

| Used in course | Title       | Species     | Diagnosis  | Case number | Case details  |
|----------------|-------------|-------------|--|-------------|---|
| a              | PB-CV-51    | Dog         | Boxer Dog. Renal infarct with arterial thrombus            | 04-53698-5  | Same dog as case 40; History: had aortic valve endocarditis, prior history of SAS, chronic history of ventricular arrhythmias (presumably arrhythmogenic cardiomyopathy), recent dx of severe mitral regurgitation and systolic dysfunction. Past few days episodic panting, occasional cough, several collapse episodes and hemorrhagic nasal discharge. Gross: Aortic valvular endocarditis. Bacterial culture of valve: Aeromonas, E. coli, Clostridium. Histo: Aortic semilunar valve and adjacent aorta and myocardium and intramyocardial and extramyocardial arteries (1): The cardiac valve is markedly thickened, has a few mineralized foci and some areas of condroid (=cartilaginous) metaplasia, and is covered by a broad band of fibrin. In other areas, the endothelium covering the thickened valve is intact, and there is no fibrin on the surface. Intralesional bacteria are not found in these sections. Heart, ventricular myocardium (2: free right ventricular wall, 5: free left ventricular wall): There is locally extensive fatty replacement of the myocardium which is more severe in the right ventricle. In both ventricles, there is an increased amount of connective tissue among the cardiac myofibers with associated myofiber loss in scattered areas of the myocardium. A few foci of myocardial fibrosis and a single area of subendocardial fibrosis are also observed in the right ventricle. There is accumulation of lipofuscin in the cytoplasm of the cardiomyocytes. Kidneys (4,5): (5) There is a well-demarcated, wedge-shaped area of fibrosis in the renal cortex with a small amount of mineral (old infarct). The intima of an arcuate artery situated in the apex of this old infarct is thickened and hyalinized and has a narrow lumen (resolved occlusive embolism). Large clusters of mononuclear cells surround this area of fibrosis. (4) There is microvesicular (fatty or glycogenic) degeneration of the epithelial cells of the renal tubules of the pars radiata. Moderate thickening of the Bowman's capsule of the glomeruli is also observed. Histo Diagnoses: Right ventricular arrhythmogenic cardiomyopathy of Boxer dogs; chronic aortic valvular dysplasia with chondroid metaplasia and mineralization (chronic healed endocarditis); chronic renal thrombus with infarction |
| a              | PB-CV-55    | Dog         | Microvascular thrombosis (DIC) and myocardial degeneration | 1661(Ab15)  | Many small blood vessels in the myocardium contain fibrin thrombi, with occasional clusters of neoplastic epithelial cells. A mild infiltrative neutrophils permeates the perivascular stroma, and there is patchy but mild necrosis of myofibres. Necrotic myofibres have pyknosis or loss of the nuclei, and disruption of the cytoplasm. Dx: Microvascular thrombosis (DIC) with multifocal myocardial degeneration and mild acute myocarditis, secondary to metastatic carcinoma  |
| a              | PB-CV-63    | Feline      | Pulmonary arterial medial hypertrophy                      | 02-35887-2  | Throughout the lung the pulmonary arteries are greatly thickened by hypertrophy of the tunica media. This is an incidental finding in cats, of no significance.   |
| a              | PB-CV-74    | Dog scrotum | Scrotal vascular hamartoma.                                | 425-64      | The dermis and subcutaneous tissue is extensively disrupted by tiny anastomosing blood-filled channels, lined by a mildly hypertrophied endothelium that shows no features of atypia. In a few areas, the proliferating cells form sheets and nests. Scattered hemosiderin-laden macrophages are present indicative of prior hemorrhage.  |
| a              | PB-CV-79    | Calf        | Adenoviral systemic vasculitis                             |             | 07-24532-15. 3 week old Limousin calf. Diarrhea started at 15 days of age. Diarrhea has persisted for 5 days. Progressing to CNS involvement beginning as hind limb paresis and now generalized depression and malaise. 5 other calves ranging in age of 5 days to 3 weeks also starting to show diarrhea. Gross: Petechiae on the intestinal serosa, esophageal serosa and focally in the mucosa and urinary bladder. Colonic contents were mucoid and some segments contained blood and fibrin. Abundant melenic mucus was present in the abomasum. Viro: bovine adenovirus isolated from small intestine and from pooled spleen-thymus-thyroid, rotavirus identified in feces by latex agglutination test. FA for adenovirus negative, BVDV PCR negative. Histo: Intestine--Surface epithelium is variably attenuated and/or eroded. Mild multifocal hemorrhages are present throughout the mucosa; small numbers of neutrophils are present beneath areas of erosion. The submucosa and serosa are markedly edematous large and small vessels are lined by reactive endothelium and occasionally contain thrombi, and some contain basophilic intranuclear inclusions. Viral inclusions and vasculitis also present in remainder of GI tract, spleen, lung, heart, kidney, liver, CNS, and urinary bladder.   |
