SYLLABUS

VETERINARY PATHOLOGY DEPARTMENT
WEDNESDAY SLIDE CONFERENCE
1983-1984

ARMED FORCES INSTITUTE OF PATHOLOGY
WASHINGTON, D.C. 20306-6000
1990

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VETERINARY PATHOLOGY DEPARTMENT, AFIP

WEDNESDAY SLIDE CONFERENCE

1983-1984

100 microscopic slides
27 35mm slides

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MI002284

LIST OF SLIDES

Slide Number	Animal	Tissue	Diagnosis
MS 1	Gaur bull	Kidney, heart	Malignant catarrhal fever
MS 2; LS 1	Pig	Skin	Pityriasis rosea
MS 3	Mink	Liver	Biseriasis
MS 4	Dog	Liver	Aflatoxicosis
MS 5	Dog	Skin	Intracutaneous cornifying epithelioma
MS 6	Penguin	Lung	Plasmodium sp.
MS 7	Rat	Pancreas	Islet-cell adenocarcinoma
MS 8,9	Whale	Heart	Zygomycosis
MS 10	Dog	Mediastinum	Chemodectoma
MS 11	Dog	Cerebrum	Globoid cell leukodystrophy
MS 12; LS 2,3	Cat	Uterus	Adenomyosis
MS 13; LS 4,5	Patas monkey	Skin	Delta herpesvirus
MS 14	Rhesus monkey	Mammary gland	Mammary carcinoma
MS 15	Aotus monkey	Lung	Aspiration pneumonia
MS 16; LS 6-8	Cynomolgus monkey	Lung, kidney	Disseminated aspergillosis
MS 17	Horse	Placenta	Torulopsis candida
MS 18	Turkey	Spinal cord	Essentially normal tissue with glycogen body

*MS = microscopic slide; LS = 35mm slide.

Slide Number	Animal	Tissue	Diagnosis
MS 19	Dog	Cerebellum	Angiostrongylus cantonensis
MS 20	Dog	Cerebellum	Abiotrophy of Gordon setters
MS 21; LS 9	Steer	Brain	Haemophilus somnus
MS 22	Goat	Cerebrum, lung	Caprine leukoencephalitis-arthritis virus
MS 23	Dog	Small intestine	Dog coronavirus
MS 24	Cat	Blood smear	Mast cell leukemia
MS 25,26	Rat	Lung, lymph node	Corynebacterium kutscheri
MS 27; LS 10	Raccoon	Cerebrum	Rabies virus
MS 28	Sea lion	Skeletal muscle	Vitamin-E-selenium deficiency
MS 29	Great horned owl	Liver	Owl herpesvirus
MS 30	Mouse	Small intestine	Murine rotavirus
MS 31; LS 11,12	Goat	Placenta	Coxiella burnetii
MS 32	Rat	Salivary gland	Sialodacryoadenitis virus (SDAV)
MS 33; LS 13-15	Rhesus monkey	Small intestine	Mycobacterium avium
MS 34	Horse	Lung, lymph node	Corynebacterium equi
MS 35	Pig	Lung	Haemophilus pleuropneumoniae
MS 36	Rat	Lung	Sendai virus
MS 37	Cat	Brain	Streptococcosis
MS 38	Squirrel	Skin	Fibropapilloma
MS 39	Rat	Salivary gland	Papovavirus
MS 40; LS 16	Dog	Kidney	Lymphosarcoma
MS 41; LS 17	Rat	Spleen	Chloroleukemia
MS 42	Cat	Lymph node	Yersinia pseudotuberculosis subsp. pestis
MS 43	Dog	Small intestine	Pseudorabies virus

Slide Number	Animal	Tissue	Diagnosis
MS 44	Rabbit	Brain, intestine	Encephalitozoonosis; coccidiosis
MS 45	Rabbit	Kidney	Vitamin D toxicosis
MS 46	Dog	Kidney	Ganglioneuroblastoma
MS 47	Dog	Bone	Blastomyces dermatitidis
MS 48; LS 18	Dog	Cerebrum	Ceroid-lipofuscinosis
MS 49	Rat	Uterus	Implantation site
MS 50	Dog	Stomach	Uremic gastropathy
MS 51	Rat	Oral cavity	Squamous cell carcinoma
MS 52,53	Goat	Lymph node	Mycobacterium paratuberculosis
MS 54	Dog	Thigh	Liposarcoma
MS 55	Sheep	Thymus	Thymoma
MS 56	Dog	Cerebrum	Histoplasma capsulatum
MS 57	Rat	Ovary	Gonadostromal tumor, Sertoli cell pattern
MS 58; LS 19-21	Guinea pig	Cerebrum	Cytomegalovirus
MS 59	Pony	Cauda equina	Granulomatous ganglioneuritis
MS 60	Rat	Spine	Chondrosarcoma
MS 61	Horse	Liver	Hepatacicosis
MS 62	Rabbit	Uterus, liver	Listeria monocytogenes
MS 63	Horse	Liver	Bacillus piliformis
MS 64	Sheep	Liver, kidney	Geeldikkop
MS 65	Sheep	Lung	Protostrongylosis
MS 66,67	Horse	Lung	African horsesickness virus
MS 68,69	Steer	Liver, lymph node	Theileriosis
MS 70	Horse	Skin	Hyphomycosis
MS 71; LS 22,23	Pony	Adrenal	Pheochromocytoma

Slide Number	Animal	Tissue	Diagnosis
MS 72	Dog	Cerebrum	Pug-dog encephalitis
MS 73	Lamb	Cerebrum	Pseudorabies virus
MS 74	Dog	Liver	Cycad toxicosis
MS 75	Dog	Kidney	Neomycin sulfate toxicosis
MS 76	Guinea pig	Lung	Pneumocystis carinii
MS 77	Rabbit	Skin	Mycomatosis
MS 78	Marmoset	Colon	Campylobacter fetus subsp. fetus
MS 79	Pig	Kidney, cerebellum	Hog cholera virus
MS 80	Sheep	Brainstem	Listeria monocytogenes
MS 81,82	Cat	Skin	Nocardia asteroides
MS 83	Dog	Skin	Basal cell tumor, granular cell type
MS 84	Dog	Skin	Schnauzer comedone syndrome
MS 85	Pony	Lung	Bronchiolitis; emphysema
MS 86	Horse	Kidney	Red maple toxicosis
MS 87	Pony	Skin	Corvulariasis
MS 88	Quail	Tongue	Capillariasis
MS 89; LS 24	Dog	Liver	Copper toxicosis
MS 90; LS 25	Monkey	Vagina	Mesothelioma
MS 91	Monkey	Colon	Mucinous adenocarcinoma

Slide Number	Animal	Tissue	Diagnosis
MS 92; IS 26	Dog	Rib	Hypertrophic osteodystrophy
MS 93, IS 27	Dog	Hard palate	Fibrous dysplasia
MS 94	Dog	Frontal bone	Multilobular chondroma
MS 95	Dog	Lung	Osteosarcoma
MS 96	Fish	Gill	Microsporidiosis
MS 97	Bull	Esophagus	Hypodermiasis
MS 98,99	Dog	Lung, urinary bladder	Dog distemper virus
MS 100	Dog	Kidney	Glomerulonephritis, membranoproliferative

COMMENTARY ON SLIDES

MS 1

HISTORY

Tissue from an Indian gaur bull (Bos gaurus). 1 of 3 animals in a captive herd of 13 that developed fever, mucopurulent nasal and ocular discharge, corneal opacities, and oronasal erosions prior to death.

GROSS PATHOLOGY

The gross lesions consisted of multiple tan 1.6-mm coalescing foci in the myocardium, pinpoint tan renal cortical foci, lingual and buccal erosions, and mucopurulent tracheitis.

LABORATORY RESULTS

A herpes virus, identified as the African strain of malignant catarrhal fever virus (MCFV), was isolated from the affected animals. Subsequent animal inoculation studies produced signs and lesions similar to those of the gaur.

DIAGNOSIS

Nephritis, perivascular and periglomerular, lymphohistiocytic, multifocal, moderate, kidney, Indian gaur, Bos gaurus, etiology - consistent with African MCFV. Arteritis, necrotizing, segmental, moderate, artery, kidney. Pancarditis, subacute, focally disseminated, moderate, heart.

COMMENT

Bovine malignant catarrhal fever is known to exist in two forms: the African form, in which the etiologic agent is a gamma herpes virus, and the American form, in which several viral types have been implicated but the disease has not been reproduced experimentally from viral isolates. The wildebeeste and other African antelopes have been shown to be asymptomatic carriers of African

MCFV. The American form of the disease has been associated with "exposure to" sheep. Outbreaks among susceptible ruminant species of both forms of the disease are reported to occur during the calving or lambing time of the respective carriers. The means of natural transmission is unknown but blood-sucking arthropods are suspected as intermediate or transport hosts.

There are small foci of myocardial necrosis and a multifocal phlebitis along with parasitic cysts consistent with a Sarcocystis sp. in the myocardium of some sections.

CONTRIBUTOR

Department of Veterinary Pathology, Oklahoma State University, Stillwater, Oklahoma.

SUGGESTED READING

Castro, A. E., Daley, G. G., Zimmer, M. A., et al.: Malignant catarrhal fever in an Indian gaur and Greater kudu: Experimental transmission, isolation, and identification of a herpes virus. Am. J. Vet. Res. 43: 5–11, 1982.

Castro, A. E., and Daley, G. G.: Electromicroscopic study of the African form of malignant catarrhal fever virus in bovine cell cultures. Am. J. Vet. Res. 43: 576–582, 1982.

Zimmer, M. A., McCoy, C. P., and Jensen, J. M.: Comparative pathology of the African form of malignant catarrhal fever in captive Indian gaur and domestic cattle. J. Am. Vet. Med. Assoc. 179: 1130–1135, 1981.

MS 2; LS 1

HISTORY

Incidental finding in a 50-lb. gilt purchased for surgical procedures.

GROSS PATHOLOGY

There were extensive skin lesions on the abdominal, flank, and perineal areas. The lesions were circular or coalescing with depressed scaly centers surrounded by raised discrete ridges.

DIAGNOSIS

Dermatitis, suppurative, subacute, focally extensive, with acanthosis, skin, breed unspecified, porcine.

COMMENT

Pityriasis rosea of swine is believed to be an inherited condition by some authors, although the mode of inheritance has not been determined. Since the disease is self-limiting in swine and has minimal impact on the swine industry, there has been little apparent interest in the condition. The disease is listed as an animal model for pityriasis rosea of man.

CONTRIBUTOR

Division of Research Support, Letterman Army Institute of Research, Presidio of San Francisco, California.

SUGGESTED READING

Altman, N. H.; Andrews, E. J., and Ward, B. C.: Spontaneous Animal Models of Human Disease. New York, Academic Press, 1979, vol. 2, pp. 20–21.

Blood, D. C., Henderson, J. A., and Radostits, O.: Veterinary Medicine. Philadelphia, Lea & Febiger, 1979, pp. 1092–1093.

Corcoran, C. J.: Pityriasis rosea in pigs. Vet. Rec. 76: 1407–1409, 1964.

Jubb, K. V., and Kennedy, P. C.: Pathology of Domestic Animals. New York, Academic Press, 1970, vo. 2, pp. 651–652.

Robbins, S. L.: Pathologic Basis of Disease. Philadelphia, W. B. Saunders Co., 1979, p. 1447.

MS 3

HISTORY

Tissue from a 4-month-old mink kit with mucus in the feces. Death followed a week-long illness.

GROSS PATHOLOGY

There were indistinct pale foci in the livers and the common bile ducts. The gallbladders were markedly thickened. Numerous small (11–13u) spherical oocysts were present in the bile and feces.

DIAGNOSIS

Papillary hyperplasia and ectasia, multifocal, mild to moderate, bile ducts, liver, mink. Cholangitis, necrotizing, chronic-active, diffuse, with luminal, intraepithelial and portal coccidial organisms, moderate, liver, mink; etiology--Eimeria sp.

COMMENT

The section of liver presented is characterized by a necrotizing or proliferative cholangitis with pericholangial fibrosis. Within the lumina of the ectatic cholangioles, in the epithelial cells of the hyperplastic bile ducts, and in the surrounding fibrous tissue are numerous 10- to 15-u coccidial forms consistent in morphology with a species of Eimeria. Schizonts, macrogamonts, and microgamonts are identifiable in most sections. Hepatic coccidiosis is a rarely reported condition of mink. Several reports mention a species (Eimeria hiepeli) seen in Europe but give little detail.

Davis et al. (Vet. Med. 48: 371–375, 1953) reported two cases of hepatic coccidiosis in U.S. mink, but the species was not identified.

CONTRIBUTOR

South Dakota State University, Veterinary Science Department, Brookings, South Dakota.

SUGGESTED READING

Foreyt, W. J., and Todd, A. C.: Prevalence of coccidia in domestic mink in Wisconsin. J. Parasitol. 62: 496, 1976.

Grafner, G. V., Graubmann, H. D., and Dobbriner, W.: Hepatic coccidiosis in minks (Lutreola vison Schreb) caused by a newly identified species of coccidae (Eimeria hiepei n sp.). Monatsch. Veterinaermed. 22: 696–700, 1967.

Myers, G. H., Foreyt, W. J., Hartsough, G. R., et al.: Coccidial infections in ranch mink. J. Am. Vet. Med. Assoc. 177: 849–851, 1980.

HISTORY

Tissue from a 10-year-old male mixed-breed dog. A small kennel reported four dogs dead within 1 week and two remaining dogs showing signs of weakness.

GROSS PATHOLOGY

Necropsy findings included hydrothorax, ascites, icterus, "nutmeg liver," and several adult Dirofilaria immitis organisms in the heart.

LABORATORY RESULTS

Analysis of commeal used in the ration revealed aflatoxin levels of 640 ppb of B_1 and 53.5 ppb B_2.

DIAGNOSIS

Cirrhosis, diffuse, with vacuolar change and bile duct hyperplasia, severe, liver, canine. Microfilaremia, liver, canine.

COMMENTS

The changes present in the section—fibrosis, necrosis of individual hepatocytes, collapse of the parenchyma, hepatocellular regeneration, bile duct proliferation, and vacuolar change—are nonspecific findings that implicate a hepatotoxin. The nature of the vacuolar change is consistent with lipidosis, though no special stains were done to prove this. The numerous small tubular and acinar structures adjacent to and within fibrous tracts were believed to be regenerating hepatocellular acini and/or bile ductules. Multifocal micronodular and/or macronodular regeneration was present in most sections. Although these changes are considered nonspecific, aflatoxicosis must be the primary differential diagnostic entity. The definitive diagnosis is dependent upon the demonstration of aflatoxins in the food consumed.

Classically, this condition was known as "hepatitis X" and "epizootic hepatitis" in the dog and was thought to have a viral etiology. Its relationship to aflatoxins in commercial feeds was shown by Newberne et al. (J. Am. Vet. Med. Assoc. 127: 59–62, 1955). The microfilaremia was considered an incidental finding.

CONTRIBUTOR

Veterinary Diagnostic & Investigational Lab., Tifton, Georgia.

SUGGESTED READING

Jones, T. C., and Hunt, R. D.: Aflatoxins (mycotoxin, aflatoxicosis, groundnut poisoning, toxin of Aspergillus spp). In Veterinary Pathology, ed. 5. Philadelphia, Lea & Febiger, 1983.

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MS 5

HISTORY

Tissue from the neck of a 6-year-old German shepherd dog.

DIAGNOSIS

Intracutaneous cornifying epithelioma, skin, German shepherd, canine.

CONTRIBUTOR

Division of Pathology, Walter Reed Army Institute of Research, Washington, D.C.

SUGGESTED READING

Stannard, A. A., and Pulley, L. T.: Intracutaneous cornifying epithelioma (keratoacanthoma) in the dog: A retrospective study of 25 cases. J. Am. Vet. Med. Assoc. 167: 385–388, 1975.

Stannard, A. A., Pulley, L. T.: Tumors of the skin and soft tissues. In Tumors in Domestic Animals, ed. 2, edited by Moulton, J. E. Berkley, University of California Press, 1978, pp. 42–51.

HISTORY

Tissue from one of two Black-footed penguins (Spheniscus demerus) that died suddenly. Five of nineteen penguins in an Ohio amusement park died suddenly or had a 1- to 2-day illness characterized by anorexia, vomiting, and diarrhea. The deaths occurred over a 10-day period in late summer.

DIAGNOSIS

Pneumonitis, histiocytic, with multifocal necrosis, mild to moderate, with intracellular protozoal organisms, lung, Black-footed penguin (Spheniscus demersus); etiology--Plasmodium sp.

COMMENT

The lesions are associated with numerous exoerythrocytic schizonts compatible with plasmodial infection. Exoerythrocytic schizonts were widespread, being particularly prominent in the liver, spleen, and heart, and were associated with reticuloendothelial hyperplasia and multifocal hepatic necrosis. The history and gross and microscopic lesions are compatible with malaria in penguins, as previously reported. The specific Plasmodium is unknown in cases like these, but it may have been acquired from wild birds.

