

WSC 2009-2010, Conference 9, Case 1.

Tissue from a nyala.

**MICROSCOPIC DESCRIPTION:** Heart, atrium **(1 pt.)**: Approximately 40% of the atrial myocardium is replaced by areas of fibrous connective tissue **(1 pt.)** which contain discrete fascicles of proliferating **(1 pt.)** thin-walled blood vessels **(1 pt.)** with variable-sized lumina, which measure up to 2mm in diameter. These vessels often contain fibrin thrombi **(2 pt.)**, and vascular walls are expanded by abundant fibrin, edema, and transmigrating neutrophils and cellular debris **(2 pt.)** (vasculitis). These vessel bundles are often surrounded by hemorrhage, fibrin and edema and which extends into the surrounding connective tissue and myocardium **(1 pt.)**. There are moderate numbers of hemosiderin-laden macrophages **(1 pt.)** surrounding the fibrovascular tissue. Abundant fibrous connective tissue and small proliferating individualized vessels, which resembles granulation tissue **(1 pt.)** extends into and replaces **(1 pt.)** the adjacent myocardium. Scattered within these areas are low numbers of lymphocytes, plasma cells, plump fibroblasts, and rare hemorrhage. There is significant myofiber loss **(1 pt.)** in these areas, with remaining myofibers showing marked atrophy **(1 pt.)** and expansion of the perimysium by loosely-arranged collagen **(1 pt.)**. Within the center of the section, in an area of fibrosis, there are several spicules of well-differentiated woven bone with occasionally foci of lamellar bone **(1 pt.)**.

**MORPHOLOGIC DIAGNOSIS:** Atrium: Fibrovascular proliferation, multifocal, severe, with fibrin thrombi, vasculitis, hemorrhage, myocardial fibrosis, and myocyte atrophy and loss. **(3 pt.)**

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

Tissue from an iguana.

**MICROSCOPIC DESCRIPTION:** Kidney: Diffusely outlining the basement membranes of renal tubules(**1 pt.**), glomerular capillary loops(**1 pt.**), and scattered throughout the tunica intima and media of renal arterioles(**1 pt.**), there is abundant darkly basophilic globular material (mineral) (**1 pt.**). Glomeruli are multifocally shrunken, with hypertrophy of parietal epithelium and periglomerular fibrosis. (**1 pt.**) Tubules are multifocally ectatic and tubular epithelium is occasionally necrotic, with sloughed epithelial cells within the tubular lumen. (**1 pt.**) In some tubules, epithelium is diffusely mineralized. Tubular lumina contain variable amounts of sloughed epithelium, rare erythrocytes, eosinophilic to basophilic proteinaceous fluid, and small to moderate amounts of mineral. Rarely, tubules are expanded by clear acicular spaces in turn surrounded by epithelioid macrophages(**1 pt.**) which often efface tubular epithelium (urate tophi) (**1 pt.**). Occasional tophi are mineralized.

**Stomach:** There is multifocal mineralization of basement membranes of gastric glands (**1 pt.**) throughout the full thickness of the mucosa. Multifocally, gastric glands are lined by necrotic, mineralized, and/or attenuate epithelium(**1 pt.**), and there is rare piling up of hyperplastic epithelium in the deeper mucosa. Glands occasionally contain granular mineralized debris within their lumina,. There are scattered areas of glandular loss, stromal collapse, and rare mild hemorrhage. There is multifocal intimal and medial mineralization of arterioles in the submucosa and muscularis(**1 pt.**).

**Heart:** There is multifocal mineralization of cardiomyofibers(**1 pt.**) which coalesce in the epicardial side into a linear band. Necrotic and mineralized fibers are scattered randomly throughout the full thickness of the myocardium. Adjacent to the foci of mineralization, cardiomyocytes are fragmented, hyalinized (degeneration), and occasionally contain pyknotic nuclei (necrosis) (**1 pt.**). There is a mild increase in collagen and plump fibroblasts adjacent to areas of myocardial necrosis and mineralization.

