracytoplasmic viral inclusion bodies. **(2 pt)**

CAUSE: Anatid herpesvirus-1 **(1 pt)**

O/C: **(1pt)**

(NOTE: The presence of intracytoplasmic viral inclusions are particular to infections of the GI tract with Anatid herpesvirus 1. Whether these inclusions represent viral proteins, or some form of intracellular migration of viral particles toward the cell membrane has not been worked out.)

WSC 2012-2013, Conference 14

Case 3. Tissue from a swan.

MICROSCOPIC DESCRIPTION: Heart: Within the myocardium, extending to and involving both the endocardium and epicardium, **(1 pt)** are multifocal to coalescing, randomly arranged nematode migration tracts **(1 pt)**. Within these tracts, myofibers exhibit the following changes: size variation, shrinkage, fragmentation, hyalinization with loss of cross striations **(1 pt)** (degeneration), rupture, necrosis **(1 pt)**, and loss. There is rare rowing and/or hypertrophy of satellite nuclei (regeneration) **(1 pt)**. These areas are infiltrated with variable combinations and concentrations of heterophils **(1 pt)**, histiocytes, lymphocytes, and plasma cells, admixed with hemorrhage, small amounts of fibrin, and cellular debris. Within necrotic areas, histiocytes often contain a yellow-brown granular pigment (hemosiderin). Multifocally within the myocardium, there are cross sections of three adult female **(1 pt)** nematodes which measure 300um in diameter **(1 pt)**, with a ridged cuticle **(1 pt)**, polymyarian coelomyarian musculature **(1 pt)**, a pseudocoelom with small amounts of granular proteinaceous content, prominent lateral cords, ovaries and a uterus containing numerous filaria **(1 pt)**. Rarely, sheets of epithelioid macrophages and rare foreign body-type multinucleated macrophages surround extruded microfilariae within the myocardium **(1 pt)**. In other areas of the myocardium, foci of cardiomyocytes display coagulative necrosis, with marked hyalinization of fibers, pyknotic nuclei, and the interstitium is separated by mild edema and rare infiltrating heterophils. Numerous vessels contain fibrinocellular thrombi **(1 pt)**, and the wall of one large thrombosed vein is fragmented with numerous degenerate heterophils and erythrocytes admixed with cellular debris within the wall, and perivascular hemorrhage (vasculitis) **(1 pt)**. There is multifocal mild subendocardial hemorrhage.

MORPHOLOGIC DIAGNOSIS: Heart: Myocarditis, heterophilic and granulomatous, multifocal, moderate with myofiber necrosis, atrophy and loss and adult filarid nematodes. **(3 pt)**

CAUSE: *Sarconema eurycerca* **(2 pt)**

O/C: (1pt)

(NOTE: There are two distinct patterns of necrosis in this heart – the migration tracts caused by the parasite migration are fairly obvious and chronic. This animal was also positive for HPAI, a paramyxovirus which is endotheliotrophic. This may explain the thrombosed vessels and the scattered areas of coagulative necrosis which is an acute change. These days, the presence of myocardial, pancreatic or liver necrosis in waterfowl should immediately raise a question of HPAI….)

WSC 2012-2013, Conference 14

Case 4. Tissue from a harbor seal.

MICROSCOPIC DESCRIPTION: Cerebellum and brainstem: Within the cerebellum, there are multifocal to coalescing areas of predominantly grey matter **(1 pt)** (but also white matter) necrosis **(1 pt)**. Necrotic areas are characterized by an infiltration of large numbers of histiocytes and neutrophils, which are admixed with large numbers of glial cells (gliosis) which often form small aggregates (glial nodules) **(1 pt)**, and cellular debris. There is karyorrhexis of scattered cells within the cerebellar granular cell layer. Affected neuropil is often spongiotic **(1 pt)**, and within the white matter, there are numerous swollen axons **(1 pt)** and infiltrating histiocytes are enlarged with foamy cytoplasm (Gitter cells) **(1 pt)**. Vessels throughout the cerebellum, and to a lesser extent, the underlying brainstem are lined by prominent reactive epithelium **(1 pt)** and surrounded by low to moderate numbers of histiocytes, heterophils, lymphocytes, and plasma cells **(1 pt)**. Throughout the necrotic areas in the cerebellum, and rarely in the brainstem, there are intracellular protozoal schizonts **(1 pt)** measuring up to 30um **(1 pt)** which contain numerous 2-3um irregularly elliptical basophilic zoites **(1 pt)**; rarely merozoites are seen free within the neuropil. Rarely, within schizonts, merozoites may be seen to be budding from a residual body (endopolygeny). The meninges overlying the cerebellar folia are expanded by moderate to large numbers of macrophages, neutrophils, lymphocytes, and plasma cells **(1 pt)**; there are similar cellular aggregates scattered throughout the meninges around the brainstem. The choroid plexus is congested and there are scattered aggregates of low to medium numbers of lymphocytes and plasma cells **(1 pt)**.

MORPHOLOGIC DIAGNOSIS: Cerebellum, brainstem: Encephalitis, necrotizing, multifocal to coalescing, with diffuse lymphohistiocytic and neutrophilic meningitis, choroid plexitis, and numerous apicomplexan schizonts. **(3 pt)**

CAUSE: *Neospora caninum, Sarcocystis neurona, Toxoplasma gondii all OK* **(2 pt)**

O/C: (1pt)

(Note: I have difficulty ascertaining precisely which cell type(s) the schizonts are in, so I have left that out. They may be in neurons, which would be likely of S. neurona, but there are so many places to award points on this description, I don't think that precise identification is necessary….)