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Conference Moderator:
Dr. Donald H. Schlafer DVM, MS, PhD, Diplomate ACVP, Diplomate ACVM, Diplomate ACT

CASE I: 19274/1A (AFIP 3167216).

Signalment: 8-year-old, female, exotic shorthair, cat (*Felis catus*).

History: The cat, previously used for breeding, was presented to the clinician in bad body condition. At clinical examination an abdominal mass, initially interpreted as an enlarged mesenteric lymph node, and multiple mammary cysts were noted. After one week a laparotomy was performed in order to localize and remove the abdominal lesion. The cat was not pregnant.

Gross Pathology: At surgery a right uterine horn mass was seen together with multiple, firm, infiltrative, omental and visceral abdominal wall nodules. Ovariohysterectomy was performed and the uterine mass and sampled omental nodules were submitted for histology. After about 20 days the cat was euthanized because of worsening of clinical signs and presence of anorexia.

Laboratory Results: Routine pre-surgical hematology and biochemistry were in normal range.

Histopathologic Description: Uterus: Effacing uterine wall and filling the uterine lumen is an irregularly nodular mass (not completely present in all slides submitted) composed of an atypical, pleomorphic, densely cellular, infiltrative, transmural, mixed, epithelial population arranged in 1-5 cell-thick irregular tubules or occasional papillae in moderate fibrous stroma and showing focal continuity with adjacent normal endometrium. There are two distinct cellular populations: one population is composed of cubic to cylindrical cells (20-35 micron) with moderate slightly eosinophilic finely granular cytoplasm with defined borders. The nucleus is round to oval (7-20 micron), basally to centrally located, with granular chromatin and one evident eosinophilic nucleolus. Anisocytosis and anisokaryosis are moderate, and there are 0-1 mitotic figures per HPF. The second population is prevalent with occasional transitional areas with the previous one and, focally, with the adjacent endometrium. Cells are highly pleomorphic with frequent aspects of anaplasia, and they are round to polygonal with irregular shape and moderate to scant homogeneous intensely eosinophilic cytoplasm (up to 60 microns). Nuclei are irregularly round to severely pleomorphic (up to 40 microns) with hyperchromatic granular or clumped chromatin and multiple eosinophilic nucleoli with frequent anisonucleosis. Anisocytosis and anisokaryosis are severe, and mitotic figures are frequent and multifocally atypical. Both populations show multifocal anaplastic syncytial multinucleated giant cells, frequently located on tubular lumen or surface of papillae, with up to 40 nuclei and are occasionally severely pleomorphic. There are multifocal areas of necrosis, with the presence of cholesterol clefts, hemorrhage, and vascular and peritoneal invasion. Hypercellular stromal areas with irregularly arranged or grouped, minimally atypical, spindle cells are occasionally evident. Peripherally is a section of ovary (not completely present in all slides submitted) with ovulatory follicles and multiple corpora lutea, along with a section of ampulla. Separated from the uterus is a section with omental vessels and a neoplastic aggregate, probably consistent with a peritoneal neoplastic implant. A neoplastic population arranged in irregular tubules and immersed in abundant stroma characterized by cytologic features similar to what previously described was diffusely found in all omental nodules examined (not submitted in the present specimen).

Contributor's Morphologic Diagnosis: Uterus : adenocarcinoma, tubular and papillary, infiltrative, with anaplasia, syncytial giant cell formation, and vascular and peritoneal invasion, cat, feline.

Contributor's Comment: In contrast to women, carcinoma of endometrium and cervix is rare in domestic animals, other than cattle and rabbits, and doesn't show a hormone-conditioned development as reported in women.[7,10] In cattle the tumor manifests as single or multiple uterine wall nodules with serosal umbilication, scirrhous reaction, and invasion of veins and lymphatics. Metastases develop in the internal iliac lymph nodes and lung.[6]

Recently in uterine adenocarcinomas of the rabbit, the expression of sex steroid hormone receptors, estrogen-alpha (ER-alpha) and progesterone (PR) didn't correlate with prognosis, but was associated with histopathologic pattern. Papillary adenocarcinoma lost the expression of both ER-alpha and PR and was characterized by expansile growth, myometrial attenuation and late invasion; in contrast tubulo-solid adenocarcinoma maintained the sex steroid hormone expression with early myometrial infiltration and without myometrial attenuation.[2]

