Saturday Night Histopathology Slide Conference

43rd Annual Meeting
American Association of Veterinary Laboratory Diagnosticians
Saturday, October 21, 2000
6:30 – 9:00 PM

Sheraton Birmingham Hotel - Medical Forum Auditorium

6:30 Welcome - Opening Remarks

Co-chairs: Drs. Pamela Parnell & Donal O'Toole

Part I of Presentations – Dr. Pamela Parnell – Moderator

6:35 - Compound Odontoma in a Wild White-tailed Deer - Fitzgerald

6:43 - Canine Oral Papillomatosis in a Wild Coyote – Fitzgerald and others

6:51 - Oscillospira-like Organism in a Guinea Pig – Quist and others

6:59 - Circovirus-like Infection in Pigeons – Sebastian and others

7:07 - Hyalohyphomycosis in a Domestic Cat – Clarke and Mendoza

7:15 - Chlamydiosis in a Psittacine - Shivaprasad

7:23 - Myelocytomatosis in a Chicken - Shivaprasad

7:31 - Reticuloendotheliosis in a Turkey – Shivaprasad

Break until 7:45 p.m.

Part II of Presentations – Dr. Donal O'Toole – Moderator

7:45 - Mycoplasma Pneumonia in a Bison – Layton and others

7:53 - Adrenalitis in a Fennec Fox with Toxoplasmosis – Miller and others

8:01 - Bone Marrow Aplasia in a Dog - Ramos-Vara and others

8:09 - Congenital Osteopetrosis in a Herd of Angus – Frank

8:17 - Mycotic Gastritis in a Cat – Watson and Yamini

8:25 - Disseminated Armillifer Infection in a Basenji Dog – Kiupel and others

8:33 - Yersiniosis in a Deer - Hooper

8:41 - Hypernatremic Cerebrocortical Necrosis - O'Toole and others

Closing remarks - Dr. O'Toole

6:35 - Compound Odontoma in a White-tailed Deer: slide 2069566

S. D. Fitzgerald

Animal Health Diagnostic Laboratory and Department of Veterinary Pathology, College of Veterinary Medicine, Michigan State University, East Lansing, Michigan 48824, USA.

A one and one-half year old male white-tailed deer (Odocoileus virginianus) was submitted to the Animal Health Diagnostic Laboratory because of a 6 x 4 x 4 cm mass involving the anterior aspect of the lower jaw. The mass was firm and covered with approximately a dozen incisor teeth, which were irregularly arranged and misdirected. The mass was ulcerated on its gingival surface, and involved the underlying connective tissue and mandibular bone. On cut section, the mass contained dozens of hard white tooth-like structures, many of which were deeply embedded within the mass.

Odontoma is the most differentiated of the dental tumors and contains all of the tooth components, including dentin, enamel, and dental pulp. The oral mass in this case had features of a compound odontoma. Odontomas are rarely reported in domestic animals, having been described in horses, cattle, sheep, and dogs. No previous reports of dental tumors in deer or cervids were found.

References:

1. Dubielzig, R. R. 1995. Diseases of the teeth In: Carlton, W. W., and M.D. McGavin (eds.). Thomson's Special Veterinary Pathology, 2nd ed. Mosby-Year Book, Inc., St. Louis, Missouri, pp. 11-18.
2. Head, K. W. 1990. Tumors of the alimentary tract In: Moulton, J. E. (ed.). Tumors in Domestic Animals, 3rd ed. Univ. of California Press, Berkeley, California, pp. 364-370.

6:43 - Canine Oral Papillomatosis in a Wild Coyote; slide 2228486-II

S. D. Fitzgerald,[1] D. Taylor,[1] J. A. Ramos,[2] T. M. Cooley[3]

[1] Animal Health Diagnostic Laboratory and Department of Veterinary Pathology, College of Veterinary Medicine, Michigan State University, East Lansing, Michigan 48824, USA.
[2] Veterinary Medical Diagnostic Laboratory, University of Missouri, Columbia, MO 65205, USA
[3] Wildlife Disease Laboratory, Rose Lake Wildlife Research Station, Michigan Dept. of Natural Resources, East Lansing, Michigan 48823, USA

An adult male coyote (Canis latrans) trapped in the wild was submitted as part of the Michigan carnivore tuberculosis surveillance project. In spite of advanced post-mortem change, prominent pale warty growths covered the lips, gingiva, tongue, palate, and pharyngeal regions. The only other gross lesion was the presence of multiple adult heartworms in the right ventricle.

Microscopically, these growths consisted of papillomatous projections of hyperplastic stratified squamous epithelium, with scant amounts of fibrovascular stroma. Cells within the stratum spinosum had large pale basophilic intranuclear inclusions, consistent with papillomavirus inclusions. The presence of papillomavirus was confirmed by electron microscopy, and papillomavirus antigen was detected in many squamous epithelial cell nuclei by immunohistochemistry. Examination of over 150 wild coyotes as part of the tuberculosis surveillance program suggests that oral papillomatosis is an uncommon finding in adult coyotes in Michigan. Previous reports of canine oral papillomavirus have been confined to Canada, and also represent a low incidence rate.