**MORPHOLOGIC DIAGNOSIS:** 1. Kidney: Nephrosclerosis, diffuse, moderate, with mineralization of glomerular and tubular basement membranes, glomerular sclerosis, and tubular degeneration and necrosis. (**1 pt.**)

2. Kidney, tubules and interstitium: Nephritis, granulomatous, multifocal, moderate, with urate crystals (gout). (**1 pt.**)

3. Stomach, mucosa: Mineralization, multifocal to coalescing, moderate with glandular atrophy and loss. (**1 pt.**)

4. Heart, myocardium: Mineralization, multifocal to coalescing, with myofiber degeneration, necrosis and loss, and myocardial fibrosis. (**1 pt.**)

**Pathogenesis:** Lack of UV-B light (a specific requirement for this species) => lack of conversion of Vit D => decreased Ca absorption in gut => hyperparathyroidism => abnormal balance of Ca:P in blod =>mineralization of soft tissues. (**2 pt.**)

O/C – (**1 pt.**)

WSC 2009-2010, Conference 9, Case 3.

Tissue from a bearded dragon.

**MICROSCOPIC DESCRIPTION:** Liver: There is diffuse disorganization of hepatic architecture **(1pt.)**. Multifocally, there are poorly demarcated areas of hepatocellular degeneration **(1pt.)** and necrosis **(1pt.)** in which hepatic cord architecture is lost, hepatocytes are shrunken with pale to occasionally hyalinized granular cytoplasm **(1pt.)**, and pyknotic or karyorrhectic nuclei **(1pt.)**. Within these areas, individual or small clusters of cells contain nuclei which are expanded up to 15um **(1pt.)** by a large, amphophilic to eosinophilic, glassy to granular intranuclear viral inclusions **(2pt.)** which is occasionally surrounded by a clear halo. In areas of hepatocellular necrosis, there is infiltration by low numbers of heterophils and rare histiocytes **(1pt.)**. Within portal areas, there is mild biliary duplication **(1pt.)**. Biliary epithelial cells also contain intranuclear viral inclusions **(1pt.)**; necrotic biliary epithelial cells are seen lining tubules as well as detached and free within the lumen **(1pt.)**. Portal areas often contain moderate numbers of histiocytes and lymphocytes **(1pt.)**.

**MORPHOLOGIC DIAGNOSIS:** Liver: Hepatitis, necrotizing, subacute, multifocal, moderate, with hepatocyte and biliary epithelial intranuclear viral inclusions. **(3pt.)**

Cause: Adenovirus **(3pt.)**

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

WSC 2009-2010, Conference 9, Case 4.

Tissue from a goldfish.

**MICROSCOPIC DESCRIPTION:** Abdominal viscera: Within the liver (**1pt.**), there are multiple, randomly scattered foci of lytic necrosis. Within these foci, hepatocytes are shrunken, with pale, granular cytoplasm and pyknotic to karyorrhectic nuclei (**1pt.**), and are admixed with cellular debris. Surviving cells within necrotic foci and hepatocytes surrounding the foci often contain an amphophilic (**1pt.**), glassy, homogenous intranuclear (**1pt.**) viral inclusion (**2pt.**) which peripheralizes the chromatin (**1pt.**). Scattered throughout the section there are foci of histiocytes containing abundant bright yellow pigment (hemosiderin) (**1pt.**) and diffusely, hepatocytes also contain small amounts of a similar pigment. Similar foci of necrosis are present within the intestinal lamina propria (**1pt.**) and exocrine pancreas (**1pt.**). There is a focally extensive area of lytic necrosis within the spleen (infarct) (**1pt.**). The remaining spleen is infiltrated by large numbers of histiocytes (**1pt.**), some of which exhibit single cell necrosis, and others contain intranuclear viral inclusions as previously described. There is diffuse splenic congestion.

**MORPHOLOGIC DIAGNOSIS:** Pancreas, liver, spleen, intestine: Necrosis, multifocal, moderate, with numerous intranuclear viral inclusions. (**4 pt.**)

Cause: (**2 pt.**) Goldfish herpesvirus

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