CONTRIBUTOR

Ohio State University, Department of Veterinary Pathology, Columbus, Ohio.

SUGGESTED READING

Beier, J. C., Stranalberg, J., Stoskopf, M. D., et al.: Mortality in robins (Turdus migratorius) due to avian malaria. J. Wildl. Dis. 17: 247-250, 1981.

Fleischman, R. W., Squire, R. A., Sladen, W. J. L., et al.: Malaria (Plasmodium elongatum) in captive African penguins (Spheniscus demersus). J. Am. Vet. Med. Assoc. 153: 928-935, 1968.

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Markus, M. B., and Oosthuizen, J. H.: The haematozoa of South African birds. VI. Avian malaria. Vet. Rec. 91: 198-199, 1972.

Stoskopf, M. K., and Beier, J. C.: Avian malaria in African Black-footed penguins. J. Am. Vet. Med. Assoc. 175: 944-947, 1979.

MS 7

HISTORY

Tissue from an adult male Sprague–Dawley rat. The rat was killed in extremis after being on test for 766 days.

DIAGNOSIS

Adenocarcinoma, islet-cell, pancreas, Sprague–Dawley rat.

COMMENT

Pancreatic islet-cell carcinomas in the rat are frequently composed of well-differentiated endocrine cells and thereby appear benign. These tumors are thought to be locally aggressive, and, although vascular invasion is a common feature, they seldom metastasize.

CONTRIBUTOR

Bio-dynamics, Inc., Mettlers Road, East Millstone, New Jersey.

SUGGESTED READING

Roe, F. J. C., and Roberts, J. D. B.: Tumors of the pancreas. In Pathology of Tumors in Laboratory Animals. Vol. 1, Tumors of the Rat. Part I, Turusov, V. S., et al. (Eds.). WHO IARC Publication No. 5, Lyon, France, 1973, pp. 141-150.

MS 8, 9

HISTORY

Tissue from an adult female Killer whale that was lethargic and became anorectic over a 2-week period prior to death. This whale had been a performing animal at the Vancouver British Columbia Aquarium until her death on 5 Oct 1980. On September 24, treatment was begun with oral penicillin followed by penicillin injections and Kaobiotic(R) to combat diarrhea until anorexia was complete. On Sept 29, vaginitis was diagnosed and treated with uterine boluses. Kanamycin injections were started. The antibiotic was changed to Liquimycin 24 hours before death.

DIAGNOSIS

Myocarditis, pyogranulomatous, focally extensive, severe, with multifocal necrotizing vasculitis and thrombosis, myocardium, killer whale.

COMMENT

Branching, pleomorphic, nonseptate hyphae and vascular invasion are typical of a Zygomycete (Phycomycete). The lesions were not confined to the heart but were generalized, extensively involving the lungs, diaphragm, intercoastal muscles, stomach, intestine, and lymph nodes as well as the heart. There were mycotic lesions in the uterus and vascular thrombosis with mycotic hyphae in the liver and pancreas.

CONTRIBUTOR

Veterinary Diagnostic Laboratory, B.C. Ministry of Agriculture & Food, Box 100, Abbotsford, British Columbia, Canada.

SUGGESTED READING

Best, P. B., and McCully, R. M.: Zygomycosis (phycomycosis) in a Right whale (Eubalena australis). J. Comp. Pathol. 89: 341-347, 1979.

Medway, W.: Some bacterial and mycotic diseases of marine mammals. J. Am. Vet. Med. Assoc. 177: 831-834, 1980.

Sweeny, J. C., Migaki, G., Vainik, P. M., et al.: Systemic mycoses in marine mammals. J. Am. Vet. Med. Assoc. 169: 946-948, 1976.

HISTORY

Tissue from a 9-year-old beagle that suffered from dyspnea.

GROSS PATHOLOGY

Radiographs of the chest revealed a soft tissue mass surrounding the trachea.

DIAGNOSIS

Carcinoma, solid, endocrine pattern, thorax, beagle, canine - probable chemodectoma.

COMMENT

The histologic features and location of the tumor are suggestive of a carotid body tumor (chemodectoma). Solid carcinomas exhibiting an endocrine pattern and arising in the thorax near the base of the heart or along the great vessels and the trachea include carotid body tumors, aortic body tumors, other extra-adrenal paragangliomas, and tumors of the thyroids or parathyroids or ectopic rests.

CONTRIBUTOR

Department of Veterinary Sciences, University of Wisconsin, Madison, Wisconsin.

SUGGESTED READING

Appleby, E. C.: Tumours of the adrenal gland and paraganglia. Bull. WHO 53(2-3): 227-235, 1974.

Capen, C. C.: Tumors of the endocrine glands. In Tumors in Domestic Animals, ed. 2, edited by Moulton, J. E. Berkeley, University of California Press, 1978, pp. 372-429.

MS 11

HISTORY

Tissue from a 5-month-old West Highland terrier that had a 2-month history of progressive rear limb paresis. The symptoms were initially detected when the dog was 3-1/2 months old. Its condition deteriorated until it was unable to stand, urinate, or defecate.

LABORATORY RESULTS

CBC: normal; neurological examination: posterior paresis with slight intention tremor, loss of proprioception in hind limbs, minimal motor control in hind limbs, sciatic and patellar reflexes present in both rear limbs, loss of panniculus reflex at L_4, forelimb and cranial nerve reflexes normal; findings on ocular examination: normal; EEG: dissociative process, no evidence of encephalitis.

DIAGNOSIS

Leukodystrophy, diffuse, severe, with perivascular and nodular macrophage (globoid cell) accumulations, white tracts, cerebrum, West Highland terrier, canine.

COMMENT

The conference participants thought the changes consistent with those of canine globoid cell leukodystrophy. In addition to the globoid macrophages, there is mild astrocytosis and myelin dysgenesis.

CONTRIBUTOR

University of Illinois, Department of Pathobiology and Veterinary Diagnostic Medicine, Urbana, Illinois.

SUGGESTED READING

Fletcher, T. F., Jessen, C. R., and Bender, A. P.: Quantitative evaluation of spinal cord lesions in canine globoid leukodystrophy. J. Neuropathol. Exp. Neurol. 36: 84–99, 1977.

Johnson, G. R., Oliver, J. E., and Scher, R.: Globoid cell leukodystrophy in a beagle. J. Am. Vet. Med. Assoc. 167: 380–384, 1975.

Suzuki, K., and Suzuki, Y.: Galactosylceramide lipidosis: Globoid cell leukodystrophy (Krabbe's disease). In The Metabolic Basis of Inherited Disease, ed. 5, edited by Stanbury, J. B. New York, McGraw-Hill Book Co., 1983, pp. 857–880.

Yajima, K., Fletcher, T. F., and Suzuki, K.: Canine globoid cell leukodystrophy. J. Neurol. Sci. 33: 179–197, 1977.

MS 12: LS 2, 3

HISTORY

Tissue from a 9-year-old female Siamese cat with intermittent vomiting. A palpable, enlarged uterus was removed surgically.

DIAGNOSIS

Adenomyosis, diffuse, severe, with superficial subacute inflammation, epithelial squamous metaplasia, and intraluminal suppuration, uterus, Siamese, feline.

COMMENT

Adenomyosis of the uterus is characterized by the presence in the myometrium of endometrial tissue that often results in diffuse, symmetrical enlargement or a focal, asymmetrical enlargement of the uterus. It has been reported to occur most commonly in the cat, the cow, and the bitch.

It has generally been accepted that adenomyosis results from a downward growth of basal endometrium. The development of adenomyosis may be related to prolonged estrogen stimulation, but definitive data supporting this concept are lacking.

CONTRIBUTOR

Hoechst-Roussel Pharmaceutical, Inc., Somerville, New Jersey.

SUGGESTED READING

Pack, F. D.: Feline uterine adenomyosis. Feline Pract. 10: 45-47, 1980.

MS 13: LS 4, 5

HISTORY

Tissue from one of two adult male patas monkeys (Erythrocebus patas) found dead or moribund in their cages.

GROSS PATHOLOGY

On gross examination facial edema and crusting were noted. An erythematous skin rash was present over the abdomen and limbs; 1- to 2-mm ulcers on the buccal mucosa; subcutaneous hemorrhages, enlarged lymph nodes, an enlarged liver, and hemorrhagic ulceration of the digestive tract were also seen.

LABORATORY RESULTS

Thrombocytopenia and anemia, elevation of the BUN, creatinine, SGOT, SGPT, and alkaline phosphatase as well as increased prothrombin and active partial thromboplastin times were noted. Cultures for enteric pathogens were negative for Shigella and Salmonella spp. Cultures of the lung yielded Klebsiella sp.

DIAGNOSIS

Dermatitis, necrotizing and vesicular, acute, multifocal, moderate, with epidermal intranuclear inclusion bodies, skin, Patas monkey (Erythrocebus patas).

COMMENTS

Simian varicella is due to Delta herpesvirus in Erythrocebus patas (patas monkeys). This outbreak of simian varicella occurred in a colony of 101 adult patas monkeys in May of 1981. An adult male was found dead and a second male became weak and died within 24 hours, at which time the colony was quarantined.

Within the next 24 hours, three additional males presented with a rash, hemorrhages from various sites, lethargy, and anorexia. Of the 23 male patas monkeys located in one room, morbidity was 100 percent within a 44-day period. Mortality in this group was 44 percent. The disease spread to the female patas colony 14 days after onset in the male colony. Mortality was 12 percent among the females. The differential diagnosis included simian varicella, measles, and simian hemorrhagic fever. The definitive diagnosis of varicella was based on 1) serum positive for varicella using ELISA testing, 2) lymph node, liver, and spleen tissue cultures positive for cell-associated herpesvirus, Delta agent, 3) gross and microscopic lesions, and 4) significant serologic titers by RIA. The source of the infection is undetermined.

CONTRIBUTOR

Litton Bionetics, Inc., Kensington, Maryland.

SUGGESTED READING

Allen, W. P., Felsenfeld, A. D., Wolf, R. H., et al.: Recent studies on the isolation and characterization of Delta herpesvirus. Lab. Anim. Sci. 24: 222-228, 1974.

Arvin, A. M., Martin, D. P., Gard, E. A., et al.: Interferon prophylaxis against simian varicella in Erythrocebus patas monkeys. J. Infect. Dis. 147: 149-154, 1983.

Ayres, J. P.: Studies of the Delta herpesvirus isolated from the patas monkey (Erythrocebus patas). Lab. Anim. Sci. 21: 685-695, 1971.

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Seibold, H. R., and Allen, W. P.: Model No. 69: Varicella. Comp. Pathol. Bull. 7: 1975.

Wenner, H. A., Abel, D., Barrick, S., et al.: Clinical and pathogenetic studies of Medical Lake Macaque virus infections in cynomolgus monkeys (Simian varicella). J. Infect. Dis. 135: 618-622, 1977.

White, R. L., Simmons, L., and Wilson, R. B.: Chickenpox in young anthropoid apes: Clinical and laboratory findings. J. Am. Vet. Med. Assoc. 161: 690-692, 1972.

Wolf, R. H., Smetana, H. F., Allen, W. P., et al.: Pathology and clinical history of Delta herpesvirus infection in patas monkeys. Lab. Anim. Sci. 24: 218-221, 1974.

MS 14

HISTORY

Tissue from a 14-year-old rhesus monkey (Macaca mulatta) that was used as a control animal for an oral contraceptive study.

GROSS PATHOLOGY

The area adjacent to the right teat was irregular, firm, and slightly raised. The growth of the tumor was confined within the subcutis. On further examination the tumor was seen to be slightly lobular and pale.

DIAGNOSIS

Carcinoma, solid, comedo pattern, intraductal, mammary gland.

COMMENT

Microscopic examination of the tumor revealed densely packed, neoplastic epithelial cells within the ducts of the mammary gland. The lumens of some ducts contained secretory material and necrotic cells, while others were completely filled with neoplastic cells. Mitotic figures were infrequent. In some sections there were small areas of papillary growth within the duct lumen and increased amounts of fibrous interductal stroma with mild infiltration of eosinophils.

CONTRIBUTOR

Wyeth Laboratories, Inc., Toxicology Building, Paoli, Pennsylvania 19301.

SUGGESTED READING

Appleby, E. C., Keymer, I. F., and Hime, J. M.: Three cases of suspected mammary neoplasia in nonhuman primates. J. Comp. Pathol. 84:351–354, 1974.

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MS 15

HISTORY

Tissue from an owl monkey (Aotus sp.). This adult female owl monkey was acquired in May of 1981. Over a 2-week period in late November, she became debilitated, anemic, and anorectic and died while being treated.

DIAGNOSIS

Pneumonia, granulomatous, multifocal to coalescing, moderate to severe, lungs, owl monkey (Aotus sp.): etiology—aspiration of foreign material.

COMMENT

Granulomatous pneumonia was an incidental finding in this case. The presence of birefringent crystals with a granulomtous response in alveolar tissue is suggestive of kaolinite aspiration. The Department of Chemical Pathology identified the material as nacrite, a kaolin-clay mineral commonly found in medicants given orally to monkeys for treatment of diarrhea.

CONTRIBUTOR

Department of Diagnostic Services & Comparative Medicine, USUHS, Bethesda, Maryland.

SUGGESTED READING

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MS 16; LS 6–8

HISTORY

Tissues from a 14-year-old cynomolgus monkey (Macaca fascicularis) that was used as a breeder.

GROSS PATHOLOGY

On gross examination, ascites and a hydrothorax were seen. The lungs were atelectatic and the heart enlarged with adhesions to the pericardium. There was a thoracic mass involving most of the mediastinum. A 1.5-cm hard, yellow nodule was seen on the cranial pole of the right kidney.

LABORATORY RESULTS

Acid-fast-stained direct smears were negative, as were cultures for Mycobacterium sp. Fungal culture produced Aspergillus sp. (not A. fumigatus).

DIAGNOSES

Pneumonia, granulomatous and necrotizing, chronic, multifocal, with fungal hyphae, lung, cynomolgus monkey (Macaca fasicularis). Nephritis, granulomatous, chronic, focally extensive, moderate, with fungal hyphae, kidney.

COMMENT

Disseminated aspergillosis is a rarely reported condition in primates. The condition is believed to occur in immunosuppressed or stressed animals and has been reported to occur concurrently with other disease conditions such as diabetes mellitus or tuberculosis.

CONTRIBUTOR

Litton Bionetics, Inc., Kensington, Maryland.

SUGGESTED READING

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HISTORY

This 9-month-old aborfus is from a 16-year-old thoroughbred with a history of two abortions and one stillbirth in the previous 3 years.

LABORATORY RESULTS

Torulopsis candida (Candida candida) was isolated from an endometrial biopsy specimen 1 month after the abortion occurred.

DIAGNOSIS

Placentitis, granulomatous, diffuse, moderate, with numerous intraepithelial and phagocytized yeasts, placenta, thoroughbred, equine.

COMMENT

Tissue was sent to the Center for Disease Control for fluorescent antibody (FA) studies. The tissue contained no Histoplasma or Sporothrix organisms, but many unicellular Candida organisms were present.

CONTRIBUTOR

New Hampshire Veterinary Diagnositic Laboratory, University of New Hampshire, Durham, New Hampshire.

SUGGESTED READING

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MS 18

HISTORY

Tissue from an 8-week-old Nicholas tom turkey belonging to a flock that was ill for 11 consecutive days. Reduced feed consumption was the first sign, after which uneven bird size was soon noted. Some birds had leg weakness and rough feathering.

DIAGNOSIS

Essentially normal tissue, lumbosacral vertebrae, spinal cord, glycogen body, and kidney.

COMMENT

This is histologically normal lumbosacral avian spinal cord sectioned through the glycogen body (corpora sciatica). A diagnosis of intestinal coccidiosis was made from other sections. The leg weakness was not related to the "spinal lesion."

CONTRIBUTOR

Animal Disease Diagnostic Lab, School of Veterinary Medicine, Purdue University, West Lafayette, Indiana.

SUGGESTED READING

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MS 19

HISTORY

Tissue from a 14-week-old male German shepherd. At 10 weeks of age the pup was presented with clinical signs of hind limb paresis and paralysis of the tail.

DIAGNOSIS

Leptomeningitis, granulomatous, multifocal, moderate, with larval metastrongyles, cerebellar meninges, German shepherd, canine.
Encephalomalacia, multifocal, mild, cerebellum.

COMMENT

Histological examination showed the presence of randomly distributed foci of granulomatous inflammation. The malacic areas in the brain were considered migratory tracts or infarcts caused by disturbances of vessels by the movement of the larvae. The larvae had polymyarian, coelomyarian musculature and a large intestine composed of a few multinucleated cells. These features are characteristic of a metastrongyle. The size and morphology are consistent with Angiostrongylus sp., probably A. cantonensis. Angiostrongylus vasorum, a canine lungworm, has similar features, but migration through the central nervous system for this metastrongyle has not been reported. The natural host of Angiostrongylus cantonensis is the rat. In its natural host the larva migrates to the brain and then to the pulmonary artery, where it reaches sexual maturity. In mammals other than the natural host the migration is not completed and the worms apparently remain in the central nervous system for some time.

