

WSC 2019-2020 Conference 19

Case 1. Tissue from calf

MICROSCOPIC DESCRIPTION: Spinal cord: Within both the grey and white matter there are extensive, coalescing, areas of rarefaction and necrosis of the grey matter which assymmetrically extend into the white matter. There is necrosis of the 90% of the grey matter **(1pt)** with a loss of grey/white matter delineation. Between areas of liquefaction, remaining neuropil is markedly expanded by edema and infiltrated by large numbers of neutrophils **(1pt)** and macrophages (which in areas of active necrosis are transformed into Gitter cells) **(1pt)**, with fewer lymphocytes admixed with abundant cellular debris, moderate amounts of fibrin, and multifocal mild hemorrhage. The necrosis extends into the central canal, resulting in loss of 60% of the ependymal, and the central canal is filled with fibrin. **(1pt)** Blood vessels in the gray matter are prominent, congested, and lined by plump endothelium. In the rare less affected areas, remaining neurons are swollen, anucleate, and have lost differential staining (ischemic necrosis). **(1pt)** Within the deeper areas of the white matter (in proximity to the grey matter), there is marked dilation of myelin sheaths, spheroid formation **(1pt)**, necrotic nerve fibers with replacement by Gitter cells, moderate edema, and abundant cellular debris. Virchow-Robins spaces of white matter vessels are expanded by low to moderate numbers of neutrophils, macrophages, and lymphocytes. **(1pt)** The overlying meninges contain scattered small to moderate numbers of macrophages and lymphocytes. Scattered throughout both the grey matter and white matter, there are numerous apicomplexan cysts which contain numerous 2-3um diameter elliptical zoites. **(1pt)**

Heart: Approximately 20% of the myocardium is replaced by areas of myocardial necrosis **(1pt)**, atrophy and fibrosis, which occasionally coalesce. Within these areas, cardiomyocytes exhibit one or more of the following changes: marked variation in cell size, hypereosinophilia, vacuolation, fragmentation, pyknosis, and mineralization **(1pt)**. There is multifocal myocyte atrophy **(1pt)** with cellular diameter approximately equal to that of cellular nuclei, and fibers are separated by small amounts of edema and fibrillar collagen. Some myocytes have large nuclei with prominent nucleoli. Areas of necrosis are infiltrated by low to moderate numbers of neutrophils **(1pt)** with fewer macrophages and rare lymphocytes, and there are occasionally aggregates of lymphocytes **(1pt)** scattered through the affected myocardium. Rarely, areas of necrosis, extend into the epicardium and epicardial fat. Occasionally, at the periphery of areas of necrosis, myofibers contain an apicomplexan cyst with numerous elliptical 2-3um diameter zoites. **(1pt)**

MORPHOLOGIC DIAGNOSIS: 1. Spinal cord, grey and white matter: Myelitis, necrotizing **(1pt)**, multifocal to coalescing, severe with mild multifocal lymphohistiocytic and neutrophilic meningitis, and numerous intracellular and extracellular apicomplexan schizonts. **(1pt)**

2. Heart: Myocarditis, necrotizing, subacute, multifocal to coalescing, marked, with occasional intracellular apicomplexan zoites. **(1pt)**

CAUSE: *Neospora caninum* **(2pt)**

WSC 2019-2020. Conference 19

Case 2. Tissue from a dog.

MICROSCOPIC DESCRIPTION: Cerebellum: Diffusely, cerebellar folia are markedly thinned and **(1pt.)**, the Purkinje cell and underlying granular cell layer **(1pt.)** are markedly hypocellular **(1pt.)** (most prominently at folial tips at the edge of the section.) There is loss of up to 75% or more of Purkinje cells **(1pt.)**. Remaining Purkinje cell soma **(1pt.)** and axons **(1pt.)** are often swollen by a variably vacuolar to diffuse accumulation of a granular pink to tan pigment **(1pt.)** (lipofuscin) **(2 pt.)** which occasionally peripheralizes the nucleus. There are scattered necrotic remnants of Purkinje cells which are abutted/replaced by glial cells with distended pink hyaline cytoplasm (neuronophagia; engulfed lipofuscin). Up to sixty percent of nuclei within the granular cell layer are lost **(1pt.)** and there are numerous glial cells/macrophages with phagocytosed lipofuscin in this region also. The molecular layer contains abundant clear space and occasional dilated axons (spheroids). Dilated axons (spheroids) are present both within the granular cell layer and molecular layer. In the superficial molecular layer, overlying areas of Purkinje cell loss, there is mild increase in astrocytes **(1pt.)** (Bergmann's astrocytes). These changes appear to be increased at the folial tips at one edge of the section. The cerebellar white matter appears normal, however, numerous neurons within the cerebellar nuclei contain abundant lipofuscin as previously described. **(1pt.)**

MORPHOLOGIC DIAGNOSIS: Cerebellum: **(1pt.)** Neuronal degeneration, necrosis, and loss, **(1 pt.)** diffuse, severe, with marked neuronal intracellular granular pigment accumulation **(1 pt.)**, gliosis, and neuronophagia.

