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20th Annual Feline Symposium

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The 20th Annual Feline Symposium was March 22, 1997 at VHUP. It again included the "Parade of Breeds," narrated by Mr. Richard Gebhardt and a wine and cheese reception hosted by Mrs. R.V. Clark, Jr. and Mrs. Edith Young. The 1998 Annual Feline Symposium will be held on Saturday, April 4, 1998. Following are the summaries of the talks at the 20th symposium.



Feline Wellness and Geriatric Therapeutics

The concept of feline wellness hinges on the fact that cats are prone to different health problems at specific stages of their life cycle. Dr. Diane R. Eigner, whose Philadelphia-based veterinary practice, The Cat Doctor, treats cats exclusively, discussed preventive care and geriatric therapeutics in cats.

Dr. Eigner often tells her clients their cats can perhaps subsist for a total of some 20 years with reasonable quality of life. If a cat is to thrive this long, she explained, it must receive adequate health care starting early in life.

When she sees a kitten for its first veterinary visit, Dr. Eigner performs a thorough physical exam and feline leukemia virus (FeLV) test, which she sometimes waives if the owner provides proof that both parents are negative for FeLV. She vaccinates for feline viral rhinotracheitis, calicivirus and feline panleukopenia (FVRCP) using an *intranasal* vaccine (to remove the risk of vaccination-site fibrosarcoma), and for

rabies if the kitten is three months of age or older.

The kitten's stool is examined for evidence of parasites, including such protozoa as coccidia. She prescribes worming medication to all young kittens and strays regardless of fecal evaluations, following the CDC's recommendations. The ears are checked for mites, and a MacKenzie toothbrush fungal culture is performed to detect dermatophytes in the skin if she feels it is warranted (she estimates that 80 percent of her purebred patients carry ringworm spores). Dr. Eigner also broaches general health care maintenance issues with the owner at this time. "I like to introduce the wellness concept early on," she said.

This involves discussion of factors like pet health care insurance, dental care, diet and behavior. Dr. Eigner advocates feeding a special kitten diet for the first year of the cat's life. For adults, she recommends the premium brands of cat food, such as Iams, Waltham, Science Diet and Select Care, all of which she credits with reducing the frequency of urinary crystal formation. For females she recommends both the commercially available diets and the premium ones.

Dr. Eigner advises her clients to begin brushing their cats' teeth early on so the cats don't object to the practice later in life. She said brushing twice weekly reduces plaque by about 70 percent. As such, it minimizes the need for dental procedures under general anesthesia later on, and lessens the likelihood that potentially insidious oral and subsequent systemic disease will develop.

"Dental disease is one of the most significant things that often goes undetected in cats," she said.

At the first and second appointment, Dr. Eigner examines kittens for the evidence of congenital defects, such as skeletal or soft tissue abnormalities and cardiac murmurs. In the follow-up visit, which is about three weeks after the initial appointment, she administers the

initial FVRCP vaccine and the first FeLV vaccine if they are at risk for exposure to feline leukemia, she deworms again (three weeks later, she examines a stool sample to ensure the kitten is free of parasites). The FVRCP vaccine is repeated and the FeLV vaccine is given if the kitten has significant FeLV exposure risk. For a kitten aged three months or older, the rabies vaccine is given if it has not yet been administered.

At six months, Dr. Eigner rescreens for FeLV (17 percent of FeLV+ cats are asymptomatic) and tests for feline immunodeficiency virus (FIV). She advises waiting until the cat is six months old to screen for FIV because earlier tests can yield false positives due to maternal antibodies. At this time, Dr. Eigner spays/neuters the kitten if it is still intact (she has performed these procedures on kittens as young as eight weeks of age without any negative consequences). Her presurgical database includes PCV/TS/BUN, as well as a thorough physical to rule out heart murmurs or other conditions that may have developed. Insertion of a microchip, which aids in identification of the cat if it gets lost, might also be done.

When a client brings in a recently-acquired adult cat, Dr. Eigner performs a physical, screens for FeLV, FIV and parasites, and updates the cat's vaccines if they are not current.

Annual visits for Dr. Eigner's <ten-year-old patients include a physical exam, fecal, dietary review and yearly FVRCP vaccine. The cats are vaccinated for rabies every three years (with the exception of the second booster, which is given one year after the initial vaccine). The FeLV vaccine is given to high-risk cats.

When her patients attain ten years of age, Dr. Eigner obtains baseline values by running a CBC/chemistry profile/a thyroid profile and urinalysis. She repeats these tests annually to monitor the function of the major organ systems, such as the kidneys.



At Dr. Eigner's clinic, geriatric exams are conducted for cats over 13 years old. These cats have their CBC, special serum values (creatinine, BUN, ALT and SAP), urinalysis and blood pressure (via ultrasonic Doppler flow detector) evaluated on a semi-annual basis. A thorough oral examination is also done, as dental disease is common in geriatric cats. If dental procedures, such as teeth cleaning and extractions, are indicated, she takes special measures for these older cats. They are given antibiotics before and after the procedure and, in order to keep the kidneys well perfused, they are started on fluids the morning of their procedure.

Although many owners are wary of having their elderly cats anesthetized, Dr. Eigner strongly recommends dental care where indicated, regardless of age. "These are not cats that shouldn't be treated," she said. "Afterwards, they are happy again, pain free, and go back to normal eating and grooming."

Geriatric cats are prone to renal failure, and Dr. Eigner treats them accordingly. Diseased kidneys tend to produce inadequate amounts of erythropoietin, a hormone that stimulates the bone marrow to produce red blood cells. She medicates anemic cats whose PCVs are <20% with iron and Epogen®, a synthetic erythropoietin formulation. Most of these cats are sent home with subcutaneous fluids and KCl (they are often hypokalemic). Their PCVs are monitored to ensure that polycythemia has not developed secondary to treatment with Epogen®.

Other therapeutics Dr. Eigner evokes for geriatric cats are cimetidine and famotidine (anti-ulcer medications); phosphorus binders (antacids; treat vomiting/nausea); cisapride (increases gastric motility); lactulose (laxative; binds ammonia); amlodipine (treats hypertension); Cosequin® (enhances cartilage integrity); and fentanyl patches (provide analgesia).



Feline Cardiomyopathies: Diagnosis, Prognosis, and Treatment

Feline heart disease can cause — or result from — insults to other body systems. Dr. Nancy A. Sanders, lecturer in small animal critical care at the School, presented the clinical signs of, and diagnostic tests and treatment options for, several types of cardiomyopathies that occur in cats.

Nonspecific signs of heart disease include dyspnea, coughing, lethargy, exercise intolerance, inappetence, weight loss, visual impairment and hindlimb paralysis/paresis. Diagnosis and characterization of heart disease can be made by integrating the results of electrocardiography (ECG), echocardiography and radiography with pertinent blood values and history and physical exam findings.

The feline heart can be affected by congenital anomalies, arrhythmias, heartworm infection, valvular and pericardial lesions, and, of greatest significance, primary cardiomyopathies.

The most common myocardial disease is hypertrophic cardiomyopathy (HCM), which is characterized by ventricular hypertrophy and its consequences. "The muscle gets thickened at the expense of the internal diameter of the heart, so there is very little space for blood to collect," Dr. Sanders explained.

These changes trigger a destructive chain of events. The atria enlarge as they pump against the stiffened ventricles. As blood stagnates in the atria, thrombi can form. These clots can enter the circulation and settle in organs and blood vessels such as the descending aorta, where "saddle thrombi" can impair the circulation to the hindlimbs, possibly resulting in paralysis. Blood also backs up into the pulmonary vasculature, leading to pulmonary edema

and respiratory distress. Hypertension and associated retinal detachment are other unfortunate consequences.

Physical exam findings include tachycardia, hypertension, gallop rhythm, heart murmurs, abnormal lung sounds, deficient pulses, cold extremities and retinal changes +/- blindness. On radiograph, the lungs typically are radiopaque and left atrial enlargement may be apparent; the heart generally does not appear enlarged because the muscle thickens toward the internal rather than external cardiac diameter. The thickness of the myocardium and consequent diminution of the chamber are evident on echocardiogram.

HCM is best treated with diuretics, vasodilators, beta-blockers and calcium-channel blockers. Other therapeutic options include chest tap to remove free fluid from the thoracic cavity, and anticoagulants to prevent clot formation. The treatment regimen should also incorporate management of underlying causes of HCM, which include hyperthyroidism, hypertension, chronic lung disease and congenital anomalies. (Breed predispositions and idiopathic mechanisms may also be responsible.) HCM carries a guarded prognosis, which varies depending upon the severity.

Restrictive/intermediate cardiomyopathy (RCM) has a similar mechanism to HCM. RCM results from myocardial fibrosis; although the heart muscle is not as corpulent as in HCM, its compliance is reduced. The ensuing pathogenesis and complications are akin to those seen in HCM, but the respiratory signs are typically more pronounced. RCM is an idiopathic disease, although suspected causes include endocarditis and viral infections. The treatment protocol for RCM is the same as for HCM, but the prognosis is slightly better because cardiac function is usually not as compromised.

Dilated cardiomyopathy (DCM) involves a different type of mechanism. Here, the myocardium is atrophied and flaccid. As a result of this weakened contractility, the chambers become engorged

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with blood. Consequently, the atria expand because they cannot pump blood into the dilated ventricles. This leads to circulatory backflow into the pulmonary vasculature, resulting in pulmonary edema and pleural effusion. Radiography reveals an enlarged cardiac silhouette (lateral view), and the lungs appear radiopaque.

The leading etiology of DCM is dietary deficiency of taurine, an essential amino acid in cats. Retinal degeneration may also be present secondary to taurine deficiency. Because commercial cat foods are nutritionally balanced, DCM is rarely seen in cats today. Most cases of DCM are idiopathic; rarely, it has been seen associated with hyperthyroidism (hypothyroidism is also a suspected cause).

DCM is treated with taurine supplementation, diuretics, vasodilators and positive inotropes (i.e. digoxin). The prognosis is guarded initially, but improves if the causative factors are identified and treated quickly.

A newly described entity, endomyocarditis is a rare condition involving inflammation of the myocardium and the internal linings of the heart. It typically affects young male cats with recent histories of stressful events, such as surgery or grooming; other underlying causes include viral infections and systemic inflammatory conditions, such as pancreatitis.

On echocardiogram, the affected heart appears thickened, as in HCM, but lung pathology and dyspnea are more severe. Endomyocarditis should be treated as a medical emergency with oxygen, diuretics, vasodilators and intensive care. If the patient survives the initial crisis, the disease may progress to HCM or RCM. The prognosis for survival is grave.

Treating heart disease is a careful balancing act. Congestive heart failure and kidney failure, for example, are treated in opposite manners. A cat in HCM likely needs diuretics to decrease associated pulmonary congestion. But diuretics can cause dehydration, leading to hypotension and renal failure.

"Everything has its drawbacks," Dr.

Sanders said, "and we have to be very careful when we put a cat on medications for heart disease."



Cat Houses I Have Known

Ideal animal husbandry systems incorporate the principles of sound health care, nutrition, safety and environmental stimulation. Geoff Loveridge, a spokesperson for the Waltham Centre for Pet Nutrition, discussed kennel, cattery and operation, as well as group animal care for cats.

Waltham's animal facility, located in Melton-Mowbray, England, serves as the nutrition and palatability testing center for the pet foods the company manufactures. The campus, which is open for public visitation, houses cats and dogs in several "homey" buildings, said Mr. Loveridge. Sixteen breeds of dogs reside at the center. The dogs have indoor/outdoor runs, play paddocks and toys.

Like its canine constituency, Waltham's cats have their needs met on many levels. The cats are housed according to sex, age and life stage. The breeding building adheres to strict hygiene; shower stalls help to ensure that entrants don't bring in pathogens from the environment. The floors are cleaned with household detergents and bleach. Like the dog runs, the cat enclosures have outdoor space too.

"The cats may choose whether they want to be inside or outside," Mr. Loveridge explained.

In addition to offering environmental enrichment, he said, this indoor/outdoor design gives the animals temperature variation. "Cats and dogs seem to like small spells of being very hot or very cold."

The tom cats live in individual runs equipped with climbing poles and window sills for perching. The queens, how-

ever, are group housed. When inside, they lounge in "social rooms," complete with heated beds, window sills, scratch pads and toys.

Pregnant queens demand special care, Mr. Loveridge said. From the start of gestation, the pregnant queen begins to gain weight. Only about a third of this extra weight is attributed to the placenta and kittens; the rest is reserve body tissue that stores energy to be used post partum. During lactation, weight loss occurs as these stored calories are utilized. Waltham's lactating queens are fed nutritious, palatable foods, and in greater quantity, so that they can end their lactation at or near their pre-pregnancy weight.

Kittens also receive special care at Waltham's diet-testing facility. Each newborn is injected with a microchip and weighed at birth. It is housed with its siblings and mother in an easily-cleaned, tiled enclosure that contains a cardboard box lined with absorbent bedding (for the kittens) and walled shelves (for the queen).

Waltham's kittens are closely monitored for weight gain. At birth, the kittens weigh about 100 grams each. But by about five weeks old, their individual genetic potentials become apparent, as kittens born to heavier queens are typically larger than their counterparts. By 20 weeks of age, individual weight differences are even greater. The kittens' growth efficiencies decline over time, and their weights even dip slightly following vaccination, likely from stress. Newly-weaned kittens are moved to new quarters, where they are group housed and provided with safe children's toys.

The next stop for the kittens is the palatability testing building, where feline enclosures are furnished with bell ropes, cardboard boxes of different heights, and other feline recreation accessories. Here, food preference tests — in which the young cats are offered a variety of meals from which to choose — are conducted. Chemical analyses are done on both the food and the urine and feces in order to assess food digestibility. At 16-20 weeks

of age, both the kittens and the pups, which are socialized as much as possible while at Waltham, are adopted out to permanent homes.

Nutrition testing for pets is a critical function at Waltham, which is a division of Mars International. The center is careful to assess the dietary needs of dogs and cats separately. "It wasn't very long ago that cats were considered to be just small dogs," Mr. Loveridge said, "whereas we know, in fact, that they've got very specific nutritional demands."



Calamitous Cats: An Overview of Feline Behavioral Problems

Behavioral problems outpace infectious, metabolic and neoplastic diseases combined as the number one reason for death among domestic cats and dogs. But whether or not behavioral disorders culminate in euthanasia or outplacement, said Dr. Karen L. Overall, lecturer in behavior medicine at the School and director of VHUP's Behavior Clinic, heartbreak almost invariably enters the picture.

Cats represent the majority of pets in the U.S., yet only account for only some 20 percent of the Behavior Clinic's clientele. Owner's often fail to recognize or acknowledge their cat's behavioral anomalies. Dr. Overall reasoned. "People will tell you that cats are asocial," she says. "Cats are not asocial. They are elegant social beings."

Normal feline social development is segmented into several discrete stages. From two to ten weeks of age, kittens are engaged in the social play period, a critical part of early feline psychosocial ontogeny. "If you want to guarantee that your kittens will be as friendly to people as possible, you have to handle them intensely between two and seven weeks of

age. If you miss this period," said Dr. Overall, who referred to adopted feral cats that never become socialized to people, "then you have a problem."

By about 12 weeks old, social play gives way to social fighting. Cats are sexually mature by about six months of age, but continue to mature socially until two to four years of age. At about this time, some cats vie for status within the household and may exhibit aggression toward people and other cats.

An aggressive cat communicates its state of mind through often subtle facial and postural responses, altering the angle of its head with respect to its body, and the position of its tail and ears. In their evolutionary history, cats, which are obligate carnivores, have developed complex social dynamics in order to flourish as hunters. As a result, said Dr. Overall, "cats are different. They don't express plain fear and plain aggression. It's overt versus covert aggression, passive versus active aggression, defensive versus offensive aggression."

Feline aggression comes in a variety of patterns, including predatory aggression, fearful aggression, play aggression, territorial aggression, maternal aggression, redirected aggression, and aggression due to lack of socialization. The most common feline aggression problems seen at the Behavior Clinic are status-related aggression and inter-cat aggression.

Often manifest as the "leave me alone" bite, status-related aggression usually occurs when the cat is being petted. Typically, the cat solicits attention and then suddenly bites the handler and flees. Here, the cat is attempting to control when the attention starts and when it ceases. Since this behavior can lead to injury, owners are encouraged to watch for signs of impending aggression (i.e. dilated pupils, flattened ears, flicking tail and low growl). At the first sign of such behavior, the handler should rise and let the cat fall from the lap. This type of aggression can be modulated with behavioral and environmental therapy, as well as psychotropic drugs.

Though common between toms, inter-cat aggression is more often based on conflicts within social hierarchies than on sex. Among toms, early neutering (before 12 months of age) has been shown to decrease fighting by about 90 percent.

Feline aggression is potentially dangerous and owners are advised to be wary when around a cat that is behaving in a truculent manner. Cats remain reactive for a long period of time after being thwarted from aggressive interactions, and should not be approached until they appear calm.

Feline temperament is mediated by several factors, Dr. Overall said. Friendliness is largely determined by the father's genes. Coat color has been associated with aggressive propensities. Perinatal nutrition influences brain development. These factors should be considered by a prospective cat owner in selecting a kitten.

While feline aggression is a daunting problem, inappropriate elimination behaviors constitute the most common behavioral problems in cats. They can take several forms, including spraying, non-spraying marking, and substrate or location aversion or preference. Diagnostic tests, such as urinalysis, should be performed to distinguish behavioral from systemic etiologies, such as cystitis.

Obsessive-compulsive disorders can also be seen in cats and can manifest as self-mutilation, pica, self-directed aggression, and ritualistic vocalization and motor behavior. As for aggression disorders, a variety of pharmacological approaches exist to treat behavioral elimination problems and obsessive-compulsive syndromes. These, combined with behavioral and environmental intervention, can improve the affected cat's quality of life.

"We become more humane when we realize that cats are complex social beings," said Dr. Overall, "and that they have problems that can be corrected."

Joan Capuzzi