CONTRIBUTOR

School of Veterinary Studies, Murdoch University, Murdoch, Western Australia 6150.

SUGGESTED READING

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MS 20

HISTORY

Tissue from a 4-1/2-year-old female Gordon setter. Between 6 months and 1 year of age there was difficulty climbing stairs. Gait became progressively ataxic and hypermetric. No weakness or sensory deficits could be demonstrated.

DIAGNOSIS

Degeneration (abiotrophy), Purkinje and granular cells, diffuse, moderate, with gliosis, cerebellum, Gordon setter, canine.

COMMENT

There is loss of Purkinje and granular cells, which is most severe in the pars intermedia and vermis. Cerebellar hemispheres are less severely affected. The disease is inherited as an autosomal recessive in Gordon setters. Abiotrophy of Gordon setters differs from the condition seen in Kerry blue terriers: In the Gordon setter the lesions are restricted to the cerebellum, whereas in the Kerry blue terrier they are present in the substantia nigra and olivary and caudate nuclei.

CONTRIBUTOR

Division of Comparative Medicine, Johns Hopkins University,
Baltimore, Maryland.

SUGGESTED READING

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MS 21; LS 19

HISTORY

Tissue from a cross-bred steer. He was seen circling before becoming recumbent, and he had bilateral nystagmus prior to death.

GROSS PATHOLOGY

The meninges were diffusely cloudy and covered with fibrinous fogs near the transverse cerebral fissure. Increased amounts of cloudy fluid were present in the spinal canal, pericardial sac, and hock joints.

LABORATORY RESULTS

Pure culture of Haemophilus somnus was isolated from specimens of brain.

DIAGNOSIS

Meningoencephalitis, fibrinopurulent, diffuse, moderate, with hemorrhage and vasculitis, brain, cross-bred Hereford steer, bovine.

COMMENT

This case was unusual in that classic gross lesions of malacia and histologic lesions of vasculitis, thrombosis, and septic infarction were not observed in most specimens of brain. Culture was necessary to arrive at the specific etiology in this case.

CONTRIBUTOR

University of Illinois, Veterinary Diagnostic Laboratory, Urbana, Illinois.

SUGGESTED READING

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HISTORY

Tissue from a 7-week-old male goat found dead after a short respiratory sickness.

DIAGNOSIS

Leukoencephalitis, subependymal, granulomatous, multifocal, moderate, with perivascular cuffing, cerebrum, breed, unspecified, caprine.

Pneumonia, interstitial, subacute, diffuse, severe, with secondary bronchopneumonia and severe alveolar edema, lung.

COMMENT

The cause of these lesions is most likely the caprine leukoencephalitis–arthritis virus (VLG), a lentivirus of the Retroviridae family. The subependymal granulomatous encephalitis and the subacute interstitial pneumonia are characteristic lesions of this disease. The VLG virus particles are found in macrophages. Many of the lesions may be the result of immune response to the virus. The lentivirus causing maedi-visna in sheep results in similar lesions and is related antigenically to VLG; however, natural cross transmission between goats and sheep apparently does not occur.

CONTRIBUTOR

Food & Drug Administration, Division of Pathology, Washington, D.C.

SUGGESTED READING

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HISTORY

This is a section of small intestine from a 6-day-old puppy with severe diarrhea. The puppy had been inoculated orally with an infectious agent 2 days previously.

DIAGNOSIS

Villous atrophy and fusion, diffuse, moderate, with crypt epithelial hyperplasia, small intestine, breed unspecified, canine.

LABORATORY RESULTS

Intestinal sections were FA positive when stained with an anti-transmissible gastroenteritis conjugate.

COMMENT

The histologic lesions were confined to the stomach and small intestine. Mucosal and glandular epithelial cells in the stomach were flattened and had enlarged nuclei and basophilic cytoplasm. Villous atrophy, flattening of enterocytes lining villi, villous fusion, and crypt hyperplasia were prominent throughout the small intestine. No significant histologic lesions were found in the colon.

The conference participants thought the histologic features were characteristic of either coronavirus or rotavirus infection, and that FA testing was necessary to differentiate between the two.

CONTRIBUTOR

Veterinary Diagnostic Services, Albuquerque, New Mexico.

SUGGESTED READING

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HISTORY

Blood smear from a 13-year-old female cat that had splenomegaly.

LABORATORY RESULTS

WBC	15.4 x 10^3
RBC	5.94 x 10^6
Hematocrit	29.3
FeLV	Negative

DIAGNOSIS

Leukemia, mast cell, breed unspecified, feline.

COMMENT

When cells with basophilic granules are found in the peripheral blood one must distinguish between basophils and mast cells. Basophils tend to have a multilobed nucleus and relatively few granules. On the other hand mast cells tend to have a round nucleus and numerous delicate granules. The cells in these smears have the appearance of mast cells.

Neoplasia of mast cells in the cat is most commonly found as a leukemic disease with involvement of the bone marrow, blood, and spleen. The most notable gross lesion in cats with mast cell leukemias is an enlarged spleen.

CONTRIBUTOR

Veterinary Reference Laboratory, Salt Lake City, Utah.

SUGGESTED READING

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MS 25, 26

HISTORY

Tissue from a 7-month-old Sprague-Dawley rat from a small in-house breeding colony in which occasional unexpected deaths from respiratory disease had occurred previously. This animal died after whelping half of a full-term litter.

GROSS PATHOLOGY

The lungs retained their shape, fully distended. Pleural surfaces in some areas were gray and slightly shaggy. Lung parenchyma was diffusely reddened with large (1-cm) scattered patches of white. The white areas showed delicate serrations along the margins.

LABORATORY RESULTS

Bacterial cultures were not done, as Corynebacterium kutscheri had been isolated from lungs of several similar cases from the colony. Imprints of lung from this animal made at necropsy and stained by the Gram method had abundant Gram-positive rods morphologically compatible with Corynebacterium spp.

DIAGNOSIS

Pneumonia, necrosuppurative, chronic-active, multifocal, moderate with numerous bacterial colonies and chronic fibrinous pleuritis, lung, Sprague-Dawley rat, rodent. Lymphadenitis, necrotizing and subacute, diffuse, moderate, lymph node.

COMMENTS

The pathology in this case is typical of the advanced disease more commonly seen in rats and caused by C. kutscheri. Active disease caused by this agent in rodents results from septicemia, with lodgement of septic emboli in the lungs (of rats, primarily) and in the kidneys and livers (of mice). The large areas of necropurulent pneumonia in rats, as demonstrated in this case, result from enlargement and coalescence of lesions beginning as embolic foci. Most cases of active disease are precipitated by immunosuppression (corticosteroid administration, X-irradiation, concurrent infectious disease, etc.).

In tissue sections, numerous Gram-positive rods typical of C. kutscheri were demonstrated in the lung lesions by the Brown-Hopps, Brown-Brenn, and MacCallum-Goodpasture methods. Because of the contributor's opinion that Gomori methenamine-silver (GMS) frequently demonstrates more C. kutcheri organisms than do Gram stains he submitted this GMS-stained slide as an example.

The "Chinese lettering" arrangement of the bacteria, characteristic of Corynebacterium kutscheri, was easily seen in the GMS-stained slides. Many sections contained a lymph node with inflammation and necrosis.

CONTRIBUTOR

Department of Comparative Medicine, University of Alabama Medical Center, Birmingham, Alabama.

SUGGESTED READING

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MS 27: LS 10

HISTORY

Tissue from a raccoon trapped in Northern Virginia.

DIAGNOSIS

Meningoencephalitis, nonsuppurative, multifocal, mild with eosinophilic intracytoplasmic neuronal inclusions, neuronal degeneration, and perivascular cuffing, cerebrum, raccoon, Procyonidae; etiology—rabies virus.

COMMENT

The inclusions were distinctive and significant; however, similar inclusions have been reported in the neuronal cytoplasm of nonrabid cats, cattle, sheep, skunks, foxes, and moose. These inclusions can be differentiated from Negri bodies by ultrastructural characteristics. The fact that inclusions other than rabies virus can be present in neurons stresses the importance of FA verification of rabies. Negri bodies consist of a compact mass of viral nucleocapsid material surrounded by bullet-shaped viral particles budding from membranes. Although both rabies and canine distemper (CD) produce eosinophilic inclusions, they can be differentiated histologically because rabies inclusions are restricted to neuronal cytoplasm, whereas CD inclusions can occur within both the cytoplasm and the nuclei of neurons and within nuclei of astrocytes. There were differences in the inflammatory response in the meninges and neuroparenchyma in participants' slides; therefore, the morphological diagnoses varied. The electronmicrograph showed bullet-shaped viral particles characteristic of Rhabdoviradae.

CONTRIBUTOR

Department of Pathology, National Zoological Park, Washington, D.C.

SUGGESTED READING

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MS 28

HISTORY

Tissue from a yearling female California sea lion (Zalophus californianus) born and raised at the National Zoo and found weak and anorectic with reluctance to move her front flippers on 7/6/83. She died on 7/8/83 after showing severe respiratory distress.

GROSSS PATHOLOGY

White streaks and chalky areas in skeletal muscle were evident, particularly diaphragm and subcapsular regions.

DIAGNOSIS

Necrosis and degeneration, multifocal, moderate, with mineralization and chronic inflammation, skeletal muscle, California sea lion, pinneped.

COMMENT

The histologic features of muscle fragmentation with hyalinization, loss of striations, and loss of nuclei and mineralization indicated myonecrosis and degeneration. Nutritional, neurogenic, metabolic, toxic, and infectious myopathies were included as differentials, but most participants agreed that nutritional vitamin-E-selenium deficiency was the most likely etiology. Exertional rhabdomyolysis was considered, but the history didn't reflect any recent periods of restraint or muscular exertion. This sea lion had been off the vitamin E supplement for one month because of an error on the part of the zookeeper. Vitamin E inactivates free radicals and prevents lipid peroxidation of cell membranes. Deficiency of vitamin E allows the free radicals to damage the cellular membrane, thereby resulting in necrosis.

CONTRIBUTOR

Department of Pathology, National Zoological Park, Washington, D.C.

SUGGESTED READING

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MS 29

HISTORY

Tissue from an adult great horned owl found dead in woods.

GROSS PATHOLOGY

Owl was in good flesh. Liver was slightly swollen and contained numerous white focal lesions 1 to 4 mm in diameter and evenly distributed throughout the parenchyma.

LABORATORY RESULTS

Bacterial culture of liver was negative. Serial passage of liver homogenate in chick embryos resulted in the demonstration of a viral agent that produced embryo pathology typical of owl herpes virus.

DIAGNOSIS

Hepatitis, necrotizing, acute, multifocal, moderate with numerous eosinophilic, intranuclear inclusions, liver, great horned owl, avian.

COMMENT

The areas of necrosis with eosinophilic intranuclear inclusions are characteristic of a herpes virus infection. Herpesviruses that are antigenically related are seen in falcons, owls, and pigeons. A herpesvirus has also been recovered from psittacine birds with Pacheco's parrot disease, but the relationship to the falcon-owl-pigeon herpesviruses is not clear.

CONTRIBUTOR

New Hampshire Veterinary Diagnostic Laboratory, University of New Hampshire, Durham, New Hampshire.

SUGGESTED READING

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MS 30

HISTORY

Tissue from a 9-day-old CD-I mouse that was inoculated with an infectious agent at 7 days of age.

GROSS PATHOLOGY

The stomach was full of milk. The colon contents were liquid and bright yellow.

DIAGNOSIS

Vacuolar degeneration, diffuse, moderate to severe, villous epithelium, small intestine, CD-I, mouse.

COMMENT

This mouse was orally inoculated with murine rotavirus (EDIM virus). The extensive vacuolar change in the epithelium of the small intestinal villi is characteristic of the lesion produced by this agent. The virus is widespread in mouse colonies. Rotavirus seronegative mice of all ages are susceptible to infection; however, only those less than 11 to 12 days of age are susceptible to the disease. The basis for this acquired disease resistance is not fully understood. Both loss of the viral receptors and decreased pinocytotic activity of the epithelium of the small intestine have been postulated from experimental work to explain this phenomenon.

CONTRIBUTOR

Division of Comparative Medicine, Johns Hopkins University, Baltimore, Maryland.

SUGGESTED READING

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MS 31: LS 11, 12

HISTORY

A Saanen goat doe gave birth to two kids 1 week prior to her expected parturition date. One kid was alive, and the other was stillborn.

GROSS PATHOLOGY

The stillborn fetus was partially mummified and about half the size expected at term. The placenta had marked thickening as a result of inflammatory exudate in the intercotyledonary areas.

LABORATORY RESULTS

A large number of acid-fast bacilli typical of Coxiella sp. were in smears from the placenta stained with a modified acid-fast stain.

DIAGNOSIS

Placentitis, necrotizing, subacute, diffuse, moderate, with intraepithelial cytoplasmic bacterial forms, placenta, Saanen goat.

COMMENT

During the past 2 to 3 years Coxiella burnetii has become a common cause of caprine abortion. Placentitis essentially confined to intercotyledonary areas, and trophoblasts with cytoplasm engorged with the organism are characteristic. The accompanying electron micrographs are of a trophoblast that has numerous Coxiella organisms in the cytoplasm.

CONTRIBUTOR

Ontario Ministry of Agriculture and Food, Veterinary Laboratory Services, Guelph, Ontario.

SUGGESTED READING

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MS 32

HISTORY

Tissue from 1 of 3 Sprague–Dawley rats in a colony of 20 rats. Swellings of the anteroventral cervical area were noted on examination.

GROSS PATHOLOGY

Several pale yellow to white masses were present in the submandibular area (bilateral). The surrounding connective tissue was edematous.

LABORATORY RESULTS

Serology: The rat had a positive antibody titer to rat coronavirus/sialodacryoadenitis virus (SDAV) by the ELISA test.

DIAGNOSIS

Sialoadenitis, necrotizing, subacute, diffuse, moderate, with ductal epithelial squamous metaplasia, submandibular (submaxillary) salivary gland, Sprague–Dawley rat. Hyperplasia, lymphoid, diffuse, moderate, submandibular lymph node.

COMMENT

The lesions seen in this case are typical of those caused by sialodacryoadenitis virus, a coronaviral pathogen of the rat. Although this epitheliotropic virus has an affinity for salivary gland tissue, it is apparently unable to infect or replicate in mucus-secreting cells. Thus the sublingual gland, which is exclusively of this type, was unaffected. Although there is no experimental evidence to suggest that acinar infection occurs in a retrograde fashion via the salivary ducts, it is interesting to note that in this case the larger ducts appear to be in an advanced stage of repair compared to the smaller ductules, which are lined by attenuated epithelium, and to the acini, in which there is evidence of necrosis. Lesions were also present in the lacrimal and harderian glands.

CONTRIBUTOR

Department of Pathology, University of Texas Health Science Center, Dallas, Texas.

SUGGESTED READING

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HISTORY

This aged adult female rhesus monkey had been losing weight over the last 6 months. The stools were soft and formless, but no enteric pathogens could be isolated. There was no blood in the stools. CBCs were within normal limits, and repeated TB tests were negative.

GROSS PATHOLOGY

The findings at necropsy were confined to the abdominal cavity. The ileum, cecum, and colon were distended with semi-soft feces, and the mucosal lining contained several thickened folds. The thickened mucosa was a pale tan to white and cut easily. The serosal surface was finely granular, and similar 1- to 2-mm granules could be observed along small vessels of the mesentery. Numerous mesenteric lymph nodes appeared prominent and were uniformly pale and tan on the cut surface.

LABORATORY RESULTS

Samples of the ileum and mesenteric lymph nodes were submitted to Ames, Iowa, for culture, and Mycobacterium avium was recovered from both tissues.

DIAGNOSIS

Enteritis, granulomatous, multifocal to coalescing, transmural, with granulomatous lymphangitis, moderate to severe, small intestine, Macaca mulatta, rhesus monkey.

COMMENT

This case is a typical example of nontuberculous mycobacterium disease in a rhesus monkey. The granularity observed along the serosal surface and within the mesentery actually represented granulomas involving lymphatics.

CONTRIBUTOR

Smith Kline & French Laboratories, Philadelphia, Pennsylvania.

SUGGESTED READING

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MS 34

HISTORY

Tissues from a 2-1/2-month-old quarterhorse foal that was losing weight and had increasing dyspnea.

GROSS PATHOLOGY

The lungs contained multiple nodules up to 12 cm in diameter. Some nodules contained pus. The pulmonary lymph nodes were enlarged. The wall of the large colon had multiple nodules up to 6 cm in diameter, and the colonic lymph nodes were enlarged.

DIAGNOSIS

Pneumonia, pyogranulomatous, necrotizing, severe, with abundant intracellular bacilli, lung, quarterhorse, equine. Colitis, pyogranulomatous, transmural, multifocal to diffuse, severe, with intracellular bacilli and abscessation, colon. Abscesses, coalescing, severe, lymph node.