A 9.6-year period survey confirmed that uterine tumors are uncommon in the cat, representing only 0.29% of all feline neoplasms examined during the study (more than 4000 cases). A higher proportion of pure-bred cats, possibly because they reached advanced age and were sexually intact, was noted. The most common uterine tumor was adenocarcinoma. Previous studies reported leiomyoma to be prevalent, and in a 20-year survey no cases of adenocarcinomas were recorded. Moreover, there have been additional case reports of endometrial adenocarcinoma, squamous cell carcinoma, mixed Mullerian tumor, leiomyosarcoma, endothelioma (or hemangioma), fibroadenoma, cystadenoma, and submucosal fibroma.[8]

A recent immunohistochemical study of feline endometrial adenocarcinomas hypothesized an association, as in women, between neoplastic endometrial transformation and alteration in cyclo-oxygenase-2 (COX-2) expression; the study showed diffuse membranous and cytoplasmic labeling compared to normal uteri where the COX-2 expression is confined to apical cell membrane. Besides synthesis of COX-2, reduced progesterone expression is reported to be involved in development of malignancy, whereas no clear evidence of epithelial-mesenchymal transition or altered E-cadherin or beta-catenin were found.[4]

In women epithelial tumors of Muellerian type are endometrioid adenocarcinoma, adenosquamous carcinoma, serous papillary carcinoma, clear cell adenocarcinoma, mucinous adenocarcinoma, squamous cell carcinoma, small cell carcinoma, giant cell carcinoma and undifferentiated carcinoma. Histologic variants of endometrioid adenocarcinoma in women are endometrioid adenocarcinoma with squamous metaplasia, papillary variant, secretory variant, ciliated cell variant, Sertoliform variant and adenoid cystic variant.[3]

The most frequent form of endometrial neoplasm in women, that usually occurs after menopause, is adenocarcinoma, a proportion of which, and particularly the endometrioid type, is related with a prolonged exogenous (administration of estrogens) or endogenous (presence of ovarian granulose-cell tumor) estrogenic stimulation and can evolve from an atypical endometrial hyperplasia.[3]

Besides choriocarcinoma, both well-differentiated endometrioid adenocarcinomas and undifferentiated carcinoma show, respectively, focal trophoblastic (choriocarcinomatous) differentiation and the presence of syncytiotrophoblast-like multinucleated cells.[3] Moreover few case reports of non-gestational and non-teratomatous uterine choriocarcinomas are associated with endometrioid carcinoma, serous carcinoma and carcinosarcoma. Foci of trophoblastic differentiation and choriocarcinoma are also found in ovarian, gastric and mammary neoplasia. The hypothesis concerning these findings regards aberrant differentiation of somatic uterine epithelial adenocarcinomatous cells or of entrapped trophoblasts or germ cells.[8]

Endometrioid adenocarcinoma with choriocarcinomatous differentiation is a very rare form of non-gestational tumors with trophoblastic differentiation characterized by a more aggressive clinical course in women. A recent case report regarding this entity discussed the differential diagnosis for the presence of pleomorphic giant cells in gynaecologic tumors aschoriocarcinomatous differentiation, giant cell carcinoma, carcinosarcoma and undifferentiated carcinoma with giant cells. Demonstration of immunohistochemical reactivity for human chorionic gonadotropin (hCG) in tumor cells is needed for a definitive diagnosis.[1] A recent case of spontaneous, metastatic, uterine choriocarcinoma in a rabbit also revealed positivity for hCG in neoplastic syncytiotrophoblasts.[5]

In the case submitted, an admixture of conventional adenocarcinoma with markedly anaplastic neoplastic cells is observed. These cells show severe anisocytosis and anisokaryosis, multifocal anisonucleosis and presence of severely pleomorphic giant cells and formation of neoplastic syncytial giant cells. This is an unusual finding, as endometrial adenocarcinomas in the cat are mainly composed of tubulopapillary or solid proliferation of neoplastic cells with variable nuclear atypia, especially in estrogen-negative tumors. The presence of multinucleation, severe

anaplasia or mixed population is not reported in the cat or rabbit.[2,8] This finding is compatible with a form of choriocarcinomatous differentiation of uterine adenocarcinoma, carcinosarcoma, or with the presence of syncytiotrophoblast-like multinucleated cells in undifferentiated carcinoma. Moreover, pleomorphic giant cells are found in giant cell carcinoma, carcinosarcoma and undifferentiated carcinoma with giant cells. Since the stromal component in this case doesn't show significant or diffuse atypia, carcinosarcoma is excluded as the arrangement of neoplastic population in tubules and papillae is not indicative of an undifferentiated carcinoma. Conversely, giant cell carcinoma can have areas of conventional adenocarcinoma.[3] To verify the possible presence of a choriocarcinomatous differentiation, an immunohistochemical staining for hCG should be performed in order to identify the multinucleated anaplastic component as trophoblastic in origin (syncytiotrophoblasts).

