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13th Annual Feline Fanciers Symposium

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13th Annual Feline Fanciers Symposium

The Thirteenth Annual Feline Fanciers Symposium was held on March 31 at VHUP. Following are summaries of the four presentations.

The Clinical Importance of Feline Blood Groups

Dr. Urs Giger, associate professor of medicine and medical genetics, discussed feline blood groups and their clinical importance when treating ill cats. Blood group incompatibility can lead to neonatal isoerythrolysis and transfusion reactions, two life-threatening conditions. But, he pointed out, blood groups are not a disease, rather they are genetically determined differences in antigens on red blood cells.

Until recently it was believed that the great majority of cats had type A blood. Now studies at the University of Pennsylvania have shown that this is not so. Dr. Giger said that 99.7% of the DSH/DLH cats typed across the United States had type A blood. Siamese and related breeds (Oriental shorthairs, Burmese) tested also have predominantly type A blood. However, Dr. Giger and his colleagues discovered that other cat breeds have a significantly higher percentage of animals with type B blood. Breeds with about 10-25% type B cats are Abyssinian, Birman, Himalayan, Persian, Scottish fold, and Somali. In the British shorthair and the Devon Rex breeds approximately 90% of the cats have type B blood. Thus, there is a great variation in the frequency of blood type A and B between breeds.

Dr. Giger said that his studies of numerous purebred cat families have shown that type A and B are simply inherited with type A being dominant over type B. This means that a cat with blood type B is homozygous for B, and type A cats can either be homozygous for A or heterozygous, thereby hiding the B gene. Offspring of two type B parents have type B blood, whereas matings of type A and B cats may produce both type A and B kittens. Also, two type A cats that carry the B gene (heterozygotes) can have type A and rarely type B kittens. There are no type O cats. Recently the researchers identified a cat with type AB blood, but it appears that this is an extremely rare and separately inherited blood type.

Knowing the blood type of a feline patient can be of great clinical importance, particularly if the animal requires a transfusion. Similar to humans, cats have naturally-occurring antibodies against the other blood type; particularly type B cats have strong antibodies against type A blood cells. These antibodies cause two major incompatibility reactions: neonatal isoerythrolysis (NI) and blood transfusion reaction.

Kittens with type A blood born to type B queen may develop a fatal NI reaction which is caused by maternal antibodies that destroy the kitten's red blood cells. Maternal antibodies do not pass through the placenta in cats, but are transferred via colostrum to the kitten during the first few days of life. These kittens are born healthy but show clinical signs within hours to days after colostrum intake. They cease to nurse, fade and most often die within the first few days of life. Specific signs may not be seen, but include dark, red-brown urine and jaundice. NI has been recognized as a major cause of fading kitten syndrome in all breeds having more than 10% type B cats, and likely occurs in other breeds too.

Dr. Giger recommends that purebred cats be blood typed prior to breeding to assure compatible blood types in the breeding pair. If this is not possible, measures can be taken to save kittens from litters of incompatible parents. Using a fostor mother and removing the kittens from the queen for the first couple of days while she is producing colostrum can prevent NI.

Knowing the blood type is also important in case of serious illness which may require a blood transfusion. There are many diseases which cause anemia and may require treatment with a blood transfusion, such as internal hemorrhage, trauma, FeLV infection, and others. If an anemic cat receives a mismatched transfusion it will not benefit from it and may experience a life-threatening transfusion reaction. Since the common blood donors have blood type A, it is desirable to know the blood type of any purebred cat in case it needs a blood transfusion. In an emergency, when blood typing is not available, a crossmatch test can be performed. A crossmatch test will detect incompatibilities between donor and recipient blood, but does not specify the blood type.

The common feline donor at the Veterinary Hospital are born healthy but may experience a life-threatening transfusion reaction. The usual amount is roughly 1/2 ounces of blood from a 10-pound cat. This blood is anticoagulated, placed into a bag, and infused into the recipient cat.