NAME THE CONDITION: Neuronal ceroid-lipofuscinosis **(3 pt.)**

NAME AN AFFECTED BREED: English Setter, Staffordshire Terrier, Border Collie, Dachshund **(1pt.)**

O/C: (1pt.)

WSC 2019-2020. Conference 19

Case 3. Tissue from a calf.

MICROSCOPIC DESCRIPTION: Cerebellum: Arising from the cerebellum **(1pt.)**, effacing the meninges **(1pt.)** and infiltrating and compressing **(1pt.)** the adjacent cerebellar folia is an unencapsulated, poorly circumscribed, infiltrative, well demarcated densely cellular neoplasm. **(1pt.)** The neoplasm is composed of palisading neuroectodermal **(1pt.)** epithelium arranged in nests and packets **(1pt.)**, supported by a scant fibrovascular stroma. **(1pt.)** Neoplastic cells also form small radial arrangements central spaces containing fibrillar neuropil (Homer-Wright rosettes) **(1pt.)** or palisade around vessels (pseudorosettes). **(1pt.)** Neoplastic cells are polygonal to spindle, with indistinct cell borders and a scant amount of eosinophilic fibrillar cytoplasm. **(1pt.)** Nuclei are irregularly round to fusiform with coarsely stippled chromatin and 1-3 distinct basophilic nucleoli; **(1pt.)** anisocytosis and anisokaryosis is moderate. **(1pt.)** Mitoses are rare. Scattered throughout the neoplasm are low to moderate numbers of individual apoptotic cells. **(1pt.)** There is compression and multifocal infiltration of the molecular layer of adjacent cerebellar folia. **(1pt.)**

MORPHOLOGIC DIAGNOSIS: Cerebellum: Primitive neuroectodermal tumor (medulloblastoma). **(5pt.)**

O/C - **(1pt.)**

WSC 2019-2020 Conference 19

Case 4. Tissue from a cat.

MICROSCOPIC DESCRIPTION: Spinal cord. (There are three sections of spinal cord; the changes in this description are a combination of those seen in the two more severely affected sections.) The ventral spinal artery is markedly dilated **(1pt.)**, moderately tortuous on cut section, and compresses the ventral funiculi. **(1pt.)** The lumen of the artery contains a large thrombus **(2pt.)** composed of polymerized fibrin **(1pt.)** as well as lamellae of entrapped erythrocytes. **(1pt.)** The endothelium and tunica intima, to include the inner elastic lamina is circumferentially effaced. **(1pt.)** The tunica media is expanded by collagen **(1pt.)** interspersed with a pink homogenous protein **(1pt.)** (hyaline degeneration). The outer elastic lamina is not visible. In one section (but not the scanned section online), there is a mural aneurysm in which the fibrotic inner tunica media extends outward through a defect in the outer tunica media. Diffusely, smooth muscle cells of the outer media are mildly hyperplastic and in disarray **(1pt.)**, and multifocally are pyknotic. **(1pt.)** There is scattered small amounts of cellular debris throughout the outer tunica media. The serosa and outer media contains moderate numbers of siderophages **(1pt.)**, fewer histiocytes and lymphocytes, and is circumferentially surrounded by lamellar collagen **(1pt.)**, which contains moderate numbers of fibroblasts, as well as small amounts of hemorrhage. **(1pt.)** Within the adjacent compressed ventral funiculi, there are moderate numbers of dilated myelin sheaths, which occasionally contain dilated axons (spheroids) **(1pt.)**, and rarely, Gitter cells. **(1pt.)**

MORPHOLOGIC DIAGNOSIS: 1. Ventral spinal artery: Arteriosclerosis **(1pt.)** diffuse, severe with aneurysmal dilatation, thrombosis, recanalization, and mural hyaline degeneration **(1pt.)**, and fibrosis.
2. Spinal cord, ventral funiculi: Axonal degeneration and loss, diffuse, mild to moderate. **(1pt.)**

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