AFIP Diagnosis: Uterus: Adenocarcinoma, tubular and papillary.

Conference Comment: The conference moderator stressed the importance of knowing the stage of estrus and the pregnancy status of the animal at the time of tissue sampling in order to appropriately interpret the histologic findings in the uterus. Glandular hyperplasia with evidence of inflammation, necrosis, and piling of the epithelium is present in the uterus of normal, intact, cycling animals and in pregnant animals with a placenta; the histologic changes in the uterus associated with a normal response to physiologic hormonal stimuli, such as pregnancy, can look remarkably similar to neoplasia. To demonstrate this point, the moderator showed part of a histologic slide of uterus from a normally cycling queen; participants were unable to determine if the changes were neoplastic or physiologic until the moderator revealed the entire specimen.

The following chart, adapted from Samuelson's *Textbook of Veterinary Histology*, briefly summarizes uterine changes throughout the estrous cycle.[9]

Stage of Estrous Cycle	**Uterine Histomorphology**	**Endometrial Gland Activity / Species Differences**
Proestrus	• Hypertrophy of mucosal epithelium • Infiltration by neutrophils • Increased vascularity of propria-submucosa with congestion and edema	Glands are relatively straight with some increase in length
Estrus	• Thickening of mucosal epithelium with mononuclear leukocytes • Maximal vascularization of propria-submucosa with congestion, edema and hemorrhage	Cow: Glands continue to elongate; increased edema with mast cell infiltration; microscopic hemorrhage with metrorrhagia
Metestrus	Decreasing congestion and edema	Glandular growth results in coiling
Diestrus	Continued decrease in the level of congestion and edema	Zenith of glandular development with branching and coiling of glands
Anestrus	• Thin mucosa and propria-submucosa • Epithelium becomes cuboidal	Glandular regression with scattered simple tubules and adenomeres

The contributor provides a detailed review of uterine adenocarcinomas in the cat and humans.

Contributor: Dipartimento di Sanità Pubblica, Patologia Comparata ed Igiene Veterinaria, Facoltà di Medicina Veterinaria, Università degli Studi di Padova.
http://www.sanitaveterinaria.unipd.it/

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CASE II: S418/08 (AFIP 3167245).

Signalment: Adult, female, crossbred, domestic swine (*Sus scrofa domestica)*.

History: During the last 2 years, an increased abortion rate was observed in several holdings with free-range pigs in Mecklenburg-Western-Pomerania, as in this case.

Gross Pathology: Randomly distributed within the endometrium, slightly elevating the edematous mucosa, numerous small, sharply demarcated grey-yellow nodules were present. The nodules were firm and gritty when cut. Few of these granulomas gleamed through the uterus wall and were also visible in the perimetrium.

Laboratory Results: Microbiology revealed a moderate growth of small colonies suspicious for *Brucella* spp. By PCR of endometrial tissue samples, DNA specific for *Brucella suis*, biovar 2 was amplified.

Histopathologic Description: Uterus: Multifocally within the severely edematous endometrium and submucosa there are large, up to 3 mm diameter, sharply demarcated areas of caseous necrosis surrounded by numerous histiocytes, epithelioid macrophages, large numbers of lymphocytes and few neutrophils. A pronounced infiltration with lymphocytes is observed in the subjacent and perivascular connective tissue, predominantly surrounding endometrial glands. Myriad coccobacilli are occasionally present within the necrotic centers of the granulomas (not visible in all sections).