Studies have shown that the transfused red blood cells have a half-life of about 35 days in the recipient cat. This is approximately the same as the half-life of the cat's own red blood cells. Transfusion of mismatched blood, however, leads to lysis (red blood cell destruction), followed by heart beat irregularities, transient cessation of breathing, and possibly death. Mismatched transfusions are particularly dangerous in type B cats.
As part of a Transfusion Medicine Academic Award, the University of Pennsylvania, School of Veterinary Medicine, offers a feline blood typing service to all veterinarians and cat breeders. Approximately 1 ml of blood in a labelled EDTA tube along with breed, age, and name of the patient is sent. If transfusion reaction, blood donor) and address of correspondent should be shipped by overnight mail to: Dr. Urs Giger - Blood typing, Department of Clinical Studies - VHUP, 3850 Spruce Street, Philadelphia, PA 19104-6010. Results will usually be reported within two weeks of sending blood样本s, but can be phoned immediately, if medically required.

Congenital Neurologic Diseases in Cats

Observation and indirect examination, along with clinical judgment, play an important role in the diagnosis of congenital neurologic disease in cats. The veterinarian—Dr. Betsy Dayre-U-Hart, lecturer in veterinary neurology—must observe the animal's behavior and response to stimuli and then decide if there are appropriate or an indication of some deficit or (in rare cases) excess of nerve stimulation.

Veterinarians have developed lists which help them determine the probable cause of a given symptom, after due consideration of the animal's age, medical history, onset of condition, and response to various treatments. Quite often, an apparently neural symptom may have other causes. In addition, neurologic conditions can lead to symptoms that may be mistakenly attributed to some other disease. Illnesses can also give rise to neurologic symptoms, as in the case of a diabetic cat that suffers from a neurologic disease secondarily.

A number of laboratory tests can be useful in helping to confirm a diagnosis (and in eliminating some conditions from the suspect list). These include blood tests; serum antigen and antibody tests; cultures for bacteria, fungi, and parasites; urinalysis; radiography; electrocardiography; and ultrasonography. At times, the veterinarian may decide to confirm (or eliminate) a suspected cause by further tests. These include cerebrospinal fluid analysis; brain or nerve biopsy; myelography (a technique for taking x-ray photographs of the spinal cord by injecting a contrast medium); nerve conduction velocity measurements; and serum tests for various neurotoxins, heavy metals, and specific pathogens. Many of these specific tests require general anesthesia, not only because they are painful, but because it is important to keep the animal absolutely still.

Few of the congenital neurological diseases are curable, but their diagnosis is still important because some apparently neurological defects are in fact due to viral disease, tumors, or dietary deficiencies that can be treated. In other cases, the owner may want to use the cat for breeding and genetic defects have to be ruled out.

Some neurological diseases are due to defects in the closure of the neural tube during fetal neurologic development. One of these conditions is spina bifida in domestic short hairs; another is sacrococcygeal dysgenesis in the Manx cat. These conditions, which are difficult to impossible to treat, are present at birth and may progress in the first weeks of life. Both are marked by signs of weakness in the hind legs, and sometimes incontinence or loss of sensation. Some of these kittens may also have meningocoele, a condition in which part of the nervous system protrudes through the skull or spinal column, resulting in constant drainage of cerebrospinal fluid. The outward signs of this condition are a "soft mushy backbone" or a wet spot at the base of the spinal column, just above the tail.

Spongiform degeneration of spinal cord cells, which has been reported in the Egyptian Mau, is manifested by weakness of the hind legs. The symptoms appear around the age of seven weeks and sometimes improve.

Both mixed breed and purebreed kittens are sometimes born with hydrocephalus, lisencephaly (undeveloped cerebral cortex), or anencephaly (lack of cerebral cortex). Hydrocephalus, which can be either congenital or acquired, literally "fluid on the brain," has as one of the outward signs a domed skull. Hydrocephalus can lead to very abnormal behavior in kittens, some of whom may gradually improve or respond to drug therapy. The condition can sometimes be treated by a fairly complicated surgical procedure.

Himalayans are known to suffer from megaeosphagus, a condition marked by a dilated, weak esophageal muscle sheath. The condition becomes manifest at the age of a few months and can have a variety of causes, including faulty innervation and myasthenia gravis (which can be treated). These animals have trouble swallowing their food and keeping it down. They sometimes recover spontaneously.