COMMENT

Many macrophages contained bacteria that were Gram positive. The lesions are compatible with the diagnosis of Corynebacterium equi infection. Although there was no laboratory confirmation, the lesions and the bacteria within macrophages were consistent with the diagnosis.

CONTRIBUTOR

Department of Veterinary Pathology, College of Veterinary Medicine, University of Missouri, Columbia, Missouri.

SUGGESTED READING

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MS 35

HISTORY

Tissue from a 25-kg Duroc gilt purchased two weeks before being found dead. No clinical signs had been noted. The 10 other pigs housed in the stall with this gilt appeared normal.

GROSS PATHOLOGY

The only significant lesions at necropsy were seen in the lungs. Sixty percent of the anterior ventral lungs were red, wet, and firm. Similar areas were irregularly present in the caudal lungs. Fibrin strands were present on the pleura over the affected areas of the lung. The lesions were bilateral.

LABORATORY RESULTS

Haemophilus pleuropneumoniae, a group D streptococcus, and a light growth of a Salmonella sp. were cultured from the lung. No mycoplasma were isolated.

AFIP DIAGNOSIS

Pneumonia, lobular, fibrino-cellular, subacute, with numerous colonies of bacilli, lung. Duroc, porcine.

COMMENT

The mononuclear response characteristic of this disease is prominent in most of the slides. Similar mononuclear cells are present in bovine pneumonic pasteurellosis. Gram-negative cocco-bacillary and Gram- positive coccoidlike organisms are present in the lesion.

CONTRIBUTOR

Department of Pathobiology, Ohio State University, Columbus, Ohio.

SUGGESTED READING

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HISTORY

These pathogen-free rats were inoculated with a common infectious agent of laboratory rats. No clinical signs were observed. The animals were sacrificed on post-inoculation day 5.

DIAGNOSIS

Bronchitis and bronchiolitis, necrotizing, subacute, multifocal, mild, lung, F344/N rat.

COMMENT

These isolator-reared, carefully monitored, gnotobiotic (defined-flora, pathogen-free) F344/N rats were inoculated intranasally with 10^4 $TCID_{50}$ (BHK-21 cells of Sendai virus (ATCC VR105)[1]. Lesions were similar to those previously described and included serous otitis media and necrotizing inflammation of progressively greater severity from the nasal passages to the intrapulmonary airways. However, the terminal bronchioles were only mildly affected and there was little interstitial pneumonia in any of the 50 rats. Although Sendai virus infection has not been as well studied in rats, numerous effects of the virus on host responses are known to occur in mice. Also, strains of mice vary widely in susceptibility to the virus; therefore, these effects may also qualitatively or quantitatively vary among mouse strains. Much work is needed to determine (1) the effects of Sendai virus infection on immune and other responses in rats, (2) the interactions of the virus with other pathogens, and (3) the genetic differences in responses to the virus.

CONTRIBUTOR

Department of Comparative Medicine, University of Alabama, Birmingham, Alabama.

SUGGESTED READING

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MS 37

HISTORY

This 13-year-old spayed female Manx cat had been treated one month prior to death for a respiratory infection with injectable chloramphenicol. Recovery was rapid and uneventful. Twenty-four hours prior to death, the cat was found semi-comatose. She had a left head tilt and horizontal nystagmus; and she later developed vertical nystagmus, fixed, dilated pupils, weak corneal reflexes, increased muscle tone in the right hind limb, and normal segmental reflexes.

LABORATORY RESULTS

Swab samples were collected from both middle ears for microbiological testing. Streptococcus pyogenes was isolated.

DIAGNOSIS

Leptomeningoencephalitis, fibrinous, subacute, diffuse, moderate, with numerous bacterial cocci, brain, Manx cat, feline.

COMMENT

The fluids taken from both middle ears produced many colonies of group A streptococci (S. pyogenes) on culture. Gram-positive bacterial colonies consistent with S. pyogenes were present in the leptomeninges and lung sections.

CONTRIBUTOR

Eastman Kodak Company, B-320 Kodak Park, Rochester, New York.

SUGGESTED READING

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HISTORY

Tissue from the head of a young grey squirrel that appeared to be in good health.

DIAGNOSIS

Fibropapilloma, skin, head, grey squirrel (Sciurus carolensis).

COMMENT

The finding of many round to oval eosinophilic intracytoplasmic inclusions in ballooning, vacuolated squamous epithelial cells of a cutaneous nodule in a wild grey squirrel is most compatible with poxvirus infection. Poxvirus-induced fibropapillomas have been reported in squirrels. Other noteworthy features of this specimen are inclusion bodies with basophilic rims, intracytoplasmic inclusions in fibroblasts and histiocyte-like cells of the dermis, widely scattered syncytial cells, neutrophils and lymphocytes in the

Intranuclear inclusion bodies were found in the parotid duct and acinar cells. Antigen specific for the polyoma subgroup of the papovavirus family was found in the cytoplasm and nuclear inclusions of infected cells by the avidin-biotin-peroxidase complex (ABC) technique. Viral particles and crystalline arrays of viral particles were found by electron microscopy to be identical to those of the polyoma subgroup. The large number of lymphocytes in the lesions were identified as large granular lymphocytes (LGL), the effector cells of natural killer cell activity, by the ABC technique and markers for LGLs.

CONTRIBUTOR

National Cancer Institute, FCRC, Frederick, Maryland.

SUGGESTED READING

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MS 41; LS 17

HISTORY

Tissue from an untreated 14-month-old Sprague-Dawley rat.

GROSS PATHOLOGY

The lungs were diffusely pale, and the liver was enlarged to twice its normal size, with accentuation of the lobular architecture. The lymph nodes in the abdomen and thorax were moderately enlarged and greenish. The spleen was markedly enlarged (9 x 2 x 1.5 cm) and friable, with large sharply demarcated whitish areas present.

DIAGNOSIS

Leukemia, granulocytic, diffuse, with multiple infarcts, spleen, Sprague-Dawley rat. (Chloroleukemia)

COMMENT

Some cases of granulocytic leukemia in rats and man produce a variant noted for the greenish color of the affected tissues, hence the terms "chloroleukemia" and "chloroma." Under ultraviolet light some of these tissues will fluoresce bright red from the presence of protoporphyrins. Some sections of the spleen submitted contained infarcts, seen as pale areas on some slides.

CONTRIBUTOR

Ortho Pharmaceutical Corporation, Raritan, New Jersey.

SUGGESTED READING

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HISTORY

Tissue from a 5-month-old DSH tomcat that was found dead without premonitory symptoms. Six weeks prior to this animal's death, two other cats from the same premises had developed submandibular abscesses that were successfully treated with tetracycline.

GROSS PATHOLOGY

Abundant straw-colored subcutaneous fluid was present on the right side of the head and neck. A 1.0-cm-diameter abscess filled with creamy exudate was present at the angle of the right mandible. The right mandibular lymph node could not be located. The right retropharyngeal and right prescapular lymph nodes were markedly enlarged. Abundant (25-35 ml) serous fluid was present in the thoracic cavity. The lungs were grossly normal. The tissue sections submitted are from the mandibular abscess and the right retropharyngeal lymph node.

DIAGNOSIS

Lymphadenitis, necrosuppurative, acute, with myriads of scattered bacilli, diffuse, right mandibular and retropharyngeal lymph nodes, DSH, feline.

COMMENT

This is a case of bubonic plague in a young cat. Yersinia pestis* was isolated from the enlarged necrotic right mandibular lymph node, which appeared grossly to be an abscess. A light growth of Y. pestis occurred in lung cultures. No histologic evidence of pneumonia was found. Very numerous small Gram-negative bacilli were present in the necrotic areas in both lymph nodes. In addition, prominent numbers of Gram-positive branching bacilli were observed in some sections of the retropharyngeal node. These Gram-positive organisms were considered to be opportunists. Because the cat was from a plague-endemic area, plague was initially considered in a differential diagnosis. Plague is endemic in wild rodents

throughout much of the southwestern United States. The domestic animal most commonly affected by plague in this region is the domestic cat. In several instances, infected cats have been the source of human infections.

CONTRIBUTOR

Veterinary Diagnostic Services, Albuquerque, New Mexico.

SUGGESTED READING

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MS 43

HISTORY

This 4-year-old male retriever died following a 2-day illness. Clinical signs included vomiting, anorexia, distress, and compulsive biting at the back over the lower lumbar region. The animal was from an urban home and had been fed uncooked chopped meat from a local butcher shop.

GROSS PATHOLOGY

There were petechiae in the wall of the stomach and small intestine. There was hyperemia of the skin over the dorsal lumbar region.

DIAGNOSIS

Ganglioneuritis, necrotizing, acute, autonomic ganglia, (Auerbach's & Meissner's ganglia), small intestine, retriever, canine.

COMMENT

The clinical and histologic features are consistent with Aujesky's virus (pseudorabies) infection in an unadapted host. Retrospective inquiry revealed no known contact with pigs, but the dog was fed on uncooked minced meat sold for consumption in a local market. Aujesky's virus infection of dogs causes acute neuritis, ganglioneuritis, and encephalomyelitis. The infection is acquired from consumption of inadequately cooked pork. In the myenteric (Auerbach's) plexuses there are neuronal cytoplasmic swelling, focal necrosis, and neuronal loss. Cell debris and neutrophilic leukocytes are present in some plexuses. Occasional neurons contain large intranuclear inclusion bodies. These are also occasionally present in neurons within Meissner's plexuses, but generally there is less involvement in this layer. Between the external muscle layers and in the serosa there is patchy necrosis of the tunica media of small arterial vessels. Intranuclear inclusion bodies are occasionally seen in cells in these damaged vessels. In some sections there are multifocal hemorrhages adjacent to the areas of vascular necrosis.

CONTRIBUTOR

Department of Veterinary Pathology, University of Liverpool, Liverpool L69 3BX, England.

SUGGESTED READING

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MS 44

HISTORY

Tissues from a young female New Zealand white rabbit.

DIAGNOSIS

Meningitis, diffuse, granulomatous, mild to moderate, meninges, brain, New Zealand white rabbit. Encephalitis, granulomatous, multifocal, moderate, brain. Hyperplasia, mucosal, with numerous coccidial forms, moderate, small intestine.

COMMENT

The granulomatous (nonsuppurative) meningitis was not marked. The glial nodules in the neuropil were thought to be consistent with encephalitozoonosis, however, few organisms are seen. The intestinal coccidiosis is thought to be caused by a species of Eimeria. There are individual cell necrosis and necrotic debris in the intestinal lumen.

CONTRIBUTOR

Syntex Research, Palo Alto, California.

SUGGESTED READING

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MS 45

HISTORY

Tissue from one of 150 female New Zealand white rabbits. These animals came from a modern breeding farm and were housed in separate compartments. Over the last ten days the colony had increased daily losses, which had reached eight animals a day when diagnostic assistance was sought from the contributor.

DIAGNOSIS

Mineralization, tubular, multifocal, moderate, outer medulla and cortex, kidney, New Zealand white rabbit. Mineralization, multifocal, moderate, transmural, stomach.

COMMENT

Some tubules are dilated and contain proteinaceous fluid. Glomeruli, although not significantly mineralized, appear atrophied. The stomach shows mineralization of the mucosa, of the muscularis mucosae and muscle layers. The intima of the blood vessels also shows mineralization. These changes are consistent with vitamin D toxicosis. The feed in this case was a commercial rabbit feed. The source of the vitamin D3 was quoted as D-activated animal sterol, but the level was not on the label. The feed was analyzed and the level of D3 found was 508,000 I/U per kilogram in the feed submitted with the animals and in excess of 200,000 I/U in an unopened bag.

CONTRIBUTOR

Veterinary Laboratory, Ministry of Agriculture & Food, Abbotsford, B.C. V2S 4N8, Canada.

SUGGESTED READING

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MS 46

HISTORY

Tissue from a 2-1/2-year-old female Samoyed that had been anorexic for 10 days, eating only grass. Radiographs showed a large mass in the abdomen. Exploratory surgery showed a retroperitoneal mass involving the kidney. The dog was euthanatized on the operating table.

DIAGNOSIS

Ganglioneuroblastoma, retroperitoneal, region of kidney, Samoyed, canine.

COMMENT

This particular type of neoplasm is considered rare in all species. The tumors are reported to be locally invasive, but distant metastases are uncommon. This diagnosis was confirmed by the Department of Neuropathology, AFIP.

CONTRIBUTOR

Battelle, Columbus Laboratories, Pathology Section, Columbus, Ohio.

SUGGESTED READING

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MS 47

HISTORY

Tissue from a 3-year-old female Labrador retriever that presented with a limp and extreme pain in the left carpus.

LABORATORY RESULTS

Organisms from various Staphylococcus spp. were isolated from exudate in the carpus. Radiographs showed lysis of the radial carpal bone.

DIAGNOSIS

Osteomyelitis and synovitis, granulomatous, chronic, diffuse, moderate to severe, carpal bone and synovium, Labrador retriever, canine, etiology—Blastomyces dermatitidis.

COMMENT

Attempts by a commercial lab to isolate a fungus from lung tissue were unsuccessful, and fungal organisms were not seen on smears of exudate from the carpus. Although no fungal organism was isolated, a diagnosis of blastomycosis can be made based on the clinical expression of the disease, the distribution and morphology of the lesions, and the distinct morphology of the organism.

CONTRIBUTOR

Division of Pathology, Walter Reed Army Institute of Research, Washington, D.C.

SUGGESTED READING

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MS 48; LS 18

HISTORY

Brain tissue from a 22-month-old English setter dog that had a history of progressive dullness, intermittent convulsions and slight ataxia for 6 months.

GROSS PATHOLOGY

The dura mater was thickened, the cortex was yellow-brown, and the ventricles were dilated.

DIAGNOSIS

Ceroid-lipofuscinosis, neuronal, diffuse, moderate, cerebrum, English setter, canine.

COMMENT

The majority of neurons of the cerebral cortex and hippocampus contain multiple cytoplasmic inclusions that are round to irregular in shape and stain eosinophilic with hematoxylin and eosin. The inclusions are Sudan black and periodic acid-Schiff (PAS) positive, equivocally acid-fast, and fuscinophilic. The finding of inclusions in nerve cells of the cerebellum was associated with necrosis and marked decrease in the number of Purkinje cells and granule cells from the granular layer. Ultrastructurally, the cytoplasm of neurons of the cerebellum contained bodies that were irregular in outline and ranged in size from 1 to 3 micrometers. The bodies were limited in part by a single tripartite membrane. The bodies contained round, oval, or tubular lamellar profiles that have been designated curvilinear bodies.

CONTRIBUTOR

Merrell Dow Pharmaceuticals, Indianapolis, Indiana.

SUGGESTED READING

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MS 49

HISTORY

Tissue from a 3-month-old Sprague-Dawley female rat, Rattus nauvergius. The rat was randomly selected and necropsied as part of a quality assurance examination of an incoming lot of rats.

GROSS PATHOLOGY

External: No lesions were recognized. Internal: Multiple 5- to 8-mm firm nodular swellings were observed in the uterine horns. No other lesions were recognized.

DIAGNOSIS

Decidual proliferation, essentially normal tissue consistent with an implantation site, uterus, Sprague-Dawley rat, rodentia.

CONTRIBUTOR

USAF School of Aerospace Medicine (VSP), Brooks AFB, Texas.

SUGGESTED READING

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MS 50

HISTORY

An 8-year-old male German shepherd dog was boarded at a private kennel for 4 days and was reported to be anorexic while there. Upon returning home he appeared thin and vomited several times and died 4 days later.

GROSS PATHOLOGY

The stomach was thickened and hemorrhagic and contained yellow fluid. The duodenum and jejunum also had areas of hemorrhage. The kidneys had irregular surfaces. The bladder was thickened and rough. The urine was reported to be normal.

DIAGNOSIS

Gastritis, necrotizing, chronic-active, multifocal, mild to moderate, with midzonal mucosal mineralization and necrosis and thrombosis of submucosal arteries, stomach, German shepherd, canine.

COMMENT

Histological examination of the kidney revealed diffuse interstitial fibrosis and periglomerular sclerosis, confirming the suspected diagnosis of chronic renal failure. It is likely an acute crisis was precipitated by the stress of boarding. The section of stomach submitted here exhibits classical lesions of uremic gastropathy. In addition to hemorrhage, necrosis, and ulceration of the gastric mucosa, vasculopathy of the submucosal muscular arteries is well demonstrated. Vascular changes present in this case include hypertrophy and focal necrosis of medial smooth muscle cells, reduplication, fragmentation and mineralization of inner elastic membranes, endothelial cell swelling and detachment, and thrombosis.

CONTRIBUTOR

Department of Veterinary Micro/Path, Washington State University, Pullman, Washington.

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MS 51

HISTORY

Tissues were obtained from a 23-month-old moribund Fischer 344 rat that had an enlargement and proptosis of the left eye.

GROSS PATHOLOGY

Gross necropsy examination revealed in the region of the harderian gland a retrobulbar mass that extended to the maxilla and adjacent teeth and along the trigeminal nerve in the cranial cavity.

