Vet's Corner: Juvenile Mediastinal Lymphoma

Diagnosis and Treatment

by Dr. Leanne Ksiazek

November 3, 1996 A one-year-old intact hob, Emmett, is brought in with increased respiratory rate and effort. He has been showing symptoms for 2 days. Weight is 3 pounds, he has been eating well, is active, bright and alert. Mucous membranes are pink and moist. Capillary refill time is approximately 2 sec. Heart is within normal limits, lungs bilaterally dull. Abdominal exam reveals splenomegaly. X-ray shows a large mediastinal mass with elevation of the trachea with significant amount of pleural effusion. Ferret is admitted and sedated with atropine and ketamine IM. His chest is tapped, and 5ml of fluid are extracted. An IV catheter is inserted, and he is given 1mg prednisone SQ. Fluid is sent to a lab for analysis and cytology.

November 4, 1996 Emmett is stable but dyspnic with stress or excitement. Ferret is given supportive care until cytology results come in. He is receiving IV fluids; prednisone SQ; and lasix, 1mg IV SID.

November 5, 1996 Fluid analysis and cytology are highly suggestive of mediastinal lymphoma. Lymphocytes are 95%.

November 5, 1996 Chemotherapy is started. Chemotherapy consists of prednisone, cytoxan, and vincristine. Prednisone continued throughout treatment period at 1/2 of a 5mg tablet SID.

Day 1: prednisone; vincristine (0.12mg/kg IV); WBC= 9,400; RBC= 9.99.

Day 3: cytoxan (10mg/kg) (reformulated at the Medicine Shoppe into capsules).

November 12, 1996 *Day 7:* WBC= 4,000; PCV= 51%; TS= 5.8. Emmett is very feisty with no respiratory problems, and he is eating well. Weight is 3 pounds. Isoflurane is used for bloodwork and placement of catheter. Vincristine is given IV.

November 19, 1996 *Day 14:* Isoflurane administered for blood tests and IV catheter placement. Held off on bloodwork today since Emmett is doing very well.

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Emmett (1995-1996)

by Cindy Sooy

Emmett was your typical 11-month-old hob: playful, energetic, happy, and healthy, or so he seemed. I was leaving to attend a conference one morning, and I was checking on the ferrets before I left. Emmett was sleeping, but his breathing was shallow and rapid. I took him out, and he bounced around getting into everything. I figured he must be coming down with something and I would take him to the veterinarian on Monday morning.

There was no change in Emmett when I got home Saturday night, and I decided to take him to the emergency clinic in the morning. The veterinarian on call did a chest X-ray. It was diffuse, indicating a mass or fluid build up. She sedated him and tapped his chest. She drew 5ml of fluid and concluded that a large mediastinal mass was responsible for Emmett's breathing difficulties. The fluid was sent to a lab, and Emmett was placed in an incubator with oxygen. Apparently no one told Emmett that he was sick, and he began to tear up the incubator. He was put in a regular cage.

My veterinarian called Monday morning. She had started Emmett on prednisone. She suspected juvenile lymphoma. She was not a proponent of chemotherapy, but since Emmett was so strong and had so much fight she wanted to try it. We decided to wait for the laboratory results and then choose a form of treatment.

Test results leaned toward lymphoma. Emmett's lymphocytes were 95%: anything over 60% may be indicative of lymphoma. Chemotherapy was started right away. We decided on Protocol I detailed by Dr. Susan Brown in the text "Ferrets, Rabbits and Rodents," Chapter 10, pg. 108. Emmett was sedated and given vincristine IV, and I took him home.

I continued giving Emmett prednisone daily and cyclophosphamide at home on days 3, 24, and 46. Emmett continued being himself, playing and eating well. Within a few days his breathing returned to normal. Chemotherapy was continued. We were very optimistic about Emmett's chances of recovery. Usually, juvenile lymphoma kills its victims before it can be diagnosed. It is a fast growing, aggressive cancer. We

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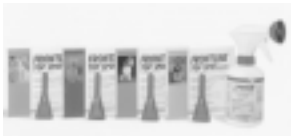
MEDICAL NEWS



Long and Short of It

Advantage and Frontline

by Cindy Sooy

Dear AFR, My son runs a ferret shelter. Ferrets often come in flea ridden in the summer months. The area where my son lives is also flea infested and it is very hard to keep the fleas under control. He's tried shampoos, powders, and sprays, but none of them eliminated the problem. What should I do?

In the past few years, two products have come out on the market for flea control in dogs and cats: Advantage, made by Bayer Corporation, and Frontline, made by Meriel (formerly Rhone Merieux). Both work in a similar manner in that they kill adult fleas on contact so the fleas don't have to bite the animal to be affected. Since both products kill adult fleas, there are no eggs laid, and the fleas are eliminated much more quickly. Both products come in small tubes and a few drops are placed on the back of the neck of the animal. Neither product is approved for use in ferrets, and both are available only through a licensed veterinarian.

Many veterinarians recommend either Advantage or Frontline for ferrets, and there are no known adverse effects from either. Advantage came onto the market before Frontline and for that reason appears to be more well-known. Frontline also kills ticks.

LYMPHOMA (continued from page 21)

November 26, 1996
Day 21: PCV= 40%; TS= 5.5. Smear shows approximately 4plts/high power field. Neutrophils appear adequate. Isoflurane administered for catheter placement. 0.12mg/kg vincristine given IV and flushed well.

Day 24: Cytoxan at home.

December 9, 1996
Emmett eating fine, weight 3.25 pounds. He is quiet, which is not normal for him. His stools are slightly soft. He is fairly alert, no increase in respiratory rate or effort. Lungs auscult normally, compressible chest. Owner reports slight virus amongst other ferrets.