References:

1. Greig, AS, and KM Charlton. 1973. Electron microscopy of the virus of oral papillomatosis in the coyote. J. Wildl. Dis. 9:359.
2. Samuel, WM, Chalmers, GA, and JR Gunson. 1978. Oral papillomatosis in coyotes (Canis latrans) and wolves (Canis lupus) of Alberta. J. Wildl. Dis. 14:165-169.
3. Timoney, JF, Gillespie, JH, Scott, FW, and JE Barlough. 1988. The papovaviradae In: Hagan and Bruner's Microbiology and Infectious Diseases of Domestic Animals, 8th ed. Comstock Publishing Associates, Ithaca, New York, pp. 527-529.

6:51 - Oscillospira-like Organism in a Guinea Pig; Slide A1-o410-8

C. Quist, S. Sanchez, S. Chitwood

Athens Diagnostic Laboratory, University of Georgia, Athens, GA 30602

A drug company submitted an adult guinea pig for necropsy. The history indicated the animal had developed diarrhea and died during a vaccine trial using an unnamed virus. Grossly, the animal was in good body condition. The perineal region was stained with dried fecal material. The gastrointestinal tract was distended by gas, and no formed feces were present in the distal colon or rectum. Histologically, the lamina propria of the distal small intestine and colon had a mild to moderate inflammatory infiltrate of lymphocytes, plasma cells, and eosinophils with rare neutrophils. Numerous elongate, slightly curved microorganisms approximately 2-4 um wide and 5 to 20 um in length were associated with the mucosa, particularly between villi. Affected villi were blunted. Organisms were PAS-positive and gram-negative. The morphologic diagnosis was moderate subacute diffuse purulent ileocolitis with villous atrophy and intralesional filamentous bacteria

Culture of the intestines yielded no Salmonella, Yersinia, Camplylobacter or anaerobic bacteria. A heavy growth of Candida albicans was obtained on a second culture attempt.

None of the traditional pathogens associated with diarrhea and enteritis in guinea pigs were isolated from this guinea pig, even using specialized media. The elongate bacterial organisms found within the distal small intestine and colon may be responsible for the clinical signs, but these organisms fail to grow using routine methods. It may be that they are strict anaerobes that died upon contact with air. Attempts to identify these organisms using molecular techniques are in progress. An early paper refers to a morphologically similar organism, Oscillospira, that is a commensal in the intestine and colon of guinea pigs. However, no recent references to this commensal have been found.

6:59 - Circovirus-like Infection in Pigeons; slide 98-55811-G7

M. M. Sebastian, R.C. Giles, K.B. Poonacha

University of Kentucky, Livestock Disease Diagnostic Center, Lexington, KY 40511

Pigeons from a squab had a history of ruffled feathers and were too weak to fly. Gross examination at necropsy revealed hemorrhages around head and neck and hemorrhages inside the rib cage of one bird. Contents of the intestine and colon were brownish green discolored and scanty. Crops were devoid of ingesta. Microscopically brain had mononuclear cell infiltration in the perivascular space around blood vessels, lymphoplasmacytic infiltration of meninges, and periventricular region with lymphocytic infiltration in adjacent neuropil. The lung lesions consisted of bronchiolar epithelial necrosis with occasional syncytial giant cell, heterophil infiltration of airways and interstitial lymphoplasmacytic infiltration. Trachea had necrosis of mucosal epithelium with heterophil deposits and lymphoplasmacytic infiltration in the submucosa. Liver and kidney had mononuclear cell and heterophil infiltration. Small intestine had heterophil and mononuclear cell infiltration. Mesentery and pancreas had severe lymphoplasmacytic infiltration along with multinucleated foreign body giant cells. Ultrathin section of spleen examined under transmission electron microscope contained cytoplasmic inclusions in mononuclear cells arranged in dense nonmembrane bound paracrystalline arrays. The morphology suggests that these are viruses of Circoviridae family.

7:07 - Hyalohyphomycosis in a Domestic Shorthair Cat; slide 221236

K-A. Clarke,[1] A. Mendoza,[2]

[1] Animal Health Diagnostic Laboratory, College of Veterinary Medicine
[2] Medical Technology Program, Department of Microbiology, Michigan State University, East Lansing, MI, 48824.

A recurrent subcutaneous mass of the right tarsus in a 15-year-old domestic shorthair cat was diagnosed as granulomatous dermatitis with intralesional Acremonium spp. hyphae and chlamydospores. Hyphae were 4-6 microns, septate, nonbranching and were either intracellular or lying free in dermal stroma. Chlamydospores were spherical and ranged from 5 to 20 microns in diameter. Apart from the recurrent mycotic dermatitis the cat is reportedly otherwise healthy.