DIAGNOSIS

Carcinoma, squamous cell, oral cavity, Fischer 344 rat, rodentia.

COMMENT

Other lesions that may be present include: degeneration, trigeminal nerve, unilateral, severe; osteomyelitis, chronic-active, maxilla, focal, moderate; periodontitis/pulpitis, chronic-active, focal, severe; inflammation - chronic-active, harderian gland, bilateral, slight to severe.

Tumors of the oral cavity occur infrequently in Fischer 344 rats. This tumor was considered of interest because of its infrequent occurrence and because of misleading clinical signs and gross necropsy findings that suggested primary involvement of the harderian gland or trigeminal nerve.

CONTRIBUTOR

Toxicology Research Laboratory, The Dow Chemical Company, Midland, Michigan.

SUGGESTED READING

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MS 52, 53

HISTORY

Tissue from an adult female Toggenburg goat that had intermittent diarrhea for about 10 months. She was treated with several drugs that had no effect on the diarrhea. The doe was the only animal affected from a herd of 150.

GROSS FINDING

The mesenteric lymph nodes were all enlarged, ranging in size from 3 x 2.5 cm to 6 x 6 cm. On section, several small white caseous foci were present mainly in the cortex. Other lymph nodes were enlarged, but the enlargement was due to equal amounts of hyperplasia in the cortex and medulla. The lymphatics draining the cecum and colon were quite prominent. The cecum and spiral colon and cranial portion of the descending colon had numerous multifocal, variable-sized, finely granular raised areas.

LABORATORY RESULTS

Cytology: Acid-fast organisms seen in touch imprints of a mesenteric lymph node and mucosal scraping of cecum.

Microbiology: After 4 weeks, plates that were inoculated to recover Mycobacterium avium and M. bovis showed no growth.

DIAGNOSIS

Lymphadenitis, granulomatous, diffuse, with multifocal granulomas, lymph node, Toggenburg goat, caprine.

COMMENT

This is typical of M. paratuberculosis infections in the sheep and the goat. Granulomas are rarely seen in either intestinal or lymph node lesions in bovine animals affected with M. paratuberculosis.

CONTRIBUTOR

College of Veterinary Medicine, University of Tennessee, Department of Pathobiology, Knoxville, Tennessee.

SUGGESTED READING

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MS 54

HISTORY

Tissue from a 15-year-old spayed female cocker spaniel cross. The owners noted a rapidly growing, solitary, subcutaneous mass noted on the medial aspect of the thigh. The tumor was easily excised, and 3 months after removal no evidence of recurrence was noted.

DIAGNOSIS

Liposarcoma, subcutis, medial aspect of thigh, cocker spaniel, canine.

COMMENT

This rare neoplasm conforms well to descriptions present in the literature and contains areas of (1) adipose cells of varying malignancy, (2) anaplastic, fibrous-appearing tissue seen as solid sheets of cells with little or no vacuolation and with an attempt at a whorled pattern, and (3) cell types somewhere between the two extremes.

CONTRIBUTOR

Maryland Department of Agriculture, Animal Health Laboratory, College Park, Maryland.

SUGGESTED READING

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MS 55

HISTORY

Tissue from a pregnant ewe (69 days into gestation) that exhibited dyspnea when exercised or recumbent. A cesarean section was performed to recover the live fetus for research purposes. Afterwards the ewe was subjected to euthanasia and necropsied. A large ovoid mass measuring 20 x 25 cm and weighing 2.8 kg was found in the left thoracic cavity. The left lung appeared to be entirely replaced by the mass. The mass also displaced the heart towards the right thoracic cavity. The right lung was unaffected. Approximately 700 ml of clear transudate was present on the pleural cavity.

DIAGNOSIS

Thymoma, thymus, anterior thorax, breed unspecified, ovine.

COMMENT

All the characteristic features previously described for ovine and caprine thymomas were present in the mass, which was encapsulated by fibrous connective tissue and tended to be subdivided into lobules or nodules by a prominent trabeculum. The lobules were composed of small lymphocytes and epithelial cells; small numbers of eosinophils were scattered within the lobules. Scattered within and between the lymphocytes and epithelial cells were varying numbers of Hassall's corpuscles and large myoid cells. Lymphocytes were prominent in this tumor but were not neoplastic.

CONTRIBUTOR

Comparative Pathology Section, National Institutes of Health, Bethesda, Maryland.

SUGGESTED READING

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HISTORY

Tissue from a 3-year-old male cocker spaniel that presented with epistaxis, blindness, and weight loss. Examination revealed left hemiparesis and proprioceptive deficits and bilateral chorioretinitis with subretinal granuloma in the left eye, in addition to dyspnea and pneumonia. A chicken house was on the property of residence.

LABORATORY RESULTS

Peripheral blood leukocytes contained Histoplasma capsulatum organisms, with the packed cell volume being 16. Histoplasma organisms were in the bone marrow and in lymph node impression smears.

DIAGNOSIS

Thrombosis, chronic, vessels, with mild nonsuppurative meningitis, hemorrhage and phagocytized Histoplasma-like organisms, leptomeninges, cerebrum, cocker spaniel, canine. Malacia, multifocal, mild to moderate, cerebrum.

COMMENT

Although the yeasts were seen with difficulty on some of the slides stained with H&E, these organisms were easily demonstrated with Gomori's methenamine silver and Gridley stains. Most attendees thought the organisms in the macrophages within the neuroparenchyma were incidental findings with no direct role in the development of the necrosis. Areas of malacia appeared to be related to ischemia following meningeal vessel thrombosis. Trauma, dirofilariasis, and idiopathic disseminated intravascular coagulation were considered as possible etiologies for the thrombosis.

CONTRIBUTOR

Louisiana State University. Department of Veterinary Pathology. Baton Rouge, Louisiana.

SUGGESTED READING

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MS 57

HISTORY

Tissue from a Fischer 344/Mal BR rat that was sacrificed at the termination of a 2-year feeding test. This rat was in an intermediate dosage group and at the time of sacrifice was noticed to have a firm abdominal mass that was ovoid and cream-yellow in color and measured 10 X 10 X 8 mm in size.

DIAGNOSIS

Gonadostromal tumor, Sertoli-cell pattern, ovary, Fischer 344/Mal BR rat, rodentia.

COMMENT

This tumor was very well delineated from the remaining ovarian tissue and showed compression of the surrounding normal ovary. The characteristic feature within the neoplasm was the tubular structures lined by tall columnar epithelial cells resembling the rete tubules. These were surrounded by undifferentiated cells. This type of tumor is rare in rats, and the one described here was the only one seen in over 700 female rats included in this study.

COMMENT

Granulosa cell tumor, Sertoli-cell pattern; ovotestis; and Sertoli-Leydig cell tumor were also considered as differential diagnosis. The diagnosis of ovotestis was discounted because this tissue lacked well-differentiated cells, germinal cells, and distinct separation of possible testicular tissue from ovarian tissue. There is confusion in the literature about designation of gonadostromal tumors. Some authorities think that arrhenoblastoma, Sertoli-Leydig cell tumor, and Sertoli-cell tumor of the ovary are varying patterns of the same tumor and have a different origin from that of granulosa cells.

CONTRIBUTOR

Carnegie-Mellon Institute of Research and Food & Drug Administration, Bureau of Drugs, Office of Scientific Evaluation, Rockville, Maryland.

SUGGESTED READING

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MS 58; LS 19–21

HISTORY

Tissue from a 3-week-old female hairless Hartley strain guinea pig. This hairless guinea pig, its mother, and a normal littermate were housed in an isolator soon after birth of the litter. The hairless guinea pig appeared normal until it suddenly developed severe depression of all central nervous system functions.

GROSS PATHOLOGY

Multiple hemorrhages were present on mucosal and serosal surfaces of the stomach and small intestine. The liver was enlarged, soft, and pale; and multiple necrotic foci were present beneath the capsule. The spleen and all lymph nodes were swollen. Multiple hemorrhagic foci were present in the cerebral cortices and brain stem.

DIAGNOSIS

Meningoencephalitis, necrohemorrhagic, subacute, multifocal, moderate, with intranuclear inclusion bodies, cerebrum, hairless Hartley strain guinea pig, rodentia.

COMMENT

Cytomegalovirus (CMV) infection limited to the salivary gland is common in guinea pigs. In the hairless guinea pig, which is also thymic deficient, CMV produces a fulminating disease involving nearly every organ, including the brain, as in this case. The mother of this hairless guinea pig and its littermate both had CMV intranuclear inclusions within salivary ductal epithelium. In the mother, there was a mild subclinical inflammatory response. Neither the mother nor the littermate were clinically affected. However, the viral particles seen in the electron-microscopic photos were characteristic of a herpesvirus.

CONTRIBUTOR

Eastman Kodak Company, Kodak Park, Rochester, New York.

SUGGESTED READING

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MS 59

HISTORY

Tissue from a 10-year-old female pony. Urinary incontinence was noted for about 4 weeks, and during the last week fecal incontinence and right facial paralysis were seen. No treatment was given during the period of developing ataxia. There was analgesia of the tailhead area extending to about 20 cm above the hocks. She tended to fall when turned and required assistance to rise because of rear limb weakness. There was drooping of the right eyelid, ear, and lip, with left deviation of the muzzle.

GROSS PATHOLOGY

At necropsy, the distal spinal cord and associated spinal nerves were firm, thickened, and gray colored.

LABORATORY RESULTS

CSF: 4500 WBC/mm^3, primarily polymorphonuclear cells
3325 RBC/mm^3
Protein, 290 mg/dl

DIAGNOSIS

Ganglioneuritis, granulomatous, chronic, diffuse, severe, cauda equina and associated ganglia, pony, breed unspecified, equine.

COMMENT

The morphologic diagnosis of granulomatous ganglioneuritis is preferred instead of granulomas because of the absence of a laminar arrangement of the cells in the inflammatory foci and because the fibrous tissue circumscribing the foci was considered to be preexistent nerve sheath connective tissue.

Similar lesions were found in the trigeminal ganglia, trigeminal nerves, and spinal nerves of terminal lumbar cord segments. Several special stains were applied, none of which revealed an etiologic agent. Possible etiologies include aberrant helminth larval migration, protozoal infections, previous fungal, bacterial, or viral (EHV-1 and EVA) infections and trauma. Reports indicate that significant vasculitis is not usually found and is not present in this case. A hypersensitivity reaction to altered myelin or bacterial antigens (i.e., streptococcal antigens) has also received attention in discussions on experimental allergic neuritis. One report describes cauda equina neuritis in four horses with circulating antibodies to bovine P_2, a protein purified from peripheral myelin. Bovine P_2 is a neuritogenic antigen used in experimental allergic neuritis. Recently, two cases of cauda equina neuritis in dogs were reported in which titers to P_2 were not elevated.

CONTRIBUTOR

Department of Veterinary Pathology, Iowa State University, Ames, Iowa.

SUGGESTED READING

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Mitsumori, K., Marta, K., and Shirosu, Y.: An ultrastructural study of spinal nerve roots and dorsal root ganglia in aging rats with spontaneous radiculoneuropathy. Vet. Pathol. 18: 714–726, 1981.

MS 60

HISTORY

Tissue from a 294-day-old female Sprague-Dawley rat. This rat was in the low-dose group of a 2-year carcinogenicity study. It was killed in a moribund condition on day 266. One month prior to necropsy it had hematuria and bloody perineum; food consumption dropped considerably with 16 percent loss in body weight in the last week of life. The rat chewed off most of its tail.

GROSS PATHOLOGY

Tissue mass: A firm, soft, irregular, elongated mass (9 cm long and 1.5 cm in diameter) was seen originating from the ventral side of the vertebral column at the sacrolumbar area (base of the tail), extending anteriorly through the abdominal cavity and protruding through the diaphragm into the thoracic cavity.

Lung: Multiple firm white nodules (0.2 cm to 0.5 cm in diameter) throughout.

Liver: Markedly enlarged and mottled.

DIAGNOSIS

Chondrosarcoma, vertebral body, epaxial muscles and unidentified tissue, Sprague-Dawley rat, rodentia.

COMMENT

Chondrosarcoma characterized by marked proliferation of round to ovoid cartilage cells with lightly basophilic matrix, arranged in nests and bundles separated by fine reticulin fibers. There were many binucleated cells and rare mitotic figures. Multiple nodular foci of metastasis were present in lung, and one focus of metastasis was also attached to the endocardium of right ventricle.

CONTRIBUTOR

Sterling-Winthrop Research Institute, Rensselaer, New York.

SUGGESTED READING

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Pool, R. R.: Tumors of bone and cartilage. In Tumors in Domestic Animals, 2nd Edition, Moulton, J. E., ed., University of California Press, Berkeley, 1978, pp. 89–149.

MS 61

HISTORY

Tissue from a 2-month-old male quarter horse found walking in circles out in the pasture.

GROSS PATHOLOGY

Poorly delineated gray foci measuring up to 1 mm in diameter were seen in the liver.

LABORATORY RESULTS

No pathogenic bacteria isolated from liver, spleen, or lung. Centrifugal flotation of feces demonstrated Strongyles measuring 52 eggs per gram.

DIAGNOSIS

Hepatocellular loss with lobular collapse, portal, diffuse, severe, with bile duct proliferation, liver, quarter horse, equine. Hepatitis, eosinophilic, subacute, focal, moderate, liver.

COMMENT

Hepatic necrosis associated with bile duct proliferation has been observed throughout the United States in neonatal foals given an inoculum of digestive promotants shortly after birth. The majority of these foals died approximately 5 to 7 days after receiving the inoculum. This case is unique, as the foal survived 2 months.

The inoculum contained fermentation products consisting of Lactobacillus acidophilus, L. casei, Bacterium bifidus, Aspergillus oryzae, Torulopsis, and Streptococcus lactis organisms; vitamins; ferrous fumarate; and inert ingredients. There are reports of mycotic agents and ferrous fumarate causing hepatoxicosis. An unusual sensitivity to iron compounds has been suggested as the cause of the hepatonecrosis of these foals, because hundreds of other foals received the product and had no known ill effects. Many conference attendees thought there was excessive fibrous tissue in the areas of hepatocellular loss, supporting a diagnosis of a chronic lesion; however, staining with Masson trichrome and reticulum stain revealed the material to be reticulum. In addition, some sections contained lesions caused by migrating nematodal larvae.

CONTRIBUTOR

Department of Veterinary Science, University of Nebraska, Lincoln, Nebraska.

SUGGESTED READING

Acland, H. M.: Toxicity hepatopathy in neonatal foals. Vet. Pathol. 21: 3–9, 1984.

Owens, T. J.: Toxic hepatic failure in newborn foals. J. Am. Vet. Med. Assoc. 183: 1407–1413, 1983.

Swerczek, T. W., and Ward Crowe, M.: University of Kentucky, Department of Veterinary Science, Notes for the Veterinary Practitioner, April, #3, 1983.

MS 62

HISTORY

Tissue from a 1-year-old chinchilla rabbit that was due to kindle on 4/27/83. On 4/23/83 she developed a bloody vulvar discharge but no fetuses were delivered. She died the next day.

GROSS PATHOLOGY

The liver was diffusely mottled by multiple focal white miliary lesions involving the entire organ. The uterus was darkened, had serosal ecchymotic hemorrhages, and contained several placentas and fetuses in varying stages of resorption.

LABORATORY RESULTS

Parasitologic examination: No parasite ova or protozoa were present. Nutritional examination: Liver selenium level was 1.087 ug/gm of dry weight. Bacteriologic examination: Escherichia coli was isolated from the small intestine and uterine swab. Listeria monocytogenes was isolated from the liver, lung, and uterine swabs. The etiology of both processes was Listeria monocytogenes.

DIAGNOSIS

Metritis, transmural, necrotizing, subacute, diffuse, severe, with colonies of Gram-positive coccobacilli, chinchilla rabbit, lagomorph. Hepatitis, necrotizing, subacute, multifocal, moderate, with colonies of coccobacilli.

Kadlubowski, M., and Ingram, P. L.: Circulating antibodies to the neuritogenic myelin protein, P_2, in neuritis of the cauda equina of the horse. Nature 293: 299–300, 1981.

Mitsumori, K., Marta, K., and Shirasu, Y.: An ultrastructural study of spinal nerve roots and dorsal root ganglia in aging rats with spontaneous radiculoneuropathy. Vet. Pathol. 18: 714–726, 1981.

MS 60

HISTORY

Tissue from a 294-day-old female Sprague–Dawley rat. This rat was in the low-dose group of a 2-year carcinogenicity study. It was killed in a moribund condition on day 266. One month prior to necropsy it had hematuria and bloody perineum; food consumption dropped considerably with 16 percent loss in body weight in the last week of life. The rat chewed off most of its tail.

GROSS PATHOLOGY

Tissue mass: A firm, soft, irregular, elongated mass (9 cm long and 1.5 cm in diameter) was seen originating from the ventral side of the vertebral column at the sacrolumbar area (base of the tail), extending anteriorly through the abdominal cavity and protruding through the diaphragm into the thoracic cavity.