Contributor's Morphologic Diagnosis: Uterus: Endometritis, mild to moderate, granulomatous and necrotizing, domestic swine, *Sus scrofa domestica*, etiologic diagnosis consistent with "miliary brucellosis"

Contributor's Comment: Brucellosis is a zoonotic disease which is caused by gram-negative, strictly aerobic, nonmotile coccobaccilli. These are facultative intracellular microbes taxonomically categorized in the class alpha-proteobacteria, family *Brucellaceae*.[4] Nine different Brucella species are known, but only seven of them infect terrestrial animals, namely *B. melitensis, B. abortuts, B. suis, B. canis, B. ovis, B. neotomae, and B. microti.* In contrast, *B. ceti* and *B. pinnipedialis* are confined to marine mammals. Each *Brucella* species can further be classified in several biovars.[3]
Brucellosis is endemic in Mediterranean countries, Africa, India, Asia, the Middle East and Central and South America.[4] The only known focus of *Brucella abortus* infection left in the United States is in bison and elk in the Greater Yellowstone Area, including Yellowstone National Park.

Five biovars have been described for *B. suis*, the cause of porcine brucellosis. Swine are mainly affected by biovars 1, 2 and 3. Hares are the important natural reservoir of biovar 2. Furthermore, pigs are susceptible to infection with *B. melitensis* as well as *B. abortus*.[1] Besides pigs, several species can be affected by different biovars of *B. suis* including reindeer, caribou and rarely, cattle and dogs. Additionally, all biovars of *B. suis* can induce serious infections in man,[4] in particular biovars 1 and 3.

Brucella suis affects pigs of all ages and breeds. Infection occurs through inhalation or ingestion of organisms. High numbers of bacteria are shed in urine, vaginal discharges, semen and the products of birth.[4] Venereal transmission is also possible.[1] The infectious agents invade the mucosa and gain entry into regional lymph nodes. The incubation

period ranges from 2 weeks up to 7 months. Subsequently most animals develop bacteremia that results in dissemination to the spleen, liver, and bone marrow, as well as mammary glands and reproductive organs. However, a self-limiting infection which is restricted to lymph nodes only may also occur in piglets.[4]

Signs of disease in sows include infertility, abortion between weeks 4 and 12 of gestation, stillbirths, mummification, or birth of weak piglets. Abortions due to *Brucella* spp. are typically associated with placentitis. The gross examination of the placenta may reveal red, yellow, normal or necrotic cotyledons. A leathery, wet appearance of the intercotyledonary region with focal thickening is typical in cattle as well as sheep and goat.[5] In boars, the most prominent clinical sign is unilateral orchitis. Other signs are infertility, lameness and paralysis.[4]

A characteristic image is seen in hares infected with *B. suis* biovar 2. While the hare's body condition may be unaltered, a widespread distribution of nodular suppurative inflammation can be seen. In particular the reproductive organs, but also the spleen, liver and lung are affected.

Brucellosis can be diagnosed by culture, serology or molecular based techniques. In most cases, serological tests are applied, although they are not completely specific. In this regard it has to be emphasized that in any case a reaction due to *B. melitensis* cannot be distinguished from cross-reactions to other bacteria, in particular *Yersinia enterocolitica* O:9 (USDA). Further techniques which are available for most species include immunostaining of tissue samples as well the polymerase chain reaction (PCR).

In 2008, five outbreaks of brucellosis were reported in Mecklenburg-Western-Pomerania a Federal State in the northeast of Germany. Three of these outbreaks were caused by *B. suis* biovar 2. Like the situation in other European countries, *B. suis* is hypothesized to be locally endemic in wild boars, and this seems to be the source of transmission of *B. suis* biovar 2 introduction to free-range pig holdings.

AFIP Diagnosis: Uterus: Endometritis, lymphoplasmacytic, diffuse, severe with diffuse, marked edema, multiple pyogranulomas, and epithelial hyperplasia, degeneration and necrosis.

Conference Comment: When histologically assessing the endometrium, the moderator commented there are 7 structures to evaluate.