| c              | 14-031384-4 | Calf        | Myocardial blackleg  |             | Sudden death; had a similar case 3 weeks ago. GROSS: sheets of fibrin in pericardial sac and covering epicardium; an area of myocardium was dark red with a butyric odour (which I could not smell). Adjacent pleura had fibrinous exudate. Lungs had generalized edema, interlobular separation by fluid, but of normal texture. HISTO: Heart (3,4) Epicardium is markedly expanded by sheets of degenerating neutrophils, congested blood vessels and dilated lymphatics partially filled with fibrin. A thick sheet of cellular fibrin coats the epicardium. The subjacent myocardium contains numerous degenerating myofibers that are fragmented or contain prominent contraction bands. Clusters of myofibres are separated by edema, scattered degenerating neutrophils and erythrocytes. Several superficial myocardial arterioles are partially occluded by fibrin. Histologic diagnoses: 1) Focal necrotizing and suppurative myocarditis and fibrinous pericarditis – Clostridium chauvoei (blackleg) 2) Localized suppurative and hemorrhagic interstitial pneumonia with focal fibrinous pleuritis. BACT: Clostridium chauvoei identified by FA test on heart and lung; Cl. novyi or Cl. sordelli not seen.  |
| c              | PB-CV-22    | Pig         | Mulberry Heart Disease                                     | 47786. H&E. | Multiple poorly demarcated foci of hemorrhage are scattered throughout the myocardium. Close inspection of these foci reveal that myofibres within these lesions have pyknotic nuclei, whereas myofibres in the areas without hemorrhage have viable vesicular nuclei. Occasional poorly demarcated areas of necrosis lack in the hemorrhage. The Martius scarlet blue stain, which stains fibrin red, highlights infrequent fibrin thrombi within capillaries or small venules, that are the likely cause of the hemorrhage and necrosis. This stain also accentuates red-staining contraction bands within the areas of necrosis. Diagnosis: mulberry heart disease.  |
| c              | PB-CV-28    | Bovine      | Myocardial epithelial inclusion                            | 99-38097-2  | Aborted bovine fetus. Gross: The liver has an irregular capsular surface and there are approximately 0.5 - 1 cm areas of congestion throughout (heart failure). Histo: Heart Throughout the myocardium, there is marked variation in myofiber diameter and focally extensive replacement of muscle fascicles with fibrosis. Scattered myofibers are mineralized. A moderate, focally intense infiltrate of lymphocytes and fewer neutrophils is evident throughout the heart wall. At one edge of the section, there is a transmural region of epithelial ductules separated by fibrous tissue. Diagnoses: Subacute severe myocarditis (BVDV? but not isolated), Epithelial inclusions-myocardium   |

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| c              | PB-CV-31        | Bovine  | Blackleg: myocardial necrosis, fibrinous pericarditis                                     | 05-k0167-3  | Found dead June 4th, was fine June 3rd. Gross: Advanced autolysis, fibrinous adhesions between pericardium and epicardium, several areas of myocardium (esp ventricles near AV junction) had discrete dark red-black areas. FA test on heart positive for Cl. chauvoei, negative for Cl. novyi, septicum, sordelli. Histo: pericardium covered by fibrin (3) and neutrophils; myocardium (4) has multiple discrete areas of acute coagulative necrosis with karyolysis & loss of striations, myofibre swelling, hemorrhage & edema, small numbers of bacilli, and bordered by a mild infiltrate of neutrophils. Dx: blackleg.  |
| c              | PB-CV-34        | Sheep   | Myocardial cysticercosis  | 04-14360-1  | Meat inspection finding in multiple sheep, nodules in muscles, diaphragm, and heart. Numerous granulomas are present and characterized by a necrotizing center and a heavy infiltration with eosinophils, macrophages, lymphocytes, plasma cells, and fewer giant cells. Similar infiltrates are also present in all layers of heart away from the granuloma. In one granuloma, there is a large cestode larvae characterized by the presence of birefringent structures (hooks?) in the wall. Diagnosis: severe granulomatous and eosinophilic myocarditis with intralesional cestode larvae typical of cysticercus spp.  |
| cn             | PB-CV-42        | Pig     | Cardiac rhabdomyoma   | 01-47626    | 6 Months old research pig. Laterally recumbent, reluctance to rise, warm, grunting, tooth grinding. Gross findings: There is an approximately 3 cm spherical mass at the base of the heart, within the wall of the left atrium. Histologically, the mass is non-encapsulated, with multiple nodules composed of interwoven bundles and fascicles of cardiac myocytes separated by fibrous stroma. The mass merges imperceptibly with adjacent normal cardiac muscle. In some areas, the cells have large, clear, perinuclear cytoplasmic vacuoles, and resemble purkinje fibres. Mitotic figures are not present. DIAGNOSIS: Cardiac rhabdomyoma. Cardiac rhabdomyomas are relatively rare, congenital tumors which occur sporadically in pigs, most typically in the ventricular myocardium. These tumors are often incidental findings, although they may be associated with sudden death, possibly due to interference with normal myocardial conduction.   |
| cn             | PB-CV-43        | Bovine  | Myocardial rhabdomyoma  | 210-60      | The tumor forms a well-demarcated mass in the myocardium, which consists of disordered proliferation of neoplastic spindle-shaped cells. These cells have indistinct borders, scant eosinophilic cytoplasm, cigar-shaped nuclei, minimal variation in nuclear size, and no visible mitotic activity. Occasional cells have more abundant cytoplasm with > 1 nucleus.   |