A number of storage diseases have neurological symptoms. These diseases are ultimately due to deficiency of some enzyme, one of the chemicals that facilitates chemical reactions in the body's cells. Enzymatic deficiencies can lead to the accumulation of wastes and other metabolic by-products in cells. Some storage diseases can be diagnosed from their symptoms, while others require analysis of blood, urine, or cerebrospinal fluid, or other tissues. Some breeds are particularly susceptible to certain storage diseases. Siameses can have cerebral sphingolipidoses, beta galactose deficiency, and mucopolysaccharidoses. Gangliosidosis affects Korats, while Persians suffer from mannosidosis. Among the conditions that can afflict domestic shorthairs are ceroid lipofuscinoses, hyperchylomicrocinemia, globoid cell leukodystrophy, and GM-1 and GM-2 gangliosidoses.

Even though each of these diseases has a different origin, they have many common features. Kittens usually look normal at birth, but grow slower than their litter-mates. Signs of disease begin to appear after a few weeks or months, and may include peripheral or central nervous system symptoms—such as tremors, spasms, and difficulty in moving. These signs tend to be progressive.

Panleukopenia virus infection can lead to the birth of kittens without a part of the brain (the cerebellum). This condition is not always fatal, and may even be asymptomatic. The kittens usually have normal strength, but they are very clumsy, likely to reach toward their food and miss it. Even so, many of these cats will adjust and live, making good pets. Since this condition is not inherited, they can be bred—although they will make clumsy mothers.

Feline Clinical Nutrition as Related to Cardiomyopathy, Feline Urological Syndrome, and Obesity

Obesity in humans and felines is defined the same way: cats whose weight is more than 15% above the ideal are classified as "overweight," while those whose weight is more than 25% above the ideal are classified as "obese." "Nutrition and obesity play an important role in such clinical conditions as feline central retinal degeneration, feline dilated cardiomyopathy, and feline urinary syndrome," explained Dr. John Burr, Animal Care Center Veterinarian, Technical Services, The IAMS Company.

The urinary syndrome (FUS) is the term for a rather vaguely defined group of clinical signs and symptoms associated with obstructions of the lower urinary tract, more specifically the bladder and urethra. FUS can occur at any age and male cats are particularly susceptible because of the anatomy of their urinary system. The clinical signs include polyuria (unusually frequent urination), obviously painful urination, straining, and blood in the urine (hematuria). When these signs are not due to infection, injury, or outside pressure on the urethra (for example from a tumor), they are often a result of uroterelithiasis: the presence of calculi (or stones) in the urethra.

Most of these stones consist of struvite, a mineral that is also known as ammoniummagnesium phosphate. A study at the University of Minnesota showed that 82% of urethral stones in cats consist of struvite.

The main predisposing factor for struvite crystal formation is a high degree of urinary alkalinity, meaning a pH well above 7.0. Other predisposing factors are the presence of microbes that produce an enzyme called urose, and an area in the urethra that is suitable for the accretion of crystals. Suggestions that viral infections, particularly hepsivirus infection, may play a role in crystal formation have not been proven.

What does seem to have been proven is that the stones are not caused primarily by diet, or more specifically the magnesium content of diet. Some earlier investigators suggested the stones were due to high dietary levels of magnesium oxide and magnesium chloride. More recent studies have shown that the amount of magnesium oxide is less important than urinary pH because crystal formation does not begin unless the urine is very alkaline. The metabolism of magnesium chloride, meanwhile, causes urine to become more acidic.

The simplest way to measure the alkalinity of urine is by means of the litmus paper test. It is important to keep a cat's urinary pH under 7.0. A pH of 6.7 or less is even better.

Trying to reduce urinary alkalinity by giving the cat vitamin C (ascorbic acid) is not advisable, because the metabolism of this compound actually causes urine to become more alkaline. Some temporary increase in urinary alkalinity is a natural result of the digestive process. One way to reduce this is by allowing cats to eat ad lib instead of providing them with a few substantial meals a day.

Protein from animal sources causes urine to become acidic and FUS is rarely a problem in cats who get most of their protein from meat and animal.
by-products. Animal proteins are rich in sulfur-containing amino acids, which are lacking in plant-derived proteins. Animal protein also contains taurine, an aminosulfonic acid necessary for the development of feline dilated cardiomyopathy (FDC) and feline central retinal degeneration. Since the relationship between taurine deficiency and FDC was established about three years ago, taurine supplementation has become the rule in the cat food industry; all commercial cat foods now contain adequate amounts of this compound.