December 12, 1996
Emmett down to 2.5 pounds. Very depressed, temperature 100F. Mucous membranes are pink and tacky. Approximately 5% dehydrated. Slight increase in size of spleen and liver but non-painful. Significant fast weight loss. Ferret is hospitalized, and IV catheter inserted. Fluids with B vitamins are given IV at 5mg/hr for 12 hours, then 3mg/hr. CBC and chem screen are sent out. Cover with antibiotics (Ampicillin IV). Possible causes: viral, lymphoma, chemotherapy reaction?

December 13, 1996
Central depression. Emmett will eat and drink readily, but he is hard to arouse. Blood work shows slight anemia (6.58) but otherwise looks good. Lymphocytes down to 15%. Continuing supportive care with IV fluids, hand feeding, antibiotics, and prednisone.

December 14, 1996
Concerned over the possibility of CNS lymphoma. All other systems are okay. Consider spinal tap +/- intrathecal?? Will switch to dexamethasone BID for now and continue antibiotics. Emmett's WBC is normal, and he is afebrile.

December 15, 1996
Owner elects to take Emmett home for supportive care.

December 17, 1996
Owner reports Emmett is acting distressed and painful; elects to have him put to sleep.

Necropsy shows absolute resolution of mediastinal mass and no thoracic fluid. Abdominal exam showed slight hepatosplenomegaly but no lymphal enopathy. General condition was excellent. CNS was not evaluated but ***highly*** suspect metastatic lymphoma.

Treatment notes:
Isoflurane worked very well, recovery was quick and very safe. IV catheter placement: 20g using the cephalics as well as the medial femorals. IV vincristine: we used 1mg fluid first to ensure patency, then gave the vincristine followed by 2–3 mls of fluids.

I spoke with my veterinarian, and she recommended that I use Advantage on my ferrets since there is little risk that they would be in contact with ticks. (Ferrets that come into shelters, however, have often been outdoors for some time and may have ticks. Frontline is best in this situation.)

Since ferrets are smaller than cats, we tested just one drop of the Advantage formula for cats that weigh less than nine pounds. It worked beautifully. In no time the fleas were gone. One drop, once a month, fit in well with our busy schedules.

My veterinarian cautioned that these products should not be used on a ferret or kit under one pound and that care should be taken with any ferrets that suffer from skin allergies because the products can cause a reaction. If a ferret begins to scratch after application of either product, he should receive a bath immediately. This will remove most of the product since it takes about 24 hours for it to spread completely over the ferret's body.

Another drawback for some could be the price. Both Advantage and Frontline come in packages of 3 or 4 tubes and cost around $25 or $30. Each tube must be used immediately after it is opened, so if you have only one or two ferrets, these products could be a bit costly. If you can get together with other ferret keepers and share or if you are a multi-ferret household, breeder, or shelter, then these products are for you. Frontline also comes in a spray form, but you must wear a mask and gloves when applying the product. Most veterinarians prefer to use the drop formula of Frontline.

As with any extralabel products, consult with your veterinarian before using either Advantage or Frontline.

EMMETT (continued from page 21)

had caught the disease early and believed we could beat it.

About six weeks after Emmett's treatment began, my ferrets came down with a mild virus. Chemotherapy impairs the immune system badly, and Emmett crashed. He wouldn't eat, and he slept most of the time. He was put on antibiotics, and I started hand-feeding him. Emmett would eat very well, but he wouldn't touch food on his own, preferring instead to sleep. Emmett didn't seem uncomfortable or in any pain, just very tired.

Emmett's condition worsened, and he was re-admitted to the hospital. Chemotherapy was stopped, and he was given massive doses of antibiotics IV. Over the next few days, Emmett went into a deeper sleep, and he became very difficult to wake. I had to talk to him, rub him, and even shake him gently to arouse him enough to be fed. He would sleep again immediately afterwards. Emmett wasn't uncomfortable yet. He would sleep peacefully, curled up on his back in ferret ways, but wouldn't wake. I took him home so I could be with him.

I slept with Emmett next to my bed so I could check on him often. A few days after coming home Emmett woke up and started scratching to come out of his cage. He explored a bit and went back to bed. We were hopeful that the antibiotics were starting to help, but then Emmett crashed again. He started to show neurological abnormalities. His back foot twitched rhythmically like he was constantly swimming. He became almost comatose. I woke up one morning to find Emmett trying to get into his litter pan. He was whimpering, his head was twisted back and to the side, and he was twitching. I knew it was time to let go. Emmett was euthanized.

Necropsy showed absolutely no trace of lymphoma in Emmett's chest. Although the virus may have played a part in Emmett's death, my veterinarian believes, due to the neurological symptoms, that the lymphoma had invaded Emmett's central nervous system. It was very disheartening for us all because Emmett had been doing so well. We really believed that we had beaten juvenile lymphoma. Because Emmett responded so well to the chemotherapy, my veterinarian wouldn't hesitate, under similar conditions, to use this treatment again in a ferret.

As a footnote, Emmett's sister, Little Sister, passed away suddenly in January. There had been a virus going around, and I and many of my ferrets came down with it. Little Sister became lethargic. I noticed her breathing was becoming shallow and rapid. She passed away before I could get her to the veterinarian. Necropsy showed juvenile lymphoma. It had invaded her thymus and stomach. Juvenile lymphoma is not a firm mass like many cancers but a crumbly, yellow mass. When lymphoma invaded Little Sister's stomach wall, the wall crumbled, and she died. It is very unusual for littermates to both fall to juvenile lymphoma, but it is possible that the mating of Emmet and Little Sister's parents created an oncogene in the offspring making them more susceptible to cancer.