| cn             | PB-CV-44        | Cat     | Cardiac rhabdomyosarcoma  | 02-47561-1  | 10 Year old cat. Chronic cough 3 weeks. Histo: HEART: The myocardium is replaced multifocally by a neoplastic population of large round cells arranged in loose clusters and cords dissecting through myocardial interstitium and often accompanied by moderate numbers of small lymphocytes and granulocytes. The population is extremely pleomorphic, with large and bizarre cells. Individual cells have huge round to oval nuclei with coarsely clumped chromatin; binucleation, multinucleation, and nuclear gigantism are common. Cells have a moderate amount of darkly basophilic cytoplasm with distinct cellular boundaries. From two to five mitotic figures are evident in each 40x field, and these frequently have abnormal configurations. The same tumour has metastasized to kidney and lung. In addition, a thoracic mass is present that is morphologically different, and is a carcinoma. Diagnosis: cardiac rhabdomyosarcoma.   |
| cn             | PB-CV-45        | Dog     | Lymphoma  | 48634       | Lymphosarcoma, medium, cleaved, nodular, in right atrium   |
| cn             | PB-CV-46        | Cow     | Myocardial neurofibroma   | 02-20137-2  | 8 year old cow, in calf, found dead, myocardial neurofibroma=schwannoma. Uncertain if this caused death.   |
| cn             | PB-CV-47        | Dog     | Oral squamous cell carcinoma, metastatic to lung (intravascular), jugular vein, and heart | 49225       | Oral squamous cell carcinoma, metastatic to lung (intravascular), jugular vein, and heart  |
| cn             | PB-CV-48        | Dog     | Hemangiosarcoma, right atrium, spleen.  | 47679       |  |
| cz             | PB-CV-78        | Cat     | Systemic toxoplasmosis (same case as above)   | D06-118-2   |  |
| cz             | PB-Aa24         | Bovine  | Acute myocardial necrosis   | 03-59507-3  | 6 month old calves, acute myocardial necrosis suggestive of toxic or nutritional 2ry cardiomyopathy  |
| cz             | PB-CV-21        | Dog     | Gastric torsion. Acute multifocal myocardial necrosis.                                    | 49253       | Throughout the myocardium, there are multiple discrete foci of coagulation necrosis, and in which the myofibres have eosinophilic cytoplasm with loss of cellular detail, and pyknotic nuclei or absence of the nuclei. There is no inflammatory reaction, nor any apparent hypertrophy of interstitial fibroblasts. Microvascular thrombosis is not observed.   |
| y              | 02-41540-3      | Dog     | Great Dane dilated cardiomyopathy   |             |  |
| y              | 09-069056-7 HE  | Horse   | Endocardial fibroelastosis  |             | 24-yr-old Standardbred. Heart failure with increased lung sounds. Presents increasing progressive lethargy and edema in chest, ventral abdomen and penis sheath. GROSS: The right and left atria and ventricles are enlarged 4-5 times over normal and the heart weighs 10.68 kg (1.82% of the body weight (normal is 0.41 to 0.97%)). The endocardial surface of the left atrium and ventricle is diffusely opaque and subtly folded forming irregular ridges. The left atrio-ventricular valves are thickened and opaque. The anterior leaflet of the left AV valve is particularly affected; the area of this leaflet is increased by 2-3 times over normal, and there is extensive deposition of fibrous tissue on the anterior surface (i.e. the surface facing the aortic valve). The posterior septal valve contains a small nodule at the free border. The chordae tendinae are markedly but irregularly thicker than usual. One chorda of the anterior leaflet has marked thickening of the half nearest the valve, with abrupt transition to a more normal thickness of the half nearest the papillary muscle. One chorda appears ruptured, but this is a very small chorda and we are uncertain if the rupture is antemortem or is a transaction during dissection. Aortic valves are thickened 4-5 times over normal and opaque. An area 2-3 cm below the aortic valves contains a thick transverse band of fibrous connective tissue, but this does not encircle the outflow tract. The luminal surface of the aorta is rough and corrugated. The liver is enlarged and weighs 22 Kg (3.76% of the body weight (Normal is 1.2 to 1.4%)) on the cut surface hepatic parenchyma has mottled pattern of dark zones interspersed with pale zones (nutmeg liver). Bilaterally, lungs are collapsed and the cut surfaces of the caudal lung lobes have patchy pink areas interspersed with dark red areas. The ventral abdomen and the area surrounding the prepuce are markedly edematous.. Necropsy Diagnosis: Left Heart: Valvular (mitral and aortic) and mural endocardiosis with cardiac dilatation, and left and right congestive heart failure. HISTO: Heart: Diffusely, the left atrial and ventricular endocardium is expanded 4-5 times over normal by abnormal deposition of basophilic, fibrillar ground substance (glycosaminoglycan) and excessive amounts of elastic fibres (special stains pending to confirm). The left ventricular myocardium consists of focal areas of myofiber degeneration and fibrosis. |
| y              | 09-069056-7 VVG | Horse   | Endocardial fibroelastosis, VVG   |             | Elastic VVG stain of above.  |