Hyalohyphomycosis refers to opportunistic infections caused by nondematiaceous fungi, which form hyaline or light-colored hyphal elements in tissue. Apart from Acremonium spp., other organisms in this group include Aspergillus, Penicillum, Paecilomyces, Chrysosporium, Pseudallescheria, and Geotrichum.

Hyalohyphomycosis has been previously reported in an Aldabra tortoise and a loggerhead sea turtle. Systemic mycosis in a dog caused by Acremonium spp. has also been reported. Hyalohyphomycosis in a domestic cat has not been previously reported.

7:15 - Chlamydiosis in a Psittacine and a rhea; slide F00-2114

H. L. Shivaprasad

CAHFS – Fresno Branch, University of California, Davis

The psittacine (F0002114) was a 6-week-old hand-fed Senegal parrot which died suddenly. Necropsy revealed very enlarged spleen. The rhea (F94-2254) was a 3-year-old female which developed respiratory signs and died. Necropsy revealed severely enlarged spleen, mild to moderately enlarged liver and petechiae on the heart. Histopathology of the spleen revealed necrosis of lymphocytes with accumulation of fibrin and infiltration of heterophils and macrophages. Scattered within the cytoplasm of macrophages were numerous small basophilic staining organisms consistent with Chlamydia sp. In addition, both birds also had hepatitis pneumonia, epicarditis, and airsacculitis. Both the spleens were positive for chlamydia by special stains and immunohistochemistry.

7:23 - Myelocytomatosis in broiler-breeder hens; slide f98-3115-3

H. L. Shivaprasad

CAHFS – Fresno Branch, University of California, Davis

Several 28-week-old broiler-breeder hens were submitted for necropsy with a history of increased mortality. Necropsy revealed severely enlarged and mottled red and white livers, spleens, and kidneys. Histopathology revealed infiltration of a large number of immature granulocytes infiltrating the liver and other organs. Myelocytomatosis is an emerging disease in broiler chickens caused by subgroup J virus of leukosis/sarcoma group of retroviruses. Subgroup J virus has also been known to cause lymphoma, hemangiosarcoma, histiocytoma, myxoma, fibrosarcoma, ganglioneuroma, renal tumors, etc.

7:31 - Reticuloendotheliosis in turkeys; slide f00-397-a9

H. L. Shivaprasad

CAHFS – Fresno Branch, University of California, Davis

Several 19-week-old turkeys were submitted for laboratory evaluation with a history of severe increase in mortality. Necropsy revealed severely enlarged and pale spleen, liver, and kidneys. In some birds, there were multiple white nodules in the liver. Histopathology revealed neoplastic infiltration of lymphocytes most prominent in the liver. Serology of live birds revealed that the birds were positive for reticuloendotheliosis virus (REV) and reticuloendotheliosis virus was isolated from the liver and spleen. REV is a retrovirus which is distinct from the leukosis/sarcoma group of avian retroviruses. Natural hosts for REV include turkeys, chickens, ducks, geese, pheasants, and Japanese quail.

BREAK

7:45 - Mycoplasma bovis Pleuropneumonia and lymphadenitis in bison; slides 9-605-00 and 9-480-00

A.W. Layton, D. Hunter, C.A. Speer, R. D.Walker, L. D. Spencer, M. Brown, K. West

Montana State Veterinary Diagnostic Laboratory, Bozeman, MT 59771

A respiratory disease affected a private herd of bison in southwest Montana in the late fall and early winter of 1999. The ages of the herd of 600 animals range from 8 months to three years and all animals originated from a closed Montana parent herd. All groups except calves were affected, with two years old having the greatest incidence. Clinical signs included dyspneic posture (tachypnea with extended neck and protruding tongue), stridor, coughing and "smacking of lips". Clinical signs occurred after early fall vaccination against BVD, PI3, IBR and BRSV with modified-live vaccine and clostridial diseases with seven-way toxoid. The environment was extremely dry and dusty at the time of vaccination. The region is selenium deficient. The number of clinical cases abated when animals were feed tetracycline and tylosin medicated pelleted feed but additional deaths occurred after discontinuation of medicated feed. A total of 24 bison died or were killed during the outbreak.

Common gross necropsy findings of multiple animals were: variable amounts of serosanguinous pleural and pericardial effusion; pulmonary and epicardial surfaces covered by tan/yellow, tightly adherent fibrinous material; fibrous adhesions of lung surfaces to thoracic wall and diaphragm; cranioventral lung lobes were heavy and wet with redden surfaces, pronounced lobular pattern, hepatization and severe edema in interlobular connective tissue; regions of encapsulated green/gray caseous necrosis in both lungs and head and thoracic lymph nodes; lymph nodes were markedly enlarged with effacement of parenchyma by above described necrosis and tan discrete foci.

Histologically, pleural and interlobular connective tissue was severely widened by fibrin exudation, and edema. At the lobular interface there were bands of a hypereosinophilic material with adjacent neutrophilic and histiocytic inflammatory infiltrate. Multifocally, coagulative necrosis involved many pulmonary lobules. Other lobules had multifocal to coalescing necrosis surrounded by neutrophils, macrophages and epithelioid macrophages. The necrosis surrounded some large bronchioles sparing the epithelial surface while obliterating smaller bronchioles. Alveolar spaces were filled with fibrin, neutrophils and macrophage. Lymph node architecture was replaced by similar necrotizing process as in the lung but mineralization occurred in necrotic cores. B&B, PAS, Ziehl-Nielsen acid-fast, Steiner's and Warthin-Starry silver and Giemsa stains were unrewarding. Mycoplasma immunohistochemical stains revealed positive staining in the necrotic cores of lung and lymph nodes.

Large numbers of colonies of Mycoplasma bovis were isolated from the lung and lymph node of multiple animals. Small numbers of colonies of Pasteurella haemolytica, Haemophilus somnus, and Actinomyces pyogenes were inconsistently isolated from the lungs of several animals. Bovine herpesvirus 4 was isolated from the lung of one animal.

7:53 - Adrenalitis in a Fennec Fox with Toxoplasmosis; slide 1801100-9

M. A. Miller, J. A. Ramos-Vara, D. E. Preziosi

Veterinary Medical Diagnostic Laboratory (MAM, JAR) and Veterinary Teaching Hospital (DAP), University of Missouri – Columbia, MO.

A privately owned, 4-month-old male Fennec fox, with a 3-week history of inappetence, decreased activity, and more recent onset of soft stools, was euthanatized. The fox had been purchased 6 weeks before its death and was housed with one other juvenile fennec fox in a pen under a barn on sand-covered concrete. The diet included commercial dog food, commercial cat food, fruits, and vegetables, but no raw meat.

At necropsy, the carcass was lean (860 g) with diminished muscle mass and shrunken thymus. The heart (6.6 g), especially in the left ventricular myocardium, had numerous white streaks up to 2 mm in length. The left ventricle was dilated and thin-walled. The lungs and liver were congested. The stomach and small intestines contained scanty mucoid content. Soft yellow-brown feces were in the colon.

Histologically, the most severe lesions were in the myocardium. Multifocal to coalescing lymphoplasmacytic inflammation was variably accompanied by necrosis, mineralization, and infiltration by neutrophils and eosinophils. Intra- and extracellular tachyzoites were observed in inflammatory foci. Tissue cysts, in occasional cardiocytes, were usually unassociated with necrosis or inflammation. Skeletal muscle and gastrointestinal smooth muscle had lesions similar to those in cardiac muscle.

Multifocal to coalescing lymphoplasmacytic inflammation was also prominent in the cortex and medulla of both adrenal glands. Inflammation was sometimes accompanied by necrosis and infiltration by neutrophils and eosinophils. Protozoal cysts were observed occasionally. Tachyzoites were common but difficult to discern among the leukocytes and cellular debris.

Inflammation in the brain and eyes (uvea) was mild. Pulmonary congestion and centrilobular hepatic congestion and necrosis were attributable to heart failure. Lymphoid tissue was atrophied.

Pathogenic bacteria were not isolated. Fluorescent antibody (FA) and ELISA tests for canine parvovirus were negative. The FA test for canine distemper virus was positive; however, immunohistochemistry for canine distemper virus and virus isolation were negative and specific lesions of canine distemper were not observed. The protozoa reacted strongly with antibody to Toxoplasma gondii by immunohistochemistry and only faintly with antibody to Neospora caninum.

This fox presumably contracted toxoplasmosis from cat feces, because cats had had access to their enclosure and to the sand used to cover the concrete flooring. Toxoplasmosis has been reported in a variety of foxes with and without clinical disease. Necrotizing adrenalitis could contribute to dilated cardiomyopathy through catecholamine release or glucocorticoid deficiency, but cardiac disease in this case can be explained by direct damage by T. gondii.

8:01 - Bone marrow aplasia (aplastic anemia) and Serratia marcescens septicemia in a dog; slide “ramos 1” or “ramos 2”

J. A. Ramos-Vara, J. Donald, M. Kerl, W. H. Fales

Veterinary Medical Diagnostic Laboratory (JAR, JD, WHF) and Veterinary Medicine and Surgery (MK). College of Veterinary Medicine. University of Missouri, Columbia, Missouri.

A 33.5 kg, 6-month-old, male Saint Bernard dog developed profuse bleeding and collapsed after it bit its tongue. On July 17 this dog was referred to the Veterinary Teaching Hospital. On presentation it had 103.2 F temperature that went up to 104.6 after fresh whole blood transfusion. The following significant clinicopathologic results (normal range in parentheses) were obtained: leukocytes = 0.0 x 103/µl (6-17); erythrocytes = 0.07 x 106µl (5.50-8.50); hemoglobin = 1.7 g/dl (12-18); hematocrit = 7% (37-55); platelets = 0.0 x 103µl; glucose 20 mg/dl (78-128); albumin = 2.3 g/dl (2.90-4.10); total protein = 5.3 g/dl (5.50-7.20); prothrombin time = 7.1 seconds (4.90-7.90); partial thromboplastin time = 17.7 seconds (11.30-20.00). Erythrocyte morphology was normal; no leukocytes were seen in the 3 smears examined. The direct Coombs test was negative. The dog died one day later. Necropsy was done within 3 hours after death.

On gross examination all mucous membranes were pale and subcutaneous tissue had numerous petechiae. About 50 ml of frank blood was in the thoracic cavity. Thoracic and abdominal serosa had disseminated petechiae. In the lungs, there were also extensive areas of hemorrhage, especially in caudal lobes, and the pleura had multifocal fibrin plaques. The cranial mediastinum had a hemorrhagic mass. The brain had extensive leptomeningeal hemorrhages. Femoral bone marrow was fatty. Aerobic cultures yielded a heavy growth of Serratia marcescens from lung, liver, and spleen. E. coli was also isolated from the spleen. There was no significant anaerobic growth from lung.

Microscopically, hemorrhages were seen in numerous organs, many times (especially the lung) associated with myriads of cocci/coccobacilli. The heaviest colonization was in the visceral pleura. Leukocytes were not evident. The architecture of lymph nodes and Peyer's patches was maintained and plasma cells were present but these organs were severely depleted of lymphoid cells. The mediastinal mass consisted of markedly atrophied thymus and extensive hemorrhage. Bone marrow from the femoral metaphysis and rib consisted of stromal cells including osteoclasts and numerous adipocytes but did not have identifiable hemopoietic cells.

A clinical diagnosis of bone marrow aplasia was confirmed by histopathologic examination. Bone marrow aplasia (aplastic anemia) is defined as pancytopenia with decreased production of all three cell lines in the marrow and replacement with fat. Causes of canine bone marrow aplasia include immune-mediated disease; immunosuppression (retroviral infection); chemotherapy (carboplatin, cyclosporin); radiotherapy; hyperestrogenism (iatrogenic, testicular -Sertoli cell, Leydig cell- neoplasms); use of trimethoprim-sulfadiazine and fenbendazole or albendazole; and multiple myeloma. However, a cause in most cases is not found. In this particular case, the cause was not determined although there was no history of drug or toxin exposure. This animal most likely succumbed to septicemia from Serratia marcescens infection associated with immunosuppression and hemorrhagic diathesis. Previously considered a saprophyte in dogs, Serratia marcescens septicemia has been occasionally reported in this species, and is usually associated with debilitating diseases and/or surgical procedures.

8:09 - Congenital Osteopetrosis in a Herd of Angus Cattle; slide 00-12843

R. K. Frank

Dept. of Veterinary Diagnostic Medicine, College of Veterinary Medicine, University of MN, St. Paul, MN

Four stillborn calves were submitted to the Minnesota Veterinary Diagnostic Laboratory for diagnostic workup. The calves were from a herd of 67 cows and 10 heifers bred to two different bulls. Cows were being fed oat hay, alfalfa hay, Sudan hay, sweet corn silage, 30% protein cattle lick, a trace mineral mix fortified with vitamins A, D and E and a salt lick. The breeding herd was vaccinated against infectious bovine rhinotracheitis (IBR), cytopathic and non-cytopathic bovine virus diarrhea (BVD), parainfluenza-3 (PI3), and bovine respiratory syncytial viruses and against 5 serovars of Leptospira interrogans the previous fall. Nine of 18 calves (seven from heifers and two from cows) sired by one of the bulls were stillborn and had multiple skeletal anomalies. This bull had not been used previously.

At necropsy, all four fetuses were small and had similar postmortem findings including brachyngathia inferior, domed forehead, patent fontanelle, impacted lower molar teeth, fragile long bones with minimal or absent marrow cavity, and cerebellar coning at the foramen magnum. Mandibles fractured easily. Frontal bones of the skull were thickened. Cervical vertebrae were shorter than expected. One of the calves also had soft, short, thickened scapulas with numerous blood-filled cavities varying in diameter from 0.5-2.0 cm.

Microscopically, the mid-shaft of the femur (submitted slide) had a marrow cavity filled with chondro-osseous tissue with no laminar cortical layers (no unequivocal cortical bone was seen in this section). The chondro-osseous tissue was characterized by coarse-woven osteoid deposited on mineralized cartilaginous spicules. Much of the osteoid was basophilic (mineralized osteoid) with cementing lines in many areas. Numerous areas of potential marrow cavities were replaced by a network of fine connective tissue. Osteoclasts were not seen.

No bacterial pathogens were isolated from lung, liver or stomach contents from any of the fetuses. No BVD virus, Akabane disease virus, bluetongue virus or IBR virus was isolated from pooled fetal tissues. A tissue pool (lung, thymus, spleen and kidney) from three of the four calves was positive for BVD virus by nested polymerase chain reaction (PCR) test, but a pool from the fourth calf was negative. Immunohistochemical staining of sections of bone, lung, kidney and liver from two of the calves was negative for BVD virus.

The final diagnosis was congenital osteopetrosis. Osteopetrosis is an inherited defect and has been reported in Angus, Hereford, Simmental, and Dutch Friesian calves. The defect is inherited as an autosomal recessive resulting in premature stillbirth, 10 days to one month prior to term. Typical postmortem findings include stillborn and undersized calves with shortening of the mandible, protrusion of the tongue, impaction of the lower molars, patent fontanelle, and the characteristic lesion of shortness of the long bones and absence of a marrow cavity. The absence of a marrow cavity is the result of defective remodeling of bone. Identification of BVD virus by nested PCR test from a tissue pool from 3 calves was considered to be an incidental finding because of the uniformity in defect pattern, failure to identify cerebellar hypoplasia or cataracts, and failure to isolate BVD virus or identify it by immunohistochemistry.

8:17 - Mycotic Gastritis and Enteritis in a Cat; SLIDES 2181180-8A or 8b.

G. L. Watson, B. Yamini

Animal Health Diagnostic Laboratory, College of Veterinary Medicine, Michigan State University, East Lansing, MI 48824

This 2 ½ year-old cat had a 2-year history of chronic gastric problems, and in the last 2 weeks became lethargic and anorexic. A mass approximately 4 cm in size was palpable in the anterior abdomen. The mass necessitated referral to the VTH. An exploratory revealed a mass adjacent to the pylorus, pancreas, and common bile duct with enlarged hepatic and mesenteric lymph nodes. Multiple biopsy samples were acquired and a gastrojejunostomy was performed. Post surgically the cat continued to deteriorate and succumbed. The animal was submitted for a necropsy to the AHDL.

Biopsy findings: The pylorus had an irregular mural scirrhous mass with clusters of macrophages, lymphocytes, plasma cells and eosinophils dissected by collagenous stroma. Fungal hyphae which were focally dematiaceous and with apparent dimorphism, septate and nonseptate, were within macrophages and occasional giant cells. In other sections the stroma had been replaced by mats of similar hyphae. The lymph nodes had medullary and sinusoidal fibrosis. Diagnoses of a granulomatous and scirrhous mural gastritis with intralesional fungi and a chronic lymphadenitis were given.

Necropsy findings: The cat weighed 9 #, and was in a fair to poor state of nutrition. The abdominal and thoracic cavities contained serosanguinous fluid. There was a 5 X 3 X 3 cm nodular, firm mass in the duodenal wall into which the common bile duct emptied. The jejunum was adhered to the pylorus. The entire small intestinal wall was thickened. Tissues were not obtained for culture since the process was felt to be most likely neoplastic.

Histopathology: The duodenum had diffuse ulceration with fibrosis and mixed inflammation dissecting the muscularis with the surface composed of neutrophils, necrotic debris and myriads of fungal hyphae, septate and nonseptate. In some regions the stroma had been replaced by mats of fungi. There were foci of vascular fibrin thrombosis. Multifocal mixed lymphocytic inflammation was within multiple tissues. The cat also had a hypertrophic cardiomyopathy.

Conclusions (Dr. Yamini): Duodenitis, ulcerative and scirrhous, chronic, pyogranulomatous to nonsuppurative, transmural, diffuse, severe with intralesional fungal organisms; cardiomyopathy, hypertrophic; hepatitis, chronic, diffuse, mild to moderate.

Discussion: A PubMed search failed to find any reports of mycotic gastritis or enteritis in the cat. A pathologist should always consider the possibility that what appears to be obviously neoplastic might be infectious instead. There were no references.

8:25 - Disseminated Armillifer Infection in a Basenji Dog; SLIDE C1265099

M. Kiupel[1, 2], K. R. Kazacos[2], E. J. Kapke[3], W. R. Widmer[3], C. E. Fishman[1, 2]

1 Animal Disease Diagnostic Laboratory and 2 Department of Veterinary Pathobiology, Purdue University, West Lafayette, IN 47907, 3 Greenwood Animal Clinic, Greenwood, IN 46142.

A 2.75-year-old male Basenji crossbred dog was presented to a veterinary practice in northwestern Indiana for a routine neuter operation. The owner, a missionary, had acquired the dog as a 2-month-old puppy in Cameroon, in west-central Africa. Upon incising the scrotum, a large number of worms fell out. Other parasites could be palpated in the subcutaneous tissues of the posterior abdomen near the surgical site. The worms were thick, white, approx. 1 cm long by 0.5 cm, highly annulated, and had a sclerotized mouth opening flanked by two pairs of large hooks. Abdominal radiographs and ultrasound revealed an irregular, nodular liver, nodules in the mesentery, and numerous hyperechoic densities in the liver, spleen, mesentery, and body wall. Because of potential risks, the dog was not treated. Two years later, the dog became acutely ill and was presented with marked ascites, high fever, and multiple organ failure. He was unresponsive to treatment, and was euthanized.

Necropsy revealed massive parasite infestation, with thousands of parasitic cysts in liver, mesentery, and intestinal serosa, with others in the kidneys, spleen, diaphragm, abdominal wall, lungs, pericardium, and meninges of the brain. These cysts were disc-like and about 0.5 cm in diameter with a semitransparent wall through which C-shaped highly annulated parasites were visible. The peritoneal cavity contained a solid mass of granulomatous tissue and parasites, which encased and strangulated the intestines, resulting in perforation and abscess formation.

The submitted slide contains a section of liver with multifocal cross sections of cysts containing nymphal parasites randomly distributed throughout the parenchyma. The inner lining of these cysts is a smooth homogeneous membrane of acellular appearance and adherent to this is a slightly compressed zone of host tissue that has mild inflammatory reaction. Tissue damage may be seen at the inner curvature of the nymph adjacent to its mouth and anus. In some nodules, the only remnant of the parasite is the broken and folded exoskeleton. The pentastome nymphs are characterized by having: 1. an unsegmented body, 2. striated metamerically arranged musculature, 3. chitinous cuticle with numerous glands 4. acidophilic glands that surround the intestine 5. a sclerotized mouth opening flanked by two pairs of large hooks and 6. neither a circulatory nor respiratory system. Nymphs of Porocephalus and Armillifer can be separated as those of Armillifer have false segments that are highly annulated and the external mouth hooks of Porocephalus have an accessory hook.

Parasitic cysts that contained nymphal pentastomes were identified in the genus Armillifer. This case illustrates very well how unusual, "foreign" parasites may enter the United States at any time due to ease of travel and translocation of pets, and may be seen by veterinarians and diagnostic laboratories.

References:

1. Chitwood M, Lichtenfels JR: Parasitological review: Identification of parasitic metazoa in tissue sections. Exp. Parasitology 32: 415-419, 1972.
2. Cosgrove GE, Nelson B, Self JT: The pathology of pentastomid infection in primates. Lab Anim Care 20: 351-360, 1970.
3. Faisy C, Boye B, Blatt A et al.:Porocephalosis, a little known parasitosis: review of the literature and a case report from Congo. Medecine-Tropicale. 55: 258-262, 1995.
4. Fain, A: Les pentastomides de l'afrique centrale. Aun musee Royal de l'afrique centrale, series 8, 92: 1-115, 1961.
5. Gardiner CH, Poynton: An atlas of metazoan parasites in animal tissues. AFIP, Washington DC, 59-60, 1999.
6. Greve JH, Russell WC: The brown hyaena (Hyaena brunnea), a new host for nymphal Armillifer armillatus. J Parasit 60: 1: 52, 1974.
7. Heuschle WP: Internal parasitism of monkeys with the pentastomid Armillifer armillatus. JAVMA 139: 911-912, 1961.
8. Moens Y, Tshamala M: Nymphal pentastomiasis in a cat. Vet Rec 119: 2: 44, 1986.

8:33 - YERSINIOSIS IN A YEARLING BEEF HEIFER; SLIDE "HOOPER"

C. Hooper

Auckland Animal Health Laboratory, AgriQuality New Zealand Ltd.

History. The animal was from a 1000 head beef cattle property in Northland, New Zealand. The animals are pasture fed and the property is frequently overstocked. The owner presented a half dozen illthrifty yearling heifers and steers to the referring veterinarian including this animal.

Clinical Signs. The heifer was emaciated, recumbent and too weak to rise. She was lethargic and had profuse diarrhea.

Necropsy. The heifer was euthanized and the necropsy done by the referring veterinarian. The small and large intestines contained loose watery green contents. The mucosal surface of the small intestine had numerous multifocal 1-2-mm indistinct yellow foci. The abomasal mucosa was mildly thickened and red.

Histopathology. The small intestinal mucosa contained numerous multifocal dense aggregates of neutrophils associated with dense colonies of fine, Gram-negative bacteria. These microabscesses were mostly within the superficial mucosal lamina propria. Some microabscesses had erosion of the overlying epithelium and were in continuum with the intestinal lumen. Both the small and large intestine were affected but lesions were more severe in the small intestine. Also present was a moderate diffuse infiltrate of eosinophils in the mucosal laminar propria and some small intestinal segments had a mild coccidial infestation.

Discussion. Yersiniosis (Y. enterocolitica and Y.pseudotuberculosis) is a common cause of enteritis in New Zealand in sheep, cattle, goats, pigs and deer. It can be a primary pathogen but is seen commonly in animals under stressful circumstances. Yersinia species including enterocolitica and pseudotuberculosis have been isolated from the feces of clinically normal animals. In this case, the referring veterinarian diagnosed a poor plane of nutrition (secondary to overstocking) and intestinal parasitism (heavy Cooperia and Trichostrongylus burdens) as the main problems in this group of illthrifty yearling cattle. The intestine was not cultured in this case so the Yersinia species was not identified, but laboratory records for the last 4 years show Y. pseudotuberculosis as the main isolate in cattle, sheep and deer with only occasional isolation of Y.enterocolitica.