1. Lumen: Examine for the presence of exudate; the lack of observation of an exudate histologically does not mean there is an absence of exudates, as it can be lost during fixation and processing
2. Epithelium: There should be a single layer of mucosal epithelium
3. Stratum compactum
4. Endometrial glands: Glands will be hyperplastic and hypertrophied during estrous. The glandular lumina contain sloughed epithelial cells often mistaken for neutrophils.
5. Endometrial stroma: Edema indicates inflammation or estrous and is often referred to as the stratum spongiosum.
6. Blood vessels: Medium sized arterioles may have hyalinized walls. Animals with multiple pregnancies may have prominent vessels in the endometrium.
7. Lymphatics

Several participants commented on the presence of endometrial glands within the muscular wall of the uterus; discussion of whether or not to diagnose this as adenomyosis followed. Adenomyosis is used when there are endometrial glands and stroma between the smooth muscle bundles.[2] Adenomyosis is occasionally due to congenity malformations within the uterus. Additionally, adenomyosis may result from hyperplastic overgrowth of the endometrium.[2] The moderator commented that in this case adenomyosis is not present as the lesion most likely resulted from smooth muscle contraction in response the inflammatory milieu of cytokines which then physically forced the endometrial glands into the superficial muscular layer.

Conference participants spent some time reviewing the differential diagnosis for intracytoplasmic microbes within trophoblasts in different veterinary species.[2] The following brief list generated by participants is not intended to be all-inclusive.

- Horse: *Streptococcus* spp., *Candida* spp., *Encephalitozoon cuniculi*
- Sheep: *Coxiella burnetii*, *Chlamydophila abortus*, *Toxoplasma gondii*
- Pigs: *Toxoplasma gondii*

- Cow: *Candida* spp., *Brucella abortus*, *Neospora caninum*
- Dog: *Brucella canis*

The contributor provides an excellent review of porcine brucellosis.

Contributor: Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, 17493 Greifswald-Insel Riems, Germany
www.fli.bund.de

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CASE III: X9402 (AFIP 3164120).

Signalment: 11-year-old, female, La Plata three-banded armadillo (*Tolypeutes maticus*).

History: This individual was presented to the hospital twice in one month for lethargy and decreased appetite. During the most recent episode, the lethargy was severe and the animal was minimally responsive. A 3 cm uterine mass was documented on abdominal ultrasound and the hematocrit had dropped from 35.5% to 25% in one week. Hemorrhage from the tumor was suspected as a cause of the lethargic episodes, and exploratory laparotomy was pursued to remove the uterine mass.

Gross Pathology: The body of the uterus was diffusely enlarged to approximately 20 x 20 x 25 mm with short uterine horns and attached ovaries. On section, the endometrium was markedly thickened, filling the lumen of the organ. An even band of myometrium was evident around the periphery.

Histopathologic Description: Uterus: Diffusely, the mucosa is hyperplastic with vacuolated epithelium that is thrown into extensive papillary projections. Some vessels within the projections are dilated and contain increased numbers of neutrophils. Occasionally glandular lumina contain neutrophils, wispy eosinophilic material or sloughed epithelial cells, and there are few clusters of neutrophils in the endometrial interstitium. Diffusely and to a visually defined depth, well-formed but irregular glands extend into the myometrium. In these deeper areas, there are irregular cysts that are up to 4 x 2 mm and lined by cuboidal epithelium. There is multifocal hemorrhage at the luminal surface and within glands.

Contributor's Morphologic Diagnosis: 1. Uterus: adenomyosis.
2. Uterus: endometritis, suppurative, acute, multifocal, mild.

Contributor's Comment: Adenomyosis is the presence of endometrial glands in the uterine stroma. It is most common in menstruating mammals, such as primates, but is rarely reported in dogs, cats and cattle[3], and there is one case report of focal adenomyosis in an African hedgehog[2]. In the National Zoo pathology database, adenomyosis has been diagnosed at necropsy in four cervids; two each bovids, felids, rodents, and viverrids; one bat; and one primate. The condition was diagnosed via ante-mortem hysterectomy in five primates, two felids, and one each rodent, canid, and edentate, the case described here. Like humans, armadillos have discoid, hemochorial and trabecular placentation, but they do not menstruate.

Development of adenomyosis is described by three theories[1]. First and most probable, endometrial glands invaginate and grow between muscle bundles of the myometrium. The second theory outlines endometrial growth via the myometrial lymphatic system. Thirdly, endometrial glands may form from myometrial tissue via metaplastic change.

In primates, clinical signs associated with adenomyosis include heavy or prolonged menstruation, painful menstruation, and irregular cycles[1]. Approximately 90% of human cases occur in multiparous women. This armadillo had never been pregnant to our knowledge, but heat cycles had been noted by keepers and veterinarians.

AFIP Diagnoses: 1. Uterus: Adenomyosis, multifocal, moderate.
2. Uterus: Endometrial hyperplasia, cystic and papillary, diffuse, moderate with multifocal mild neutrophilic endometritis.