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| y              | 12-030132-8   | Dog          | Valvular endocardiosis (best)                 |               | 12-year-old toy poodle. History: Chronic cough, acute onset dyspnoea tracheal and main stem bronchi collapse, MVD, pulmonary hypertension, pulmonary oedema. Internal findings: The heart is markedly enlarged, globoid with exaggerated sternal and diaphragmatic contact. Total heart weight is 40.15 gram (0.98 % of body weight; reference mean 0.76; range 0.58 - 0.94). Both the left and right ventricular as well as the septal walls are thickened, measuring approximately 10.5, 3.5 and 6 mm respectively with a left to right ventricular ratio of 3:1. The right atrium is approximately twice the size of the left atrium, measuring 42 x 24 mm. Disrupting the free margin and valvular apposition of both right and left atrioventricular valve leaflets, extending deeper into the valve leaflet and down the chordae tendineae, are multiple coalescing, raised, smooth, irregular nodules, ranging from 3 to 7 mm (nodular myxomatous degeneration - endocardiosis). Nodular changes are most marked within the right atrioventricular valve, where they especially affect the septal cusp. The lungs fail to collapse, are diffusely heavy and firm, ooze small amounts of blood tinged fluid when cut, and contain random multifocal irregular 1 to 3 mm pale tan foci that are subtly more firm than the surrounding pulmonary parenchyma. There is dorsoventral flattening of the entire length of the trachea, resulting in an exaggerated elliptical profile with marked lateral stretching of the dorsal tracheal ligament. The trachea measures 15 x 6 mm on cross section with the dorsal tracheal membrane spanning 11 mm of the cross sectional thickness. There is a focal, poorly demarcated, irregular plaque like thickening of the dorsal surface of the tip of the epiglottis. Both lobes of the prostate are diffusely enlarged, approximately two fold and a single, well demarcated, roughly wedge-shaped, green to brown subtly depressed focus, is present within the dorsal aspect of the left lobe and affecting approximately 15 % of the left lobe. Morphological diagnosis: Atrioventricular valves: Bilateral severe nodular myxomatous degeneration (endocardiosis, grade III). Heart: Biventricular concentric hypertrophy with right atrial dilation. Lung: Diffuse pulmonary oedema with multifocal fibrosis. Trachea: Dorsoventral tracheal collapse, global. Larynx, epiglottis: Focal fibrosis. Prostate: Diffuse benign prostatic hyperplasia with focal infarction. HISTO: Heart (slide 7 and 8): The normal architecture of both atrioventricular valves are diffusely but irregularly expanded by pale blue mucinous matrix with increased numbers of slender haphazardly arranged fibroblasts (myxomatous degeneration), forming multiple irregular nodules extending the full thickness and length of the valves. |
| y              | 13-063790-2   | Dog          | Valvular endocardiosis with mild endocarditis |               | 9-yr-old Chihuahua. CLINICAL: Congestive heart failure one week ago treated successfully, but started to be nauseous, vomiting despite medications and anorectic for more than a week. GROSS: The left atria is dilated to 2 times its normal volume. The tricuspid and mitral valve leaflets have marked, multifocal, white tan nodules present at the junction of the valve leaflets and chordae tendinae. There is rupture of a single chordae tendinae on the septal cusp, and the free chord has a tapered end. There is a focal, 3 mm diameter and 3 mm deep, smooth-surfaced defect in the ventricular septum directly below the right cusp of the aortic valve. The valve cusp is immediately adjacent to but not affected by this defect. A thin curtain of membranous tissue is present within this defect. All other tissues are normal. MORPHOLOGIC DIAGNOSIS: Heart: 1. Marked endocardiosis of the mitral and tricuspid valves, with left atrial dilatation and pulmonary congestion. 2. Heart, subaortic: Membranous ventricular septal aneurysm. HISTO: Heart: The stratum spongiosa of the left atrioventricular valve leaflet is markedly thickened by a proliferation of loose fibroblastic eosinophilic myxomatous matrix. There are multifocal aggregates of neutrophils, pyknotic debris, and fibrin surrounding vessels within the epicardial fat, at the junction of left atrium and ventricle. HISTOLOGICAL DIAGNOSIS: Heart: Marked, generalized, myxomatous left and right AV valvular degeneration (MMVD) Heart: Mild, focal, neutrophilic epicarditis.   |
| y              | 14-006986-2   | Dog          | Cardiac vascular amyloidosis                  |               | Part of a hemophilia study, repeated transfusions; amyloidosis  |
| y              | Duke LVFW LS5 | Dog          | Doberman dilated cardiomyopathy               |               | Research study  |
| y              | PB-Ac22       | Bovine fetus | Neospora caninum abortion with myocarditis    | N207/08-13536 | N207/08-13536 Lesions are similar in both fetuses. In all sections of brain (including A3-cerebrum), there are numerous multifocal randomly distributed areas of necrosis containing increased numbers of glial cells and surrounded by mononuclear cells. These occasionally contain tiny basophilic structures, which may be tachyzoites or simply nuclear debris. Numerous mononuclear cells populate the meninges. The heart contains similar patchy but extensive infiltrates of mononuclear cells, affecting both the myocardium and endocardium. Similar inflammatory infiltrates are present in skeletal muscle in association with myofibre necrosis, and in the kidney. The placenta contains a mild leukocyte infiltrate, which is difficult to recognize because of autolysis. Histologic lesions are not present in the sections of thyroid, trachea, esophagus, colon, spleen, thymus, liver (extramedullary hematopoiesis), and skin. MULTIFOCAL LYMPHOCYTIC AND NECROTIZING ENCEPHALITIS, MYOCARDITIS, MYOSITIS, AND PLACENTITIS; TYPICAL OF NEOSPORA INFECTION. The histologic lesions are typical of those seen with Neospora infection. BVD virus infection can cause similar lesions. Immunohistochemistry for both Neospora and BVD virus antigens are available if additional confirmation is needed. Frozen tissues are also available if needed.  |
| y              | PB-CV-1       | Dog          | Normal conduction system.                     | 41891         | One end-AV node (small cells); Middle-subendocardial purkinje cells (bundle branches); Other end - bundle of His  |