FDC is a condition marked by enlargement of the heart and consequent decrease in blood pressure. Its incidence is not yet known; its symptoms include overall weakness and obstruction of blood flow to the back legs. Fortunately, this condition in cats can be treated successfully with taurine dietary supplements, as has been demonstrated by dramatic series of chest radiographs showing how a previously enlarged heart returns to normal size. A laboratory test for blood levels of taurine is available. Taurine deficiency has also been implicated in feline central retinal degeneration, which leads to irreversible blindness. This condition develops gradually, owing to the variable taurine content of different foods and the long serum half-life of taurine (from 30 to 88 days). Retinal degeneration is seldom diagnosed until the cat has lost its eyesight. Fortunately, its progression can be halted—although not reversed—by a change in diet.

The National Research Council has recommended a daily allowance of at least 400 units of taurine a day to prevent feline retinal degeneration, with a minimum of 500 units for pregnant queens. The amount needed for prevention of FDC is substantially larger, in the neighborhood of 2,500 units a day.

Medical Approaches to Feline Respiratory and Hepatic Problems

Medical approaches to hepatic and respiratory problems in cats form the subject discussed by Dr. Joan C. Hendricks, assistant professor of medicine.

Cats can suffer from a number of liver conditions. At present, there is no cure for liver cancer. The situation is more hopeful in regard to inborn errors of metabolism, which may be responsible for most of the liver diseases whose symptoms include jaundice, icterus, and discoloration of the cat's gums, eyes, and mucous membranes.

The liver can be characterized as a metabolic factory that processes many different substances, making some of them and breaking down others. It is the major organ for degrading poisons and drugs, as well as most of the waste products resulting from normal metabolism.

Jaundice is a major sign of liver disease. It is caused by the tissue build-up of bile, one of the liver products that plays an important role in digestion. Jaundice may be due to leakage of bile into the bloodstream because the liver fails to excrete the bile salts. Often, jaundice is a symptom of liver disease, especially chronic liver disease or cirrhosis. Jaundice can also be caused by bile duct obstruction, which can be either total or partial. Partial obstruction is more common and less severe than total obstruction.

Cats with jaundice may show signs of depression, anorexia, and weight loss. They may also have fever, jaundice, and edema because the liver fails to remove carbon dioxide and other substances from the blood. Jaundice may also lead to abnormal bleeding because the liver fails to produce certain blood-clotting factors. Jaundiced cats may have icterus, which is a yellowish discoloration of the skin and mucous membranes. Jaundiced cats also tend to have a yellowish tint to their gums and eyes.

Respiratory disorders may be caused by a variety of conditions, including bronchitis, pneumonia, and asthma. Bronchitis is a chronic inflammation of the bronchi, which carry air from the windpipe to the lungs. Bronchitis can be caused by a variety of factors, including viruses, bacteria, and allergens. Pneumonia is a serious condition in which the lung tissues become inflamed and filled with fluid and pus. Asthma is a chronic inflammatory disorder of the airways that causes narrowing of the bronchioles and difficulty in breathing.

Diagnosis of a respiratory condition starts with a thorough physical examination and history. The important questions are: Is the cat suffering from bronchitis or asthma? Is the cat being treated for bronchitis or asthma? Is the cat being treated for a chronic lung disorder? Is the cat being treated for a chronic lung disorder that is controlled by medication? Is the cat being treated for a chronic lung disorder that is not controlled by medication?

Endoscopy is another useful diagnostic method. This involves passing a thin tube, with a camera and light source, down the cat's throat to examine the organs. The endoscope can be used to examine the stomach, intestines, and lungs. The endoscope can also be used to take samples of tissue for biopsy.

Medical treatments for respiratory disorders include antibiotics, bronchodilators, and corticosteroids. Antibiotics are used to treat infections. Bronchodilators are used to relax the bronchioles and improve breathing. Corticosteroids are used to reduce inflammation and swelling.

Finally, liver disease can lead to abnormal bleeding because the liver fails to produce certain blood-clotting factors. Jaundiced cats may have icterus, which is a yellowish discoloration of the skin and mucous membranes. Jaundiced cats also tend to have a yellowish tint to their gums and eyes.

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