Conference Comment: Most conference participants readily identified both adenomyosis and endometrial hyperplasia in the uterus. The moderator and participants commented on the section quality, observing that it was difficult to fully evaluate the uterus and the lesion because only a small segment of uterus is present.

Participants discussed the pathophysiology of endometrial hyperplasia and subsequent endometritis. The first requirement for development of the proliferative endometrial lesion is estrogen priming, which increases expression of intracellular progesterone receptors. Next, there is prolonged progestational stimulation of the endometrium, resulting in conversion of the epithelium to its secretory mode thereby producing lesions of cystic endometrial hyperplasia. Subsequent colonization by bacteria such as *Escherichia coli*, *Proteus* spp., *Staphylococcus* spp., or *Streptococcus* spp., results in ensuing endometritis. Recently, it has been shown that stimulation of the progesterone-primed endometrium by trauma, bacterial infection, or a foreign body can produce both cystic endometrial hyperplasia and endometritis.[4]

Species	Endometrial Hyperplasia	Pyometra
Bitch[4]	• Common • Continued progesterone secretion following estrogen-priming of the endometrium	• Common • Appropriate stimulation of progesterone-primed endometrium • *E. coli* most common • Also *Proteus* spp., *Staphylococcus* spp., or *Streptococcus* spp
Cow[4]	• Not as common as the dog, but more frequent than equids • Often associated with ovarian follicular cysts or granulosa-cell tumors • Prolonged estrogenism	• Associated with corpus luteum activity → elevated progesterone • Common early post-partum following dystocia, retained fetal membranes, or metritis • Also common after breeding when venereal infection results in early embryonic death • Progesterone effects: ○ Increased susceptibility to infection ○ Maintains closure of cervix ○ Inhibits myometrial contraction • Streptococci, staphylococci, coliforms, *Arcanobacterium pyogenes*, *Pseudmonas*
Mare[4]	• Rare	• Continue cycling • Cervix is often open • Rarely results in systemic illness • Severity of endometrial change is related to the length of the estrous cycle • *Streptococcus zooepidemicus* is most common • *E. coli*, *Actinomyces* spp., *Pasteurella* spp., *Pseudomonas* spp.

Contributor: Department of Pathology, National Zoological Park, P.O. Box 37012 MRC 5501, Washington, DC 20008
http://nationalzoo.si.edu/

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CASE IV: P314-10 (AFIP 3166498).

Signalment: 7 month-old, male, domestic short-hair, cat (*Felis catus*).

History: A seven-month-old, apparently healthy, male, domestic cat was presented to a veterinary clinic for elective neutering. Bloodwork performed prior to surgery revealed marginally elevated total serum protein. During surgery, the referring veterinarian noticed multifocal "thickenings" on the surface of both testes and epididymides. Both testes with epididymides were submitted for histopathology.

Gross Pathology: As described by the referring veterinarian, a few slightly raised whitish plaques, 1-2mm in diameter, were present on the surface of both testes and epididymides (tunica vaginalis).

Laboratory Results: Immunoperoxidase for feline coronavirus was performed (Animal Health Laboratory; University of Guelph); results are provided in the contributor's comment.

Histopathologic Description: Testicle: Two different slides are submitted, but the basic lesion is present in both. Multifocally expanding the tunica vaginalis, there is a moderate, multifocal to coalescing mixed inflammatory infiltrate consisting of variable proportions of neutrophils, macrophages, plasma cells, and lymphocytes. Depending on the focus examined, the infiltrate ranges from lymphoplasmacytic to granulomatous/ pyogranulomatous with focal fibrin deposition. Pyogranulomatous foci are characterized by mostly degenerate neutrophils with variable numbers of macrophages, admixed with cellular debris. In some sections, mostly granulomatous inflammation extends into the epididymis. There is also multifocal edema. Diffusely, seminiferous tubules are devoid of spermatozoa with sloughed degenerate and occasionally multinucleated germ cells in the tubular lumen (immaturity and degeneration). Special stains did not reveal any microorganisms.

Contributor's Morphologic Diagnosis: 1. Moderate, multifocal, pyogranulomatous vaginalitis.
2. Moderate, multifocal, granulomatous epididymitis (in some sections).