| y              | PB-CV-12      | Dog          | Cardiac thrombosis and myocardial infarcts    | 06-38242-4    | Cardiac infarcts, with thrombus in same slide; dog with pancreatitis and DIC  |
| y              | PB-CV-13      | Donkey       | Monensin toxicity- myocardial necrosis        | 99-02195      | Ionophore toxicosis causing myocardial necrosis. fed cattle mineral mix that contained 2000ppm of monensin.   |
| y              | PB-CV-16      | Bovine       | Subacute myocardial necrosis, Sarcocysts      | 23054         | Widespread but patchy areas with loss of myofibres (prior necrosis) with remaining fibroblast-like/satellite cells. A few Sarcocystis cysts are present as an incidental finding.   |
| y              | PB-CV-17      | Bovine       | Subacute myocardial degeneration              | 30741         | Severe lesions as above with extensive mineralization (white muscle disease).   |

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| y              | PB-CV-18 | Dog          | Doxorubicin-induced myocardial necrosis  | 01-27143-10 | 7 year old Labrador Retriever. Multicentric lymphoma 3 years ago. Treated with chemotherapy and half-body irradiation. Relapsed at 8 months; chemotherapy. Relapsed 5 months ago; partial remission since. Proteinuria & renal failure, hepatopathy, bleeding tendency, low platelets, cardiomyopathy. Gross: The lungs were markedly edematous & congested. Mild myocardial pallor and the LV:RV ventricular ratio was 6:1. Total heart weight was 198.61 grams, right ventricle was 32.49 grams, left ventricle and septum weighed 143.45 grams (left ventricular hypertrophy). The liver was moderately enlarged with rounded borders and weighed 2.05 kg. Histo: Heart lesions are most severe and extensive in the left ventricle. Many myofibres are hypertrophic with central myofibrillolysis. Some contain multiple small to very large sarcoplasmic vacuoles (adria cells). Moderate, multifocal generalized interstitial fibrosis is also present. Diagnoses: Myocardial necrosis consistent with doxorubicin toxicity; metastatic lymphosarcoma, membranous glomerulopathy   |
| y              | PB-CV-19 | Dog          | Myocardial fibrosis  | 04-17487-2  | 3 year old Rottweiler. Found dead, "owner suspects poisoning". Histo: extensive replacement of myofibres by fibrous tissue; no significant inflammation. Cause not determined.   |
| y              | PB-CV-25 | Bovine       | H. somni: subacute myocardial infarction with suppurative myocarditis and phlebitis. Sarcocysts. | 42115(Aa10) | The myocardium contains a well-demarcated 4x8 mm irregularly shaped area of coagulation necrosis, with an intense infiltrate of neutrophils in the surrounding tissue. The adjacent myocardial tissue contains myofiber loss and fibrosis, and a blood vessel in the adjacent tissue contains a thrombus but no lesions of vasculitis. Occasional venules in the more normal areas of myocardium contain lesions of vasculitis, with numerous neutrophils obscuring their walls. Scattered myofibres throughout the heart contain sarcocysts (an incidental finding).  |
| y              | PB-CV-27 | Dog          | Parvoviral myocarditis   | 00-k0476    | 4 week old puppies. 3 littermates have died suddenly in last 3 days. This pup is 4 weeks old today. The last remaining female pup has a gallop rhythm and tachycardia. Gross: Lungs are congested and edematous. The heart weights are normal. Histo: severe multifocal myocarditis with interstitial infiltrates of mononuclear cells and occasional neutrophils, and occasional large basophilic intra-nuclear inclusion bodies in myofibers. Dx: parvoviral myocarditis   |
| y              | PB-CV-29 | Feedlot calf | BVDV myocarditis with Purkinje fibre necrosis  | 01-50273-A6 | Calves originated from Manitoba; purchased on Nov 1/01; first treated for illness on Nov 20 - lame, down but eating. Euthanized Dec 6th. No gross lesions noted in heart. Histo, heart: There are multifocal areas of necrosis and infiltration of many lymphocytes. Many arteries have marked perivascular cuffing of lymphocytes. The subendothelial and myocardial bundles of Purkinje fibers contain variable numbers of necrotic Purkinje fibers with infiltration of lymphocytes and are surrounded by accumulation of many lymphocytes forming thick cuffs. Diagnosis: Multifocal lymphoplasmacytic necrotizing myocarditis (with necrosis of Purkinje fibers) - probably BVD; also systemic lymphocytic and necrotizing, and Mycoplasma bovis pneumonia. BVDV isolation was attempted but negative, but BVDV antigen was identified by immunohistochemistry.   |
| y              | PB-CV-30 | Bovine       | Eosinophilic myocarditis   | 0118408-1   | Meat inspection case. Heart - One section has marked eosinophilic inflammation with myofibre loss and focal granulomas; lesions are more lymphoplasmacytic in another section. There is severe, diffuse eosinophilic myocarditis with small foci containing mineralized debris and occasional multi-nucleated giant cells. There is extensive fibrosis with collagen in some areas. Occasional small granulomas and diffuse and focal lymphocytic infiltrates are also evident. Some adjacent normal muscle fibers contain large sarcocysts. Diagnosis: eosinophilic myocarditis. Comment: Cysticercus bovis lesions are usually more focal but cannot definitely be ruled out. Sarcocysts are present, but they are not numerous, and are commonly found in normal heart muscle. In my opinion, eosinophilic myocarditis associated with sarcocystis is the more likely agent in this case.   |
