Erythroblastic Leukaemia In A Domestic Longhair Cat

Charlotte Dye

BVM&S CertSAM PhD DSAM(feline) DipECVIM-CA MRCVS

European Veterinary Specialist in Internal Medicine, RCVS Specialist in Feline Medicine

Charlotte graduated from The Royal (Dick) Vet College in 1998. She has a special interest in feline medicine, having gained the RCVS Diploma in Feline Internal Medicine and completed a PhD in feline virology. Charlotte has worked in both academia and private practice before joining Pride Veterinary Centre in 2011 adding feline expertise to the team. She gained the European Diploma in Veterinary Internal Medicine in 2017.

Test yourself with these Teatime Teaser questions

A three-year old, female neutered, domestic longhair cat was presented with acute onset collapse and pallor. Prior to this the cat had been bright and alert but with significant weight loss (from 3.25kg to 2.75kg, 15% reduction) over the preceding month. There was no history of trauma and there was no known access to toxins or drugs.

On physical examination the cat was in poor body condition (BCS 1.5/5) and was weak and unable to stand. The mucous membranes were very pale and the capillary refill time could not be appreciated. The breathing was shallow and tachypnoeic (80bpm) and there was a 3/6 systolic heart murmur. The heart rate was elevated at 240bpm with sinus rhythm. The pulse quality was strong and there was no pulse deficit. The rectal temperature was slightly low at 99.9°C. The remainder of the routine clinical examination was unremarkable. The systolic blood pressure was 150mmHg and ophthalmoscopic examination was unremarkable.

Figure 1

Q1. Construct a problem list and differential diagnosis list?

Q2. What tests would you recommend at this stage?

Q3. Can you identify these cells? (Figure 1)

Q4. What initial treatment would you recommend?

Q5. The results so far were highly suspicious for a primary bone marrow disorder. What additional testing would you recommend at this stage?

Answers on the next page

Q1. Construct a problem list and differential diagnosis list.

Collapse/Weakness

- Hypoxia (e.g. anaemia, respiratory disease)
- Cardiovascular (e.g. heart failure)
- Metabolic disease (e.g. DKA)
- Electrolyte abnormalities (e.g. hypokalemia)
- Hypoglycaemia
- Neuromuscular disease
- Musculoskeletal disease
- Emaciation

Pallor

- Distributive shock
- Anaemia
  - Decreased erythrocyte production (bone marrow pathology)
  - Erythrocyte destruction (e.g. IMHA)
  - Haemorrhage

Weight loss

- Reduced food intake
- Malabsorption
- Malassimilation
- Hyper metabolism (e.g. hyperthyroidism, diabetes mellitus)

Heart murmur

- Primary cardiac disease (e.g. HCM, DCM, RCM, UCM)
- Haemic murmur (secondary to anaemia)

Tachycardia and tachypnoea

- Secondary to anaemia (most likely in this case)
- Primary respiratory or cardiac disease
- Consequence of pain

Hypothermia

- Shock
- Reduced ability to maintain body temperature (emaciation, reduced movement/collapse)
- Sepsis

Q2. What tests would you recommend at this stage?

Haematology (including fresh blood smear)

- Essential to rule anaemia in/out and to ascertain whether this is regenerative or non-regenerative
- Identify any changes that might suggest inflammatory disease (e.g. neutrophilia with left shift or band cells)
- Identify any changes that might suggest bone marrow disease (e.g. abnormal cell morphology)
- Identify any evidence of infectious disease (e.g. Haemoplasma)

Serum biochemistry

- General profile to identify any evidence to support metabolic disease (e.g. liver or kidney dysfunction)
- Assess for hyperbilirubinemia in case of intravascular haemolysis

Infectious disease screening

- FIV antibody
- FeLV antigen
- Haemoplasma PCR

Additional blood tests

- Slide agglutination test (+/- Coombs test if negative)
- Coagulation profile (PT and APTT)
- Blood typing

Urinalysis

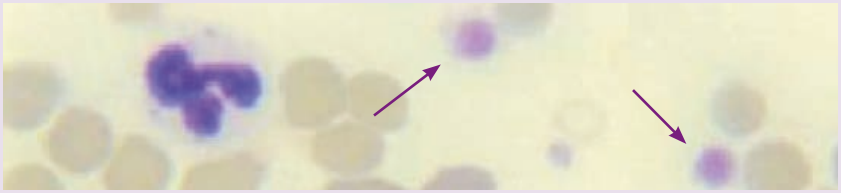
Blood results

- Severe non-regenerative anaemia (normocytic, normochromic)
- High number of nucleated red blood cells (intermediate and late normoblasts)
- Marked thrombocytopenia (confirmed on smear cytology)
- Mild neutropenia

Infectious disease testing was negative. Slide agglutination test and Coombs test were negative. Serum biochemistry revealed a moderate elevation in liver enzymes and creatine kinase along with mild hypoproteinaemia. Coagulation times (PT/APTT) were within normal limits and urinalysis was unremarkable.

Q3. Can you identify these cells?

Nucleated red blood cells.



Q4. What initial treatment would you recommend?

The cat was assessed to be well hydrated, so fluids were not administered immediately but an intravenous catheter was placed in case emergency IV access was required. Given the tachycardia oxygen supplementation was given and because of the mild hypothermia the cat was placed in an incubator. A blood transfusion was performed (50ml type A whole blood) following which the haematocrit increased from 6.0% to 13.2%. 24 hours later the cat appeared much brighter.

Q5. The results so far were highly suspicious for a primary bone marrow disorder. What additional testing would you recommend at this stage?

- Imaging (thoracic radiographs and abdominal ultrasonography)
- Bone marrow aspirate/biopsy (cytology, histopathology and FeLV PCR)