Contributor's Comment: The nature and location of the lesions suggests feline infectious peritonitis. Immunohistochemistry confirmed the diagnosis, as feline coronavirus antigen was demonstrated within the histiocytic cells of the pyogranulomatous foci. A few months later, the cat is still clinically normal.

Feline infectious peritonitis (FIP) is caused by Feline infectious peritonitis virus (FIPV), an enveloped, single stranded, positive sense RNA virus in the family Coronaviridae that infects domestic and wild felids. FIPV appears to have evolved by a deletion mutation from Feline enteric coronavirus (FECV), a coronavirus that has tropism for villous enterocytes and causes mostly inapparent infections or mild diarrhea in cats, predominantly kittens. The mutated coronavirus (FIPV) has tropism for and the ability to replicate in macrophages, which allows widespread dissemination of the virus in the host and development of a systemic, generally fatal disease in susceptible individuals (usually less than 2 years); most animals infected with FIPV do not, however, develop clinical disease. The pathogenesis of FIP is complex and still not fully understood. Cell-mediated immunity is responsible for FIPV clearance. The degree of humoral immunity is also important, and in part determines the evolution of the disease. Viral strain differences, breed and likely other factors are also involved. FIP is characterized by the deposition of immune complexes mainly in venules and arterioles of many serosal surfaces and organs (e.g. kidney, spleen, lungs) leading to the development of vasculitis (Arthus type III reaction) which is, with pyogranulomatous inflammation, the microscopic hallmark of the disease. This vascular lesion is variably associated with edema, fibrin exudation, necrosis, and/or hemorrhage. The vasculitis is the basis of the effusion grossly observed in most FIP cases. If the cat survives, then macrophages accumulate in affected tissues, as they cannot eliminate the virus. Three forms of the disease are recognized: the "effusive" (or "wet") form; the "noneffusive" (or "dry") form; and a mixed form. Although described as separate entities, the wet and dry forms are actually both ends of a spectrum.[1,2]

Orchitis and periorchitis (vaginalitis) are uncommon FIP-related lesions. Theses lesions are believed to develop by extension of the peritonitis along the tunica vaginalis. Pathologists and clinicians should keep this uncommon presentation of FIP in mind when presented with a cat with testicular lesions. [3,5]

AFIP Diagnosis: Testis: Orchitis, periorchitis, and serositis, pyogranulomatous, perivascular, multifocal, moderate with phlebitis, testicular atrophy and germ cell degeneration.

Conference Comment: Conference participants discussed some of the key histologic features of testicular degeneration. Death of Sertoli cells and spermatogonia results in sloughing into the seminiferous tubular lumina. The moderator noted that Sertoli cells will occasionally phagocytize necrotic/apoptotic spermatids, forming spermatid giant cells which are frequent in the submitted specimens. As the cellular loss proceeds, there is stromal collapse resulting in increased interstitial tissue and a thickened, wavy PAS-positive basement membrane around seminiferous tubules. When evaluating tubules to assess spermatogenesis, the moderator stated that, on average, one out of every six to eight seminiferous tubules should have mature spermatids.

The moderator stressed the importance of examining all four germinal layers in the testis; Samuelson's *Textbook of Veterinary Histology* provides an excellent description of the germinal layers. The population of spermatogonium cells is the first germinal layer and gives rise to the remaining cell types. There are three histologically distinct populations of spermatogonia. Reserve cells, also referred to as dark type A spermatogonia, are relatively senescent with heterochromic nuclei and scant cytoplasm. The few reserve cells that enter the spermiogenic cycle are transformed to one of two cell types. The first type is light type A spermatogonia, sharing many histomorphological features with their dark type predecessor but have nuclei which are lighter in color or euchromatic. The second type is type B spermatogonia; these cells resemble light type A cells, but the former have a round nucleus as opposed to the oval nucleus of the latter. The second germinal layer is composed of primary spermatocytes, the largest cells in spermiogenesis; these cells are round with large, round, vesciulate nuclei. The primary spermatocytes give rise to the third layer, the secondary spermatocytes, often inapparent on routine histologic examination. Finally, spermatids are formed, characterized by development of a flagellum, an acrosome and condensed, elongate nuclear material.[5]

Participants noted the slide variation with some slides having epididymis with granulomatous inflammation.

Contributor: Department of Pathology and Microbiology, Faculty of Veterinary Medicine, University of Montreal http://www.medvet.umontreal.ca

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