| y              | PB-CV-35 | Cat          | Feline suppurative and lymphocytic endomyocarditis   | D07-03      | YB 177463. 6 month old DSH cat. Surgery 2 days prior to death with good recovery. After cat went home, started breathing heavily & wheezing, fluid recovered from chest tap. Intubated-lots of fluid, died shortly thereafter. Histo: heart--patchy areas with prominent interstitial fibroblasts, mild fibrosis, variation in myofibre size; infiltrate of neutrophils and lymphocytes in endocardial connective tissue extending into the myocardium, with occasional aggregates around myocardial blood vessels. Lung: alveolar edema with increased numbers of plump macrophages, prominent perivascular edema, rare bronchioles contain eosinophils in the lumen and mild aggregates of lymphocytes in adventitia.  |
| y              | PB-CV-38 | Cat          | Hypertrophic cardiomyopathy  | 48586. H&E  | Dyspnea, pulmonary edema, weak pulse, cardiomegaly. Heart was 0.62% of body weight, normal <0.5%. Lesions are present throughout the myocardium, with some sparing of the layers immediately adjacent to the endocardium and the epicardium. There is marked diffuse fibrosis causing wide separation of the myofibres, with plump fibroblasts in the interstitium. The myofibres in some areas are perhaps more plump than normal (myofibre hypertrophy), while they are atrophic in other areas. Infrequent scattered lesions of myofibre disarray are present, in which the arrangement of the myofibres is haphazard rather than parallel, and many branching myofibres are present. The Masson trichrome stain highlights the fibrosis. The lung contains a diffuse increase in the number of foamy alveolar macrophages, and these cells occasionally have a slightly muddy cytoplasm suggestive of early hemosiderin accumulation. The alveolar septa are thickened by increased numbers of mononuclear cells. With the Masson trichrome stain, there is an equivocal increase in the amount of blue-staining matrix in the alveolar septa. Diffuse myocardial hypertrophy and moderate diffuse fibrosis, compatible with hypertrophic cardiomyopathy |
| y              | PB-CV-40 | Dog          | Boxer cardiomyopathy   | 04-53698-2  | Same dog as case 51. Lesions in the right ventricle are present throughout the myocardium but selectively affect the outer half. The lesions are patchy in their distribution but relatively extensive, and consist of interstitial fibrosis, loss of myofibres and replacement by adipocytes, and irregularity in size of myofibres (myofibre atrophy). Myofibre disarray is not evident. The liver contains lesions of right heart failure: periacinar heart congestion, atrophy and bilirubin retention within periacinar hepatocytes, and fibrosis around terminal hepatic venules with increased prominence of the perivenular lymphatic vessels. Diagnosis: arrhythmogenic right ventricular cardiomyopathy of Boxer dogs. Lesions were similar but more mild in the left ventricle (slide #5)   |

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| y              | PB-CV-5  | Dog     | R&L valvular endocardiosis with heart failure, mild hemosiderin in lungs | 05-13524-2 & 3 | The atrioventricular valve is thickened and distorted by irregular deposition of mucinous matrix, which appears as scant eosinophilic collagen separated by fibrillar basophilic mucinous stroma, and a disordered arrangement of fibroblasts. The lung contains lesions of left heart failure. The alveoli contain mild hemorrhage, flocculent debris, and increased numbers of plump and sometimes foamy alveolar macrophages. Hemosiderin is not obvious in these macrophages on H&E, but is detected in scattered macrophages with diffuse distribution using the Prussian blue stain. The alveolar septa are congested, with mild interstitial fibrosis that is indistinct with H&E but highlighted with a Masson trichrome stain.   |
| y              | PB-CV-57 | Dog?    | Heart: coronary arteriosclerosis, with chronic infarcts                  |                | Most of the small arteries within the myocardium have remarkable thickening of the tunica media. There are well-demarcated foci of subacute necrosis in which the necrotic muscle fibers have hypereosinophilic cytoplasm and pyknotic nuclei, and pump fibroblasts are present particularly at the periphery of the lesions. In addition, there are poorly demarcated foci within the myocardium that are completely devoid of myofibers and contain mature collagen (chronic infarcts). Diagnosis: coronary arteriosclerosis, with subacute and chronic infarcts ("multifocal intramural myocardial infarction").   |
| y              | PB-CV-58 | Dog     | Heart: coronary atherosclerosis  |                | There is marked enlargement of most coronary arteries in the perineum and myocardium. The enlargement is the result of both intimal (i.e., inside the internal elastic lamina) proliferation of smooth muscle-like cells, and deposition of foam cells in intimal and medial tunics. The latter cells are macrophage-like round cells with abundant foamy cytoplasm. Cholesterol clefts (needle-like clear spaces) are prominent in some of the more severe lesions. Despite the extent of the lesion, myocardial necrosis is not present.  |
| y              | PB-CV-60 | Dog     | Pulmonary arterial hypertrophy 2ry to PDA                                | 03-15061-3     | Lung. Throughout the lung, the medium-sized arteries are thickened by hypertrophy of the tunica media and probable fibrosis of the adventitia. Neither plexiform lesions nor thrombosis are evident. Secondary to patent ductus arteriosus.   |