References:

1. Jubb, Kennedy and Palmer 4th ed, vol 2, The Alimentary System.
2. Yersiniosis and trace element deficiency in a dairy herd. Aust Vet J. 2000 Jan; 78(1):28-30

8:41 - Dehydration-induced polioencephalomalacia in yearling calves with access to water; SLIDE 00b6509 #15

Donal O'Toole,[1] Lynn Woodard,[1] Greg Wilkerson[2]

1 Department of Veterinary Science, University of Wyoming, Laramie, WY 82070

2 College of Veterinary Medicine (final year veterinary student), Oklahoma State University, Stillwater, OK 74078

The documented causes of cerebrocortical necrosis in adult cattle in Western US rangelands are sulfate-induced polioencephalomalacia, altered thiamine status, lead poisoning, and direct and indirect sodium ion toxicosis. We report an episode of dehydration-induced laminar cerebrocortical necrosis (indirect sodium ion toxicosis) in yearling cattle with access to good quality water and no exposure to salt supplements.

A rancher moved 70 yearling cattle to a native grass pasture containing a full water tank in early June 2000. Maximum daily atmospheric temperature was 30°C. When checked a week later, four yearlings were dead and 30 were depressed, dehydrated, constipated and aggressive. Blindness was not a feature. Three yearlings were dead beside a heavily walked fence line. A fourth carcass was at the water tank. The carcass of a 300-kg steer was submitted for necropsy, along with water for analysis.

The carcass was dehydrated. The rumen was one third full of dry plant material. Cecum and colon contained scant mucoid contents. Several 1 – 3-mm areas of tan-discolored malacic cerebral cortex were in frontal and parietal areas bilaterally. A post-mortem cisterna magna CSF sample had an increased white blood cell count consisting primarily of neutrophils (400 leukocytes/μl; reference value < 10 leukocytes/μl). The principal morphological findings were acute multifocal cerebral edema, multifocal laminar cerebrocortical necrosis, associated histiocytic infiltration, and mineralization of degenerate neurites. Small peracute lesions of cerebral edema progressing to necrosis were centered on small blood vessels. No evidence of vascular degeneration, thrombosis or hemorrhage was present. Lesions were absent in non-cortical areas of the brain. Other changes were mild intra-alveolar pulmonary edema and diffuse lymphoid depletion of gut-associated lymphoid aggregates. The cerebrum contained 2,530-μg/g sodium (reference concentration: < 1,800-μg/g).

The rancher said that the yearlings broke into an adjacent pasture containing cows and water shortly after being placed in the pasture with the water tank. They were returned to the original pasture, where a hill blocked the sight line to that pasture's water tank, which was downwind. The yearlings walked the fence for days attempting to get back to the water and cows in the adjacent pasture, in the process neglecting the water present in their own pasture. Total losses were six dead yearlings died and 15 with neurological signs including hypermetria of varying severity. Survivors in the group lost 100-kg body weight due to water deprivation and cerebral complications.

Cattle die after 3 - 5 days of dehydration under range management conditions in warm, arid areas. In the present case, neurological disease occurred in cattle as a direct result of dehydration, without concurrent salt supplementation or subsequent overloading on water. A curious aspect of the episode was that cattle died in spite of access to good quality water. Dehydration-induced polioencephalomalacia should not be excluded because a pasture contains water, since behavioral factors play a role in animals' ability to locate water. There is considerable variation in the response of various species to sodium ion toxicosis (cattle and sheep: subtle cerebral edema progressing to polioencephalomalacia; people and primates: hemorrhagic encephalopathy; pigs: cerebrocortical necrosis with eosinophilic meningoencephalitis; rats: cerebral edema with myelinolysis; poultry: effusion into body cavities). The occurrence of vascular lesions is a variable feature in cattle and was absent here. Differentiation of this form of PEM from others relies on clinical history and chemical analysis for sodium concentrations in brain, cerebrospinal fluid and/or aqueous humor.

References:

1. Igbokwe IO: 1997, The effects of water deprivation in livestock ruminants: an overview. Nutritional Abstracts and Reviews (Series B) 67 (12): 905 – 914.
2. Gould DH: 1998, Polioencephalomalacia. Journal of Animal Science 76 (1): 309-14
3. Osweiler GD, Carr TF, Sanderson TP, Carson TL, Kinker JA: 1995, Water deprivation--sodium ion toxicosis in cattle. J Vet Diagn Invest 7 (4): 583-5
4. http://www.afip.org/vetpath/WSC/wsc99/99wsc27.htm AFIP Wednesday Slide Conference - No. 27, 26 April 2000 Case I - 99/1240 (AFIP 2694720)