Lung: Multiple firm white nodules (0.2 cm to 0.5 cm in diameter) throughout.

Liver: Markedly enlarged and mottled.

DIAGNOSIS

Chondrosarcoma, vertebral body, epaxial muscles and unidentified tissue, Sprague-Dawley rat, rodentia.

COMMENT

Chondrosarcoma characterized by marked proliferation of round to ovoid cartilage cells with lightly basophilic matrix, arranged in nests and bundles separated by fine reticulin fibers. There were many binucleated cells and rare mitotic figures. Multiple nodular foci of metastasis were present in lung, and one focus of metastasis was also attached to the endocardium of right ventricle.

CONTRIBUTOR

Sterling-Winthrop Research Institute, Rensselaer, New York.

SUGGESTED READING

Misdorp, W., and van der Heul, R. O.: Tumors of bones and joints. International Histological Classification of Tumors of Domestic Animals, Part 2. Bull. WHO 53: 265-282, 1974.

Pool, R. R.: Tumors of bone and cartilage. In Tumors in Domestic Animals, 2nd Edition, Moulton, J. E., ed., University of California Press, Berkeley, 1978, pp. 89-149.

MS 61

HISTORY

Tissue from a 2-month-old male quarter horse found walking in circles out in the pasture.

GROSS PATHOLOGY

Poorly delineated gray foci measuring up to 1 mm in diameter were seen in the liver.

LABORATORY RESULTS

No pathogenic bacteria isolated from liver, spleen, or lung. Centrifugal flotation of feces demonstrated Strongyles measuring 52 eggs per gram.

DIAGNOSIS

Hepatocellular loss with lobular collapse, portal, diffuse, severe, with bile duct proliferation, liver, quarter horse, equine. Hepatitis, eosinophilic, subacute, focal, moderate, liver.

COMMENT

Hepatic necrosis associated with bile duct proliferation has been observed throughout the United States in neonatal foals given an inoculum of digestive tract contents shortly after birth. The majority of these foals died approximately 5 to 7 days after receiving the inoculum. This case is unique, as the foal survived 3 months.

The inoculum contained fermentation products consisting of Lactobacillus acidophilus, L. casei, Bacterium bifidus, Aspergillus oryzae, Torulopsis, and Streptococcus lactis organisms; vitamins; ferrous fumarate; and inert ingredients. There are reports of mycotic agents and ferrous fumarate causing hepatoxicosis. An unusual sensitivity to iron compounds has been suggested as the cause of the hepatonecrosis of these foals, because hundreds of other foals received the product and had no known ill effects. Many conference attendees thought there was excessive fibrous tissue in the areas of hepatocellular loss, supporting a diagnosis of a chronic lesion; however, staining with Masson trichrome and reticulum stain revealed the material to be reticulum. In addition, some sections contained lesions caused by migrating nematodial larvae.

CONTRIBUTOR

Department of Veterinary Science, University of Nebraska, Lincoln, Nebraska.

SUGGESTED READING

Acland, H. M.: Toxicity hepatopathy in neonatal foals. Vet. Pathol. 21: 3-9, 1984.

Owens, T. J.: Toxic hepatic failure in newborn foals. J. Am. Vet. Med. Assoc. 183: 1407-1413, 1983.

Swerczek, T. W., and Ward Crowe, M.: University of Kentucky, Department of Veterinary Science, Notes for the Veterinary Practitioner, April, #3, 1983.

MS 62

HISTORY

Tissue from a 1-year-old chinchilla rabbit that was due to kindle on 4/27/83. On 4/23/83 she developed a bloody vulvar discharge but no fetuses were delivered. She died the next day.

GROSS PATHOLOGY

The liver was diffusely mottled by multiple focal white miliary lesions involving the entire organ. The uterus was darkened, had serosal ecchymotic hemorrhages, and contained several placentas and fetuses in varying stages of resorption.

LABORATORY RESULTS

Parasitologic examination: No parasite ova or protozoa were present.
Nutritional examination: Liver selenium level was 1.087 ug/gm of dry weight.
Bacteriologic examination: Escherichia coli was isolated from the small intestine and uterine swab. Listeria monocytogenes was isolated from the liver, lung, and uterine swabs. The etiology of both processes was Listeria monocytogenes.

DIAGNOSIS

Metritis, transmural, necrotizing, subacute, diffuse, severe, with colonies of gram-positive coccobacilli, chinchilla rabbit, lagomorph. Hepatitis, necrotizing, subacute, multifocal, moderate, with colonies of coccobacilli.

COMMENT

Listeriosis must be considered etiologically in any disease of rabbits in which multifocal miliary lesions of the liver are produced. Other potential etiologies include biliary coccidiosis, Tyzzer's disease, tularemia, and salmonellosis. In this case, Warthin-Starry stains for Bacillus piliformis were negative, as were results of the fecal examination. However, interestingly enough, the silver stain revealed the small bacillary agent. Gram stains confirmed the organism to be Gram-positive. The organism was also easily demonstrated within the uterus and also within a focal necrotic area in the adrenal gland. Listeriosis presents as a sporadic septicemia in rabbits, other laboratory animals, and chinchillas. It is characterized by abortion, sudden deaths, or both, and appears to have an affinity for the gravid uterus. Rarely is there CNS involvement. The suspected route of infection is oral and stress related, but the pathogenesis is obscure. When systemic, the organism is rather easily cultured, in contrast to the usual cases of CNS involvement in ruminants.

CONTRIBUTOR

Michigan State University, Animal Health Diagnostic Laboratory, Lansing, Michigan.

SUGGESTED READING

Flatt, R. E.: Bacterial diseases. In The Biology of the Laboratory Rabbit. New York, Academic Press, 1974, pp. 219-221.

Jones, T. C., and Hunt, R. D.: Veterinary Pathology, ed. 5. Philadelphia, Lea & Febiger, 1983.

MS 63

HISTORY

This 3-week-old thoroughbred filly was found dead. There had been no premonitory signs of illness.

GROSS PATHOLOGY

The liver was greatly enlarged and swollen. Multifocal areas of necrosis were distributed throughout. Ecchymotic hemorrhages were present on the serosal surface of the intestine, cecum, and colon.

DIAGNOSIS

Hepatitis, necrotizing, multifocal, coalescing, severe, with large intracellular bacilli compatible with Bacillus piliformis, thoroughbred, equine.

COMMENT

Numerous filamentous bacterial rods compatible with Bacillus piliformis (Tyzzer's disease) were present within the cytoplasm of hepatocytes about the periphery of the necrotic foci.

CONTRIBUTOR

Livestock Disease Diagnostic Center, University of Kentucky, Lexington, Kentucky.

SUGGESTED READING

McLeod, C. G., Stookey, J. L., Harrington, D. G., et al.: Intestinal Tyzzer's disease and spirochetosis in a guinea pig. Vet. Pathol. 14: 229-235, 1977.

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MS 64

HISTORY

Tissue from one of 40 weaner rams that died after showing severe photosensitization and jaundice. These rams were in a flock of 190 grazing in barley stubble paddock. Sheep nuts, lupid seed, oats, and Lucerne hay were fed as supplements.

GROSS PATHOLOGY

Severe emaciation and photosensitization, jaundice, a pale yellow-green hue to the liver, which had an accentuated lobular pattern, and pale kidneys were observed.

DIAGNOSIS

Hepatopathy, characterized by hepatocellular swelling, single cell necrosis, centrilobular hepatocyte loss, Kupffer cell hypertrophy, and biliary ductal hyperplasia and necrosis, diffuse, mild to moderate, liver, Merino, ovine. Nephrosis, and hyperplasia, multifocal, with acicular cleft formation, cortex, kidney.

COMMENT

The outstanding feature of the liver was the presence of cholesterol-like clefts in Kupffer cells, hepatocytes, and the lumens of bile ductules. Epithelium of the ductules was irregularly hyperplastic, atrophic, or necrotic. A mild degree of karyomegaly was also evident throughout the liver.

In the kidney there were cholesterol-like clefts in the lumens of the proximal convoluted tubules, associated with segmental epithelial hyperplasia. Other observations in the kidneys included dilation of the ascending loops of Henle and distal convoluted tubules, leakage of proteinaceous fluid, and mild karyomegaly of the tubular epithelium.

The clefts in the liver are considered pathognomonic for geeldikkop by some authors. The presence of these clefts in the kidney is unusual. Similar clefts are reported in other nephro-hepatic intoxications. The pathogenesis of geeldikkop was investigated for 6 decades--from 1918 to 1972--without definitive success. It has now been shown that the plant Tribulus terrestis plays a central role in the pathogenesis, which had been long suspected. This plant provides a microenvironment supporting the growth of Pithomyces chartarum, a fungal saprophyte of grasses and other plants that produce a toxin known as sporidesmin. When this toxin alone is given to sheep in .75–4.0 mg/kg doses it produces the classic signs and lesions of facial eczema. If the toxin is given in the .25–.70 mg/kg range while feeding T. terrestris, classic geeldikkop results. The apparent mechanism of both forms of photosensitization is failure of the liver to excrete phylloerythrins. The difference in disease form is determined by the biliary-hepatocellular changes induced by the toxicants. In geeldikkop, T. terrestris toxins modify the toxicity of sporidesmin, producing lesions at lower dose range and an altered clinical presentation from that of facial eczema.

CONTRIBUTOR

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MS 65

HISTORY

Fifteen Rocky Mountain bighorn ewes (Ovis canadensis) were transported to a new range. Deaths began to occur both on the home range and among the transplants within 2 weeks. Coughing and some nasal discharge were noted clinically.

GROSS PATHOLOGY

Each animal was in poor condition. There was gray-red to gray-tan consolidation of the anteroventral lung lobes. Firm, light tan to green nodules and foci 1 to 3 cm in diameter were found throughout the dorsal caudal lung lobes. Occasionally, organisms of Protostrongylus sp. were in terminal pulmonary bronchioles.

DIAGNOSIS

Pneumonia, chronic, multifocal to coalescing, moderate, with numerous metastrongyle parasites, lung, Ovis canadensis.

COMMENT

The metastrongyle parasites within the lung lesions are consistent with Protostrongylus sp. The species can not be identified in histologic sections. There are numerous bronchi and bronchioles containing purulent exudative material, but there are no histologic changes consistent with bronchitis or bronchiolitis in the sections examined. An acute inflammatory lesion not in the plane of section was the most plausible explanation.

CONTRIBUTOR

Veterinary Laboratory, B. C. Ministery of Agriculture and Food, Abbotsford, B.C. V2S 4N8.

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MS 66, 67

HISTORY

Tissue from a 5-month-old mixed-breed colt from South Africa. This foal was running with its dam on pasture in late summer. It was found dead one morning. There had been no premonitory signs.

GROSS PATHOLOGY

Pale yellow froth was present in both nostrils. The lungs were incompletely collapsed and heavy. Interlobular septa and visceral pleura were thickened, and clear fluid oozed from the cut surfaces of the lung. The trachea and bronchi were froth filled. Marked pericardial edema and thoracic serous effusion were observed.

LABORATORY RESULTS

African horse sickness virus was isolated, and high virus titers were demonstrated in the lung and spleen. The virus serotype was not determined. The protein content of the pericardial and thoracic fluid was 3.0 g/dl by refractometry.

DIAGNOSIS

Edema, pulmonary, pleural, interlobular, and alveolar, acute, diffuse, severe, grade equine. Lymphoid depletion and necrosis, diffuse, moderate, white pulp, spleen.

COMMENT

African horse sickness virus (Orbivirus sp.) causes clinical disease in horses and dogs. Three forms of the disease have been described: pulmonary, cardiac, and mixed; however, there is probably only one form, with variations in lesions, which are determined by the virus-host relationship and viral serotype. Transmission is by hemophageous Culicoides sp., accounting for the seasonal peaks of the disease among horses. Dogs become infected by ingestion of infected horse flesh. Ultrastructural studies have not revealed endothelial damage or viral particles in affected tissues.

CONTRIBUTOR

Veterinary Research Institute, Onderstepoort Republic of South Africa, and Department of Veterinary Pathology, Armed Forces Institute of Pathology, Washington, D.C.

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MS 68, 69

HISTORY

his bull was inoculated with an infectious agent. There was a slight febrile eaction on postinoculation day (P.I.) 8. Peripheral lymph node enlargement as present by P.I. day 18. The animal became progressively anorectic and maciated. It was killed and necropsied on P.I. day 25.

GROSS PATHOLOGY

t necropsy there were generalized subcutaneous and visceral icterus, eneralized peripheral and internal lymph node enlargement and edema, epatomegaly with diffuse portal infiltration and pale discoloration, edema of he gallbladder wall, multiple rectangular 2.5- to 5.0-cm abomasal ulcers, and isseminated white raised 0.5-cm foci in the cortex of the lobules of both idneys. The animal had been splenectomized prior to inoculation.

IAGNOSIS

perplasia, lymphoblastic, diffuse, with mild multifocal necrosis and numerous tracellular parasitic protozoal forms (Koch bodies), lymph node, crossbreed, ovine, infiltration and proliferation, lymphoblastic, with Koch bodies, portal reas, diffuse, moderate, liver. Erythroparasitism, diffuse, severe, lymph node nd liver, etiology--Theileria parva.

OMMENT

st Coast fever is caused by protozoal parasites of the genus Theileria. There re three Theileria sp. parasites which, separately or in combination, cause the rease (T. parva, T. lawrencei, and T. mutans). T. parva has been classically garded as the causative organism. The tick vector for T. parva is hipicephalus appendiculatus. This same tick can also transmit T. lawrencei. e pathogenesis and lesions of East Coast fever have been reviewed, as has e development in the tick vectors. The disease is endemic in East and ntral Africa, where it causes significant cattle losses. Field cases of East ast fever are routinely diagnosed by examination of Giemsa-stained blood

smears for lymphoblastoid cells containing macroschizonts, in conjunction with the typical clinical signs. The roles of humoral and cell-mediated immunity have recently been reviewed. It appears that cell-mediated immunity (CML type I) is the most important factor in the immune response in the bovine.

CONTRIBUTOR

Veterinary Research Institute, Onderstepoort Republic of South Africa, and Department of Geographic Pathology, Armed Forces Institute of Pathology, Washington, D.C.

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MS 70

HISTORY

Tissue from the pastern area of the right forelimb. This 15-year-old quarter horse gelding had become severely lame prior to euthanasia.

GROSS PATHOLOGY

There was severe laminitis. Large numbers of irregular "leeches" were present between the hoof wall and the distal and middle phalanges.

LABORATORY RESULTS

Pythium sp. (Hyphomyces destruens) was cultured on numerous occasions. The only material suitable for culture was the "leeches."

DIAGNOSIS

Dermatitis, necrogranulomatous, eosinophilic, with fungal hyphae and surrounding granulation tissue, focally extensive, severe, pastern area, quarter horse, equine, etiology—Pythium sp. (Hyphomyces destruens).

COMMENT

This lesion is characteristic of pythiosis. Lesions caused by this fungus are most common on the lower limbs and ventral abdomen and are usually single. "Leeches" are the only structures in which hyphae are seen, so a diagnosis by histology or culture can be made only if tissue containing "leeches" is submitted.

Pythium sp. has been classified as a Phycomycete or Zygomycete by many authors but it is currently classified as an Oomycete in the kingdom Protista by Chandler *et al.*

CONTRIBUTOR

Department of Veterinary Pathology, School of Veterinary Medicine, Louisiana State University, Baton Rouge, Louisiana.

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MS 72

HISTORY

Tissue from a 1-year-old spayed-female pug that had recently developed lethargy, circling to the right, right head tilt, stiff hypermetric gait, and papilledema.

DIAGNOSIS

Meningoencephalitis, granulomatous, (lymphohistiocytic), mild to moderate, cerebrum, brain, pug, canine.

COMMENT

The encephalitis seen in pug dogs varies from the reticulosis-granulomatous complex in site of lesion (pug dog encephalitis is cerebral rather than brain stem or cerebellar) and histologic locale (pug dog encephalitis is a gray and white matter lesion, while reticulosis usually involves white matter). The cases of pug dog encephalitis seen here were from a single kennel, but the pedigrees and relationships of the dogs are not known.

CONTRIBUTOR

Department of Pathology, New York State College of Veterinary Medicine, Cornell University, Ithaca, New York.

SUGGESTED READING

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MS 73

HISTORY

Tissue from a 3-month-old Suffolk feeder lamb held in dry lot on a 12 percent protein ration. The lamb was found down in opisthotonus. No premonitory symptoms had been observed. The temperature was 107 F.

LABORATORY RESULTS

Pseudorabies virus was identified in the brain sections by fluorescent antibody test and by virus isolation.

DIAGNOSIS

Meningoencephalitis, subacute, diffuse, with neuronal intranuclear inclusions, mild to moderate, cerebrum, brain, Suffolk, ovine, etiology--pseudorabies virus.

COMMENT

There are scattered herpetiform intranuclear inclusions within neurons. There is considerable variation in the inflammatory infiltrate from slide to slide. Some slides contain pockets of neutrophils as well as lymphoplasmacytic infiltrates, while others have very little. Scattered satellitosis and neuronophagia are present.

CONTRIBUTOR

Animal Disease Diagnositic Laboratory, Purdue University, West Lafayette, Indiana.

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MS 74

HISTORY

Tissue from a 2-year-old female mixed-breed dog from Florida. This dog began vomiting after eating the seeds from a plant. Two days prior to death she became icteric, dehydrated, and weak.

GROSS PATHOLOGY

The dog was severely icteric. There were severe, acute, hemorrhagic enteritis and colitis, along with necrotic hepatopathy and moderate ascites.

LABORATORY RESULTS

Total bilirubin	19 mg/dl	Urea	144 mg/dl
Direct bilirubin	18 mg/dl	Creatinine	2.5 mg/dl
Indirect bilirubin	1 mg/dl	Total protein	3.3 g/dl
Aspartate aminotransferase	119 IU/l	Albumin	1.6 g/dl
Alanine aminotransferase	297 IU/l	Globulins	1.7 g/dl
Serum alkaline phosphatase	584 IU/l		

DIAGNOSIS

Necrosis, hemorrhagic, centrilobular–midzonal, acute, diffuse, severe, with moderate bile stasis, liver, mixed breed, canine.

COMMENT

Zamia floridana, a member of the Cycadaceae, is a common native and cultivated plant in Florida. Cycad intoxication of domestic animals has rarely been described in the United States. Acute intoxication results in severe gastrointestinal disturbances and hepatic dysfunction, whereas long-term ingestion of cycads produces posterior ataxia, paresis, and paralysis. The toxic constituents in cycads are composed of a group of azoxyglycosides found in varying quantities throughout the plant. Cycasin represents the most studied compound of this group and has been demonstrated to be responsible for hepatotoxic effects. It also has carcinogenic effects in laboratory animals.

CONTRIBUTOR

Department of Comparative Pathology, College of Veterinary Medicine, Gainesville, Florida.

SUGGESTED READING

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HISTORY

Tissue from a 14-day-old male Boston terrier puppy. This puppy was one of seven that developed profuse diarrhea 13 days after whelping. He was treated parenterally with fluids containing neomycin sulfate. He became dehydrated, went into a coma, and then died.

DIAGNOSIS

Nephrosis, acute, diffuse, with coarse granular casts, moderate, Boston terrier, canine.

COMMENT

The total dosage of neomycin sulfate received per administration was determined to be approximately 80 times the recommended amount. Neomycin is poorly absorbed from the intestinal tract, but parenteral administration results in high blood levels and rapid excretion in the urine. Acute tubular necrosis or ototoxicity may occur when relatively large or repeated doses of the drug are used.

CONTRIBUTOR

Department of Veterinary Science, University of Nebraska, Lincoln, Nebraska.

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HISTORY

Tissue from an adult female strain 13 guinea pig found dead without prior clinical signs.

GROSS PATHOLOGY

All of the lung lobes were uniformly red and firm and failed to collapse.

DIAGNOSIS

Pneumonia, interstitial, subacute, with intra-alveolar protozoal forms, diffuse, moderate, lung, strain-13, guinea pig, etiology—Pneumocystis carinii.

COMMENT

Clinical Pneumocystis infections are rare occurrences in any species. Immunosuppression is considered an essential component for clinically significant infections to occur. Premunition is probably significant in the control of this organism, which is ubiquitous among many species. Some attendees thought that this case was unusual in that guinea pigs are rarely infected and that it has been difficult to produce experimental infections in the guinea pig. Pneumocystis causes interstitial plasma-cell pneumonia in man. The infiltrate present in this case, however, is principally lymphocytic and led to speculation that there might have been an underlying lymphoproliferative change that caused an immunosuppression predisposing to the overgrowth of the protozoan. Stress associated with pregnancy and parturition was also discussed as a possible predisposing factor.

CONTRIBUTOR

US Army Medical Research Institute of Infectious Diseases, Pathology Division, Fort Detrick, Frederick, Maryland 21701.

SUGGESTED READING

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MS 77

HISTORY

Tissue from an adult female European wild rabbit (Oryctolagus cuniculus).

GROSS PATHOLOGY

The rabbit was in poor nutritional condition, with bilateral, severe swelling and erythema of the eyelids and a white ocular discharge. The anogenital region was markedly swollen and ulcerated.

DIAGNOSIS

Dermatitis and cellulitis, subacute, diffuse, moderate, with marked edema, fibroblastic proliferation (myxoma cells), and epithelial ballooning degeneration and necrosis with intracytoplasmic inclusion bodies, skin and skeletal muscle, eyelid, European wild rabbit (Oryctolagus cuniculus), etiology--leporipoxvirus, infectious myxomatosis of rabbits.

COMMENT

Edematous swelling in the anogenital area is almost pathognomonic for myxomatosis.

CONTRIBUTOR

10th Medical Laboratory, APO New York 09180, and Department of Veterinary Pathology, AFIP, Washington, D.C.

SUGGESTED READING

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HISTORY

Tissue from a 4-year-old marmoset (Callithrix jacchus) that had several episodes of bloody mucoid diarrhea. The diarrhea was responsive to treatment; however, this animal was found dead in his cage 3 weeks after the last treatment.

LABORATORY RESULTS

The white blood cell count was 48,000, and the blood glucose was 38 mg/dl. Colonic swabs at necropsy yielded Campylobacter fetus subsp. jejuni.

DIAGNOSIS

Colitis, necrosuppurative, acute to subacute, segmental to diffuse, moderate to severe, colon, marmoset (Callithrix jacchus), etiology-- Campylobacter fetus subsp. jejuni.

CONTRIBUTOR

US Army Medical Research Institute of Chemical Defense, Comparative Pathology Branch, Aberdeen Proving Ground, Edgewood, Maryland.

SUGGESTED READING

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MS 79

HISTORY

Tissues from one of 52 weaner pigs that were purchased for rearing. Seven days after arrival on the farm, 27 of the pigs had high fever, anorexia, and cutaneous hyperemia. Most of these pigs died 7 to 12 days later.

GROSS LESIONS

Petechial and ecchymotic hemorrhages were seen in many organs, including larynx, kidney, urinary bladder, and lungs. There were edema and hemorrhage in the lymph nodes and infarction of the spleen and kidney.

LABORATORY RESULTS

A severe leukopenia was evident in the pigs examined. Hog cholera virus was isolated from the brain and tonsil. The fluorescent antibody test on tonsil tissue demonstrated hog cholera antigens in the tonsil.

DIAGNOSIS

Necrosis, coagulative, acute, multifocal, severe, kidney, porcine (consistent with renal infarcts). Nephritis, interstitial, subacute, multifocal, moderate, kidney. Meningoencephalitis, subacute, multifocal, mild, cerebellum, brain.

CONTRIBUTOR

Department of Veterinary Medicine, Animal Industry Research Institute TSC, Chunan, Miaoli, Taiwan 350, Republic of China.

SUGGESTED READING

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MS 80

HISTORY

Tissue from a ewe that had recently lambed and was in lactation. She was fed hay and silage supplemented with grain.

DIAGNOSIS

Encephalomeningitis, subacute, diffuse, with microabscessation, moderate, brainstem, breed unspecified, ovine, etiology— Listeria monocytogenes.

COMMENT

The Brown–Hopps stain revealed gram-positive organisms consistent with listeriosis. It is commonly believed that an association exists between listeriosis and silage-feeding.

CONTRIBUTOR

Upjohn Pharmaceutical Corporation, Raritan, New Jersey.

SUGGESTED READING

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MS 81, 82

HISTORY

Tissue from a 6-year-old female DSH cat. A mass appeared on the abdomen and was treated with ovaban, which caused it to decrease in size. Gradually over a period of 6 months the mass grew back. The cat was depressed, anorexic, and thin.

GROSS PATHOLOGY

The mass was firm and 3 cm in diameter, with multiple ulcers with a "creamy" discharge.

LABORATORY RESULTS

Nocardia asteroides was cultured on multiple occasions.

DIAGNOSIS

Dermatitis and cellulitis, pyogranulomatous, chronic, diffuse, severe, with a fistulous tract and gram-positive, acid-fast, filamentous, and coccibacillary bacteria, dermis, subcutis, and subcuticular muscle, domestic short-hair, feline.

COMMENT

This is a somewhat unusual presentation for the most common Nocardia sp., N. asteroides. Generally these organisms are scattered throughout the lesions and seldom form granules. N. brazilliensis is the species usually found in mycetomas. Without the acid-fast stain, most attendees considered Actinomyces sp. the most probable etiology because of the granule formation. The Ziehl-Neelsen stain frequently fails to stain Nocardia sp., but the modified Fite-Faraco usually does.

CONTRIBUTOR

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SUGGESTED READING

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MS 83

HISTORY

Tissue from a 6-year-old male poodle that was presented 6 months previously with a small mass near the left ear canal. The mass got bigger.

GROSS PATHOLOGY

A portion of the mass was received devoid of any overlying skin. It was a 1.5 x 1-cm semicircular, firm lesion and was white on cut surface.

DIAGNOSIS

Basal cell tumor, granular cell type, dermis and subcutis, poodle, canine.

COMMENT

This is a rarely seen form of basal cell tumor. The biologic behavior is the same as for other forms of canine basal cell tumor; they do not recur following adequate surgical excision, nor do they metastasize.

CONTRIBUTOR

Laboratory of Pathology, University of Pennsylvania, School of Veterinary Medicine, Philadelphia, Pennsylvania.

SUGGESTED READING

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MS 84

HISTORY

Tissue from an 8-year-old spayed female schnauzer with chronic skin problems for more than three years.

GROSS PATHOLOGY

Multiple comedomes.

DIAGNOSIS

Epidermal and follicular, hyperkeratosis with adnexal ectasia and atrophy, diffuse, moderate, skin, schnauzer, canine.

COMMENT

The section of skin has a slightly thickened epidermis with marked hyperkeratosis of the surface epithelium. All of the hair follicles in the dermis are distended and contain keratin plugs. Keratin plugs are also present in the ducts leading from the sebaceous glands to the hair follicles, forming cysts lined by stretched squamous epithelium. There is a minimal degree of inflammation associated with the dermal changes.

Although schnauzer comedome syndrome is a specific condition, the lesions seen histologically in this case are found in many endocrine alopecias, including hypothyroidism, growth hormone deficiency, hyperadrenocorticism (Cushing syndrome), and vitamin A deficiency. A complete history and a thorough clinicopathologic workup are important in determining the pathogenesis and etiology of skin lesions such as this.

CONTRIBUTOR

Experimental Pathology Laboratories, Inc., Research Triangle Park, North Carolina.

SUGGESTGED READING

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MS 85

HISTORY

Tissue from a 20-year-old female Shetland pony. The pony is thin and has had several episodes of respiratory distress over the last three years. Steroids were the only drugs that would relieve the symptoms.

DIAGNOSIS

Bronchiolitis, chronic-active, multifocal, mild, with intrabronchiolar mucin plugs and mild alveolar emphysema, lung, Shetland pony, equine.

COMMENT

The lung is congested. Bronchiolar lumens contain plugs of mucus mixed with a few neutrophils and macrophages. The epithelial lining ranges from flattened cells resembling squamous epithelium to hyperplastic cuboidal cells. Cells resembling goblet cells with basal nuclei and a large amount of pale, apical cytoplasm are in some bronchioles. There is moderate peribronchiolar fibrosis accompanied by a mixture of lymphocytes, plasma cells, macrophages, and neutrophils. Eosinophils are sparse. While most conference attendees thought there was a mild amount of alveolar expansion on the H&E, slide many questioned the presence of alveolar emphysema. However, a microslide section stained with Masson's trichrome does demonstrate mild fibrous clubbing at the ends of some ruptured alveolar septa, indicating a mild degree of emphysema. Ruptured alveolar septa without clubbed ends are considered to be artifactually produced by postmortem manipulation of overinflated alveoli. Intra-alveolar hemorrhages are attributed to electrocution.

The clinical disease known as heaves includes several pathoanatomic entities as well as chronic obstructive pulmonary disease (COPD). Proposed etiologies for COPD include diet (3-methylindole toxicity), previous infections (equine influenza), allergy to dust or molds (Micropolyspora faeni, Aspergillus sp., Nocardia sp., etc.) and genetic predisposition. The cause in this case is unknown.

CONTRIBUTOR

Department of Veterinary Pathology, Iowa State University, Ames, Iowa.

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HISTORY

Tissue from a 12-year-old grade male horse that was kept in a pasture with three other horses. They were observed eating large quantities of wilted leaves from a recently fallen red maple (Acer rubrum) tree. Clinically, the horses were depressed, lethargic, anorectic, cyanotic, and icteric. Two horses were subjected to euthanasia. One recovered.

DIAGNOSIS

Nephrosis, multifocal, mild, with eosinophilic hyalin tubular casts, kidney, breed unspecified, equine.

COMMENT

The histologic findings, coupled with the history of eating red maple leaves, lead to the presumptive diagnosis of red maple poisoning. Other possible considerations included onion poisoning, phenothiazine intoxication, equine infectious anemia, autoimmune hemolytic anemia, piroplasmosis, leptospirosis, and ehrlichiosis. Onions were not observed on the pasture, and no phenothiazine derivatives had been administered. The other possibilities were not conclusively ruled out, but they seemed unlikely, especially since all horses were affected and because all were observed eating large numbers of red maple leaves.

Because some casts have a faint brownish coloration and contain a few narrow needle-shaped crystals, they are thought to be myoglobulin or hemoglobulin rather than just nonspecific protein. Myoglobulin and hemoglobulin cannot be differentiated histologically or histochemically, but they can be differentiated in fresh urine specimens by their differing solubility in ammonium sulfate. Hemoglobulin precipitates and myoglobulin remains in solution when 2.8 grams of ammonium sulfate is added to 5 ml of urine (85% saturation).

CONTRIBUTOR

Department of Pathology, College of Veterinary Medicine, University of Georgia, Athens, Georgia.

SUGGESTED READING

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MS 87

HISTORY

Tissue from a 4-year-old gelded polo pony that had been imported into Nigeria from Tchad. Shortly after arrival, slowly enlarging, firm cutaneous nodules were observed on the lateral and ventral sides of the body.

GROSS PATHOLOGY

Typical lesions consisted of single to multiple hairless, heavily pigmented, umbilicated, firm nodules 1 to 2 cm thick and 1 to 6 cm in diameter. Normal epidermis covered early nodules. On cut surface the dermis consisted of dense collagenous tissue overlain by a thin, sometimes crusted epidermis. Dermal lesions extended beneath normal epidermis at margins. Embedded in the dermis were multiple foci containing black grains.

LABORATORY RESULTS

Curvularia sp. was isolated from pigmented granules.

DIAGNOSIS

Pyogranulomas, multifocal-to-coalescing, moderate, with colonies of dematiaceous chlamydospores and hyphae, skin, polo pony, equine, etiology—Curvularia sp., probably C. geniculata.

COMMENT

Chlamydospores and short hyphal fragments formed pigmented mycotic colonies within the pyogranulomas. The open-oval shape, resembling cross sections of a mushroom cap, are characteristic. Distribution of lesions on the horse corresponded to feeding sites of Hippobosca equina, a blood-sucking fly that was numerous in the stable where this animal was being kept. In addition to being a possible mode of infection, this may explain the diffuse, perivascular eosinophilia in these tissues, since an eosinophilic response is not

considered typical for black-grain mycetoma. Long-term treatment with high levels of an organic iodide compound resulted in clinical improvement.

CONTRIBUTOR

School of Veterinary Medicine, North Carolina State University, Raleigh, North Carolina.

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STORY

sue from a 3-month-old quail that was one of a flock of 30,000 with 1,000 sick d 200 dead birds. Live birds that were submitted for necropsy exhibited en-mouth breathing and were drooling saliva.

ROSS PATHOLOGY

cropsy revealed thick, white, caseous exudate that diffusely covered the cosa of the mouth, esophagus, and crop. Capillaria eggs were identified in ears of oral exudate.

AGNOSIS

ssitis, subacute, multifocal, mild, with severe acanthosis and numerous oepithelial nematode eggs, tongue, quail, avian.

OMMENT

e slides submitted contain tongue and floor of the mouth. The macroscopic ferential diagnosis should include caustic chemicals (quaternary ammonia infectants and trichothecene mycotoxins), pox, trichomoniasis, povitaminosis A, and candidiasis. Capillaria sp. is the most likely parasite to found in the oral cavity of fowl. These worms are characterized by a ooth cuticle, two bacillary bands, coelomyarian musculature, and -embryonated bioperculate eggs. Other nematodes from which Capillaria must be differentiated are: Trichuris sp. (larger, single bacillary band and ually found in the lower bowel in mammals); Anatrichosoma sp. mbryonated eggs); Spirocerca lupi and Gongylonema sp. (spirurids with al cords, lateral alae, and thick-shelled, embryonated eggs).

CONTRIBUTOR

Veterinary Diagnostic Laboratory, Auburn, Alabama.

SUGGESTED READING

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MS 89: LS 24

HISTORY

Tissue from a 10-year-old female dog that was first seen as a clinically normal 9-year-old, for evaluation of possible liver disease. She was next seen as a 10-year-old, with depression, vomiting, and anorexia. Radiographically, the liver was normal. Liver biopsy revealed focal hepatocellular vacuolar change and lipofuscin granules in the centrolobular hepatocytes. Six months later, the dog was euthanatized.

GROSS PATHOLOGY

Ascites and icterus were present. The liver was atrophic, reddish-brown and nodular (nodules ranged from a few mm to 2 cm in diameter). The gallbladder was thickened. The portal lymph nodes were mottled golden-brown and enlarged.

DIAGNOSIS

Cirrhosis, diffuse, moderate, with intracellular rhodanine positve granules, hepatocytes, liver, Bedlington terrier, canine.

COMMENT

This case represents the end-stage form of an inherited chronic progressive hepatic degeneration of Bedlington terriers. Impaired copper metabolism results in accumulation of copper in hepatocyte lysozomal granules. Apparently, significant quantities of copper must be stored before evidence of liver failure and cirrhosis develops. The cause of this condition is unknown.

Abnormal laboratory data and biopsy findings (liver-associated tests and morphologic changes) were present prior to onset of clinical signs. Copper-positive (Timm's silver sulfide, rubeanic acid, and rhodanine-positive staining) lipofuscin-filled granules were the first morphologic changes observed in hepatocytes.

Liver copper was 585.5 ppm on a wet weight basis.

Cirrhosis was diagnosed based on the presence of necrosis, biliary hyperplasia fibrosis, and hepatic regenerative nodules. These findings, along with the laboratory results and special stains, support an etiologic diagnosis of copper toxicosis. Hepatocytes, especially in the degenerating foci, contain a heavy concentration of rhodanine-positive granules. Copper toxicosis in Bedlington terriers is considered to be an inherited disease and is similar but not identical to Wilson's disease in man. These conditions do differ; for example, serum copper and ceruloplasmin levels are generally low in affected humans and usually normal in affected dogs. An iron stain identified some of the granular material in Kupffer cells to be hemosiderin. Anemia is frequently seen with this condition. Hemolysis may be due to peroxidation of the RBC membranes by free copper or it may result from sequestering of copper by defective ceruloplasmin. Differential etiologies are aflatoxicosis, other heavy-metal toxicosis, idiopathic chronic-active hepatitis, and chronic infectious canine hepatitis.

CONTRIBUTOR

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MS 90; LS 25

HISTORY

Tissue from a 5-1/2-year-old female nulliparous pig-tailed macaque (Macaca nemestrina). She was reported pregnant and was thought to have died from complications related to pregnancy. Signs of illness had not been noted prior to death. Her last recorded body weight was 5.0 kg on March 3, 1982. She was found dead on July 22, 1982; her body weight was 7.03 kg.

GROSS PATHOLOGY

The peritoneal cavity contained several large multicystic masses; the largest measured 22.0 x 16.0 x 10.0 cm and weighed 1.75 kg. It was attached to mesentery by a relatively thin strand of connective tissue. Two similar smaller masses were attached to the body of the uterus. Multiple smaller cystic or nodular masses were attached to omentum by very thin connective tissue attachments. On section, the outer portion of the larger mass contained numerous fluid-filled cysts. The inner area was more solid and contained fewer cysts. The other masses were similar.

DIAGNOSIS

Mesothelioma, serosa, vagina, Macaca nemestrina, nonhuman primate.

COMMENT

Despite a careful postmortem examination, there was no evidence of tumor outside of the peritoneal cavity and only serosal surfaces were involved. Multiple sections of ovarian tissue revealed only normal structures.

Hemangiosarcoma, hemangioma, lymphangioma, mesothelioma, granulosa cell tumor, and endometriosis were considered in the differential diagnosis, based on the gross photo. Histologically, mesothelioma, granulosa cell tumor, and surface/germinal epithelial cell carcinoma of the ovary were discussed as the primary differentials. Special stains demonstrated that this neoplasm contained PAS-positive/diastase-sensitive material as well as colloidal-iron

AMP)-positive/hyaluronidase-sensitive material, characteristics that are dicative of a mesothelioma. Mesotheliomas are not common in animals xcept for their frequent occurrence in the scrotums of F344 rats and in the bdominal and pleural cavities of neonate or fetal calves.

CONTRIBUTOR

erkes Primate Center, Center for Disease Control, Atlanta, Georgia.

UGGESTED READING

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MS 91

HISTORY

Tissue from a 9-year-old female African green monkey, Cercopithecus ethiops. She arrived in the colony in September 1981 and was housed in a single indoor cage. Found dead with no prior clinical signs on a Saturday morning, she had been fasted Thursday night prior to anesthesia (with ketamine) Friday morning. Recovery had been uneventful.

GROSS PATHOLOGY

The abdomen was distended and when opened, gas was released, partly relieving the distension. The abdomen contained ingesta; peritoneal surfaces were hyperemic. The intestines were distended with gas, and a 1.5-cm-diameter hole was present in the descending colon, approximately 2 cm proximal to an annular constriction.

LABORATORY RESULTS

Alpha-hemolytic Streptococcus isolated from heart blood at necropsy. E. coli from colon at necropsy.

DIAGNOSIS

Adenocarcinoma, mucinous, colon, African green monkey, Cercopithecus ethiops, nonhuman primate.

COMMENT

Mucinous adenocarcinoma is characterized by mucus-filled crypts in the mucosa and large mucus-filled cysts in the submucosa, muscular tunica, and serosa. Some of the cysts were only partially lined by epithelium. It was speculated that the unlined portion was due to sloughed cells or, more likely, to extension of the mucus through the epithelial layer, to dissecting the musculature to form large lakes. The mucous nature of the material was confirmed by special stains; it was both PAS- and mucicarmine-positive.

CONTRIBUTOR

Bowman Gray School of Medicine, Department of Comparative Medicine, Winston Salem, North Carolina.

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MS 92: LS 26

HISTORY

Tissue from a 6-month-old male boxer canine. The dog was presented with a 9-day history of lameness, swollen painful joints, anorexia, and pyrexia. These clinical signs improved briefly after treatment with antibiotics, steroids, and antihistamines. However, two days later the dog's condition deteriorated; he became severely lame and was unable to bear weight. The femorotibial, carpal and tarsal joints, and costochrondral junctions were markedly swollen, firm, and painful.

GROSS PATHOLOGY

The distal limbs were thickened and the joints swollen and firm. There was subcutaneous edema of the distal limbs with marked thickening of, and ecchymotic hemorrhages within, the periarticular tissues of the carpal, tarsal, and femorotibial joints. The most striking lesions were characterized by fine 2 to 3-mm pale lytic zones and hemorrhage within the metaphysis, beneath the physis. Bone lesions were bilaterally symmetrical and most prominent in the proximal cartilogenous scapula, the humoral and femoral heads, and the distal ends of the radius, ulna, tibia, and fibula. Gross lesions were not observed in the bones of the head or vertebrae.

LABORATORY RESULTS

The dog had a leukocytosis, neutrophilia, and elevated serum-alkaline-phosphatase levels. Radiological examination revealed radiolucent areas within the distal metaphyses of the radius and ulna, tibia and fibula, with periosteal new bone formation.

DIAGNOSIS

Osteomyelitis and periostitis, necrohemorrhagic, chronic-suppurative, diffuse, moderate to severe, with metaphyseal microfractures and periosteal bone formation, rib, boxer, canine.

COMMENT

This slide is fairly representative of the late stages of hypertrophic osteodystrophy (HOD) of dogs. HOD is somewhat of a misnomer because the hypertrophic periosteal reaction is compensatory to the metaphyseal lesions where the initial changes occur. A better name for this condition may be metaphyseal osteopathy, as proposed by Grondalen. HOD is characterized by microfractures and the absence of primary trabeculae in the metaphysis immediately adjacent to the growth plate. The moderator suggested that the transverse cleft prevented metaphyseal capillaries from extending to the hypertrophic cartilage of the growth plate, thereby interfering with normal appositional growth and remodeling.

This condition was differentiated from scurvy by the presence of inflammatory cells; also, the proliferation of poorly differentiated mesenchymal elements associated with scorbutic lesions was lacking in this case. HOD is distinguished from hypervitaminosis D by the inflammatory reaction, which is more severe than normally seen with excess vitamin D, and by the absence of soft tissue mineralization.

CONTRIBUTOR

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S 93; LS 27

ISTORY

ssue from a 5-month-old female collie. The dog was presented for nasal welling approximately 2 weeks prior to euthanasia. No radiographic bnormalities were seen. Cultures were negative, and antibiotic therapy was ot beneficial.

ROSS PATHOLOGY

esions were confined to the nose, which was characterized by a firm gray nd red mottled mass that effaced the nasal turbinates and the overlying ortical bone. Remaining axial and appendicular skeleton was normal.

ABORATORY RESULTS

n alpha-hemolytic Streptococcus and chromogenic rods were isolated from nasal swab at necropsy.

IAGNOSIS

ibrous dysplasia, diffuse, moderate, hard palate region, collie, canine.

OMMENT

ibrous dysplasia is not considered a neoplastic disease. Growth usually is by xpansion within an intact periosteum. The pathogenesis is unknown, but some uthors consider the lesion to be a malfunction in bone-forming mesenchyme; thers think bone maturation is arrested at the woven bone stage. Fibrous ysplasia must be differentiated from two benign neoplasms, osteoma and ssifying fibroma. The latter two lesions have broader bony trabeculae and less ibrous matrix. Fibrous dysplasia is reported in the literature to be differentiated om the ossifying fibroma by the absence of osteoblasts aligned on bony urfaces. In our experience, this was not found to be true. Although the eported rapid growth in this case is considered to be unusual for fibrous ysplasia, the histological criteria for the diagnosis were met.

CONTRIBUTOR

C. E. Kord Animal Disease Laboratory, Nashville, Tennessee.

SUGGESTED READING

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Pool, R. R.: Tumors of bone and cartilage. In Tumors in Domestic Animals, ed. 2, edited by Moulton, J. E., 1978, pp. 92-99.

HISTORY

Tissue from a male Doberman. Swelling had been developing slowly around the edge of the orbit and over the frontal bone. Mineralized material was encountered during surgical exploration. Underlying bone was slightly eroded but not destroyed.

GROSS PATHOLOGY

The specimen's external surface was irregular, fibrous, and pale yellow-white. It resisted cutting slightly and resembled cartilage.

DIAGNOSIS

Multilobular chondroma (chondroma rodens), frontal bone, Doberman, canine.

COMMENT

The histologic pattern is that of contiguous lobules, each surrounded by connective tissue containing small vessels. Centrally the lobules generally contain cartilage, but conversion to bone can be recognized, and osteoclasts are present. Cartilage is usually surrounded by a zone of fusiform cells that merge with interlobular septa. Mitotic activity is minimal.

This is a fairly good example of this uncommon neoplasm of dogs. It is considered a locally aggressive lesion; however, there have also been reports of metastatic lesions. Some think that the term "osteochondroma" should be restricted to apply to the solitary or multiple cartilage-capped lesions reported most often in dogs and horses. The origin of this neoplasm is not known, but multilobular osteoma/chondroma is generally thought to develop from the periosteal elements of the flat bones of the cranium.

CONTRIBUTOR

Department of Veterinary Science, University of Arizona, Tucson, Arizona.

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MS 95

HISTORY

Tissue from a 7-year-old female Irish wolfhound. This dog was anemic and had lameness of the right rear limb and a recent cough. She was found dead.

GROSS PATHOLOGY

The distal third of the right femur is enlarged. On sectioning this enlargement is composed of a soft tissue mass and new bone formation. The soft tissue mass is hemorrhagic in many areas, involves the medullary cavity, and appears to have invaded and replaced areas of cortical bone. Both lungs contain numerous dark raised nodules. One of these nodules has ruptured, leading to massive intrathoracic hemorrhage.

DIAGNOSIS

Osteosarcoma, telangiectatic, metastatic to the lung, Irish wolfhound, canine.

COMMENT

Osteosarcoma is a malignant neoplasm of bone-forming cells. Dahlin subclassifies such tumors as osteoblastic, fibroblastic, and chondroblastic depending on the most prominent component. The telangiectatic form is recognized as being highly vascular. The latter must be differentiated from vascular tumors, e.g., hemangioma and hemangiosarcoma. Endothelium is generally lacking in the blood-filled spaces of the telangiectatic osteosarcoma. That, along with the production of osteoid, differentiates this tumor from the true vascular neoplasms.

CONTRIBUTOR

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SUGGESTED READING

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MS 96

HISTORY

Tissue from juvenile Chinook salmon. The clinical signs of this fish and others were impaired swimming efficiency, reduced growth rate, and increased mortality attributable to starvation and predation.

GROSS PATHOLOGY

Exophthalmos; ascites; hemorrhagic pylorus, ceca, and fins; petechiae on the opercula and skin; and darkened tails.

DIAGNOSIS

Inflammation and epithelial proliferation, subacute, multifocal, mild, with microsporidian cysts in capillary endothelial cells, gill lamellae, Chinook salmon, Oncorhynchus tshawytscha, fish.

COMMENT

Loma sp. was identified as the Microsporidia.

CONTRIBUTOR

Hazleton Laboratories, Madison, Wisconsin.

SUGGESTED READING

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MS 97

HISTORY

Tissue from a 2-year-old Hereford bull that was one of five cattle found dead. Two others were showing dyspnea. One of these died shortly after being moved to a different pasture. The other recovered.

GROSS PATHOLOGY

Congestion and emphysema in lungs, petechiae in trachea, swelling around esophagus, and both swelling and hemorrhage in the pharyngeal region.

DIAGNOSIS

Periesophagitis, eosinophilic and hemorrhagic, acute, diffuse, moderate, with arthropod larvae, esophageal musculature and adventitia, Hereford, bovine, probable etiology---reaction to Hypoderma lineatum larvae.

COMMENT

At the AFIP the Department of Gastrointestinal Pathology requires that the mucosa be inflamed in organs such as the esophagus and intestines in order to use the terms esophagitis or enteritis, respectively. The bot is characterized morphologically by a thin cuticle muscle layer, and tracheae. Tracheae of various sizes can be recognized by their round lumen lined by a rigid cuticle.

CONTRIBUTOR

Department of Veterinary Science, University of Arizona, Tucson, Arizona.

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MS 98, 99

HISTORY

Tissue from a 3-month-old mixed-breed female dog. The puppy was received at the animal support unit of a medical school. On arrival, she was active, alert, playful, and eating daily. By fifteen days later, she was anorectic and lethargic. She was found dead on the 16th day.

GROSS PATHOLOGY

Marked diffuse consolidation of the lungs was the primary gross observation reported to the pathology laboratory.

DIAGNOSIS

Bronchopneumonia, necrosuppurative, diffuse, severe, with syncytial giant cells and intranuclear and intracytoplasmic inclusions, lung, mixed-breed, canine. Intranuclear and intracytoplasmic inclusions, transitional epithelium, urinary bladder.

COMMENT

The lungs and urinary bladder (and other tissues not submitted with this case) demonstrated lesions very consistent with infection by canine distemper virus. The suppurative component of the pneumonia was considered to be the result of bacterial infection secondary to a predisposing viral insult, and, in fact, colonies of bacteria were observed in several lung sections. Bordetella bronchiseptica is often cultured from these lung lesions; however, other bacteria can cause these secondary infections associated with distemper. Culture was not done in this instance.

CONTRIBUTOR

Pathology Branch, Air Force Aeromedical Research Laboratory, Toxic Hazards/Pathology, Wright-Patterson Air Foce Base, Ohio 45433.

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MS 100

HISTORY

Tissue from a 10-month-old male Doberman. This dog's dam and two littermates died with similar lesions. Clinical signs were vomiting, weight loss, and lumbar pain.

DIAGNOSIS

Glomerulonephritis, membranoproliferative, diffuse, severe, with mild chronic interstitial nephritis, kidney, Doberman pinscher, canine.

CLINICAL PATHOLOGY

Calcium, 6.7; phosphorus, 15.5; BUN, 133; creatinine, 7.6.

COMMENT

This case resembles the familial progressive renal disease reported in Doberman pinschers. These dogs present with varying degrees of polyuria, polydipsia, and progressive weight loss. Histologically, the most severe changes are seen in the glomeruli. There is dilation of Bowman's spaces with mesangial cell proliferation, increased mesangial matrix, and wire loop formation. Occasionally glomerular sclerosis is observed, as seen in this case. Tubular changes are usually less severe with tubular degeneration, fibrosis, and mononuclear cell infiltration. These changes are associated with the nephrons served by severely altered glomeruli. The etiology is not known. The family history suggests a genetic factor is involved in the pathogenesis.

CONTRIBUTOR

Furrow Veterinary Pathology, Inc., Beltsville, Maryland.

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