| y              | PB-CV-61 | Dog     | Primary pulmonary hypertension with plexiform arteriopathy               | 05-33290-2     | 3 month old Cavalier KCS dog. Acute onset dyspnea, hyperpnea, lethargy, pulmonary hypertension, died. Small and medium-sized pulmonary arteries throughout the lung as hypertrophy of the tunica media. In addition, scattered arteries have fibrinoid material and basophilic nuclear debris in their wall with infiltration of neutrophils. Plexiform arterial lesions are present but are rare. This dog had a patent foramen ovale, which was considered secondary to the primary pulmonary hypertension.   |
| y              | PB-CV-62 | Dog     | Pulmonary hypertension with plexiform arteriopathy due to PDA (+VVG)     | 06-27447       | Pulmonary hypertension with plexiform arteriopathy, due to patent ductus with R-L shunting. Shetland sheepdog. Exercise intolerance, hindend collapse on excitement, lameness, pink mucuous membranes, HR=160 bpm, no murmur, hypoxemia, polycythemia, rads-enlarged pulmonary artery. Collapsed and turned cyanotic during examination, died. Gross: PDA with right ventricular hypertrophy. Histo: Slide 1 & 2 have lung. Pulmonary arteries are greatly expanded by medial hypertrophy, as well as severe vasculitis. Inflamed vessels have vacuolation and nuclear debris within their walls along with infiltration of neutrophils. Endothelial cells are hypertrophied. Fibrinoid material is scant. There is myofibre hypertrophy and prominent disarray (due to hypertrophy from PDA). This probably represents long-standing pulmonary hypertension leading to medial hypertrophy, with acute exacerbation of the pulmonary hypertension resulting in the vascular necrosis and the development of right-to-left shunting through the patent ductus.   |
| y              | PB-CV-64 | Cow     | Uremic damage to vessels: rumenal edema                                  | 04-53783-11    | 04-53783. Hereford cow with renal failure due to chronic pyelonephritis. Rumen. The mucosa is massively thickened by edema, and many blood vessels within the lamina propria contain eosinophilic fibrinoid material in their walls, along with patchy infiltrations of neutrophils and fibroblast proliferation in the vessel walls and in the surrounding connective tissue. Diagnosis: Pyelonephritis with renal and ureteral calculi, peritonitis, rumenal edema due to uremic vascular necrosis.   |
| y              | PB-CV-65 | Feline  | Feline infectious peritonitis -- kidney and liver (+IHC)                 | 05-38926-2     | Young adult Burmese cat. Lethargy for 4 months. The kidney contains multiple foci of necrosis and fibrinous inflammation, surrounded by neutrophils and macrophages, with peripheral infiltrates of lymphocytes and plasma cells. Venules are often present in the center of these foci, and some are surrounded by fibrinoid material. The capsular surface of the liver is covered by fibrin with focal infiltrates of neutrophils and macrophages, and leukocytes and plasma cells separating this exudate from the hepatic parenchyma. The lung is edematous and contains patchy aggregates of neutrophils and macrophages with fewer lymphocytes. Diagnosis: fibrinous and pyogranulomatous nephritis, peritonitis, pneumonia -- feline infectious peritonitis. (see also the positive immunohistochemistry for coronavirus)   |
| y              | PB-CV-67 | Bovine  | Aspergillosis: vasculitis & ischemic necrosis                            | 02-52387-3,4,6 | Aspergillus rumenitis with liver vasculitis & ischemic necrosis, embolic pneumonia  |
| y              | PB-CV-68 | Dog     | Heartworm: arteritis and microfilariae                                   | 00-14759-4     | Heartworm positive teaching dog. Anaesthetized for dentistry...two days ago started coughing excessively, very productive. Gross: the right atrium and ventricle are dilated, resulting in a slightly rounded cardiac silhouette. Four adult heartworms (Dirofilaria immitis) occupy the right ventricle and extend into the pulmonary artery. The endothelial surfaces of the pulmonary trunk and major pulmonary arteries have multiple thin, raised tracts producing a finely corrugated appearance on the inner aspect of these vessels. Two incarcerated worms are present in arteries of the left caudal lung lobe. Lungs have patchy red discoloration unaccompanied by palpable changes. The liver is enlarged and diffusely dark red, but maintains sharp borders. Liver weight is 559 g. Histo: Lung: Several large arteries have massively thickened walls resulting from circumferential proliferation of loose fibrous tissue at the intimal surface. In two affected vessels, a single papillary structure extending from the arterial wall into the lumen is composed of similar mature connective tissue surrounding a central lake of amorphous eosinophilic material. A recanalized thrombus fills one artery. A thick band of eosinophils, plasma cells, and lymphocytes is present in interstitial connective tissue surrounding some affected arteries, and low numbers of eosinophils are present within the arterial wall. Microfilaria are evident in several small blood vessels and extend into alveolar septa. Smooth muscle surrounding the majority of bronchioles is hypertrophic. Pulmonary artery: The intima is segmentally proliferative, forming papillary folds of loose connective tissue with abundant ground substance. The endothelial covering of this layer is similarly hyperplastic. Increased and irregular ground substance deposition expands the medial layer in some areas. Diagnoses: 1. Proliferative pulmonary endarteritis, 2. Microfilaremia, Comment: Intimal fibrosis involving the main pulmonary trunk and its branches reflect damage from migration of adult forms of D. immitis. |

| Used in course | Title      | Species | Diagnosis   | Case number | Case details  |
|----------------|------------|---------|---|-------------|---|
| y              | PB-CV-7    | Horse   | Endocardial fibroelastosis with mineralization & Purkinje fibre vacuolation | 05-21199    | Five sections from the left ventricle and septum have marked endocardial thickening due to fibrosis, endocardial fibrillar degeneration and mineralization, endocardial mucinosis, and infiltration of few foamy macrophages. The subendocardial purkinje fibers are swollen and degenerate. These lesions are typical of EQUINE ENDOCARDIAL FIBROELASTOSIS, a condition of unknown etiology that is relatively recently described but reported before to be the cause of sudden death in horses (3 papers). The cause of sudden death is related to the degeneration of purkinje cells and failure of conductive system. Reference: Buergett CD. 2003. Equine cardiovascular pathology: an overview. Animal health Res Rev 4(2): 109-129. FINAL DIAGNOSIS: EQUINE ENDOCARDIAL FIBROELASTOSIS (WITH PURKINJE FIBER DEGENERATION)  |
| y              | PB-CV-71   | Deer    | Malignant catarrhal fever   | 05-52701-3  | 3 year old Sika deer, found isolated from the group, blind. Lymphocytic interstitial nephritis with lymphocytic vasculitis (3), lymphocytic portal hepatitis (3), with lymphocytic meningoencephalitis (6).   |
| y              | PB-CV-77   | Cat     | Systemic toxoplasmosis  | D06-118-1   | D06-118. YB173807. 8 week old kitten. Diarrhea and anorexia beginning 2 days after vaccination, progressed on the next day to weakness & ataxia, then lateral recumbency & jaundice. Gross: jaundice, excessive pericardial fluid, pulmonary hemorrhages (due to CPR attempts?), liver large and congested. The section of cerebrum contains multifocal lesions of necrosis and inflammation which are randomly scattered within the gray and white matter. In these, there is disruption of the neuropil and infiltration of lymphocytes, microglia, and astrocytes. In addition, many neurons contain numerous 2-micron-diameter basophilic protozoal zoites in their cytoplasm. These are located mainly in proximity to the areas of necrosis, but are occasionally identified in otherwise normal areas of brain. Rare similar lesions are present in the gray and white matter of the cerebellum. In the small intestine, the villi are mildly atrophic and there is fusion of adjacent villi. The villous epithelium contains numerous protozoa which appear as a single or multiple 1x3 micron basophilic structures in the apical cytoplasm, or less commonly as the multiple zoites described above. The lymphocytes are present in the lamina propria but their numbers are not increased. Patchy areas of myofibre necrosis with infiltration of a few lymphocytes are present in the heart, with rarely observed protozoal cysts. Multiple 100-micron-diameter foci of necrosis are present in the pancreas and contain protozoa both as free zoites and forming cysts. In the lung, alveolar septa are diffusely hypercellular due to increased numbers of histiocytic mononuclear cells in the septa and mild proliferation of type 2 pneumocytes. The occasional protozoa are noted in these cells (probably in the pneumocytes). The liver contains multiple poorly demarcated foci of necrosis, with patchy areas of lymphocytic inflammation that predominantly affect the portal tracts, and cholangiolar proliferation. The protozoal cysts are not observed in the liver. The colon contains a mild infiltrate of neutrophils. Histologic lesions are not present in the sections of kidney, urinary bladder, stomach, or spleen. 1. MULTIFOCAL LYMPHOCYTIC AND NECROTIZING ENCEPHALITIS, PANCREATITIS, MYOCARDITIS, INTERSTITIAL PNEUMONIA, AND HEPATITIS WITH PROTOZOAL CYSTS (PROBABLY TOXOPLASMOSIS) 2. PROTOZOA IN INTESTINAL VILLOUS ENTEROCYTES (PROBABLY TOXOPLASMA) These striking lesions are indicative of systemic protozoal infection, and the particularly severe lesions in the brain would explain the neurologic signs. These systemic lesions as well as the presence of protozoa in intestinal enterocytes are typical of toxoplasmosis. |
| y              | PB-CV-8    | Dog     | Heart failure lung. Dog   | 03-263D     | Dog. Heart failure, with pulmonary interstitial fibrosis, alveolar edema, patchy aggregates of hemosiderin-laden macrophages, mild type II pneumocyte hyperplasia. With Perl's iron stain. YB 110830-19284-2003   |
| y              | PB-CV-80   | Cat     | HCM with severe myofibre disarray   | D07-40-2    | D07-40-2. 186890. 18 year old Manx cat. Acute onset dyspnea. Gross: pulmonary edema, heart is 27.6 g, L:R ventricle ratio of 5:1. Histo: LV free wall and septum, but not right ventricle, have many focal areas affecting >25% of the myocardium with amazing myofibre disarray, and moderate interstitial fibrosis; pulmonary edema and histiocytosis, periacinar hepatocellular atrophy, chronic renal tubular necrosis and fibrosis. slide 1 is RV + S, slide 2 is LV.  |
| y              | PB-CV-81   | Dog     | Chagas disease  |             | D07-67-1. Trinidad. Lymphocytic myocarditis with many protozoa. 16-3-7  |
| y              | PB-CV-82   | Cat     | Reactive systemic angioendotheliomatosis                                    |             | 07-104509. 07-24117. 9 year old cat. Acute onset lethargy, weight loss, died. Necropsy: thoracic effusion, congested lungs, mild hepatic lipidosis. Histo: intraluminal proliferations of spindle-shaped endothelial cells within small vessels, in heart, lung & kidney. PCR was negative for Bartonella. See Fuji, 2005. <a href="http://www.vetpathology.org/cgi/content/full/42/5/608">http://www.vetpathology.org/cgi/content/full/42/5/608</a>  |
| y              | PB-CV-9    | Pig     | Endocarditis  |             |   |
| y              | SA AV node |         | SA & AV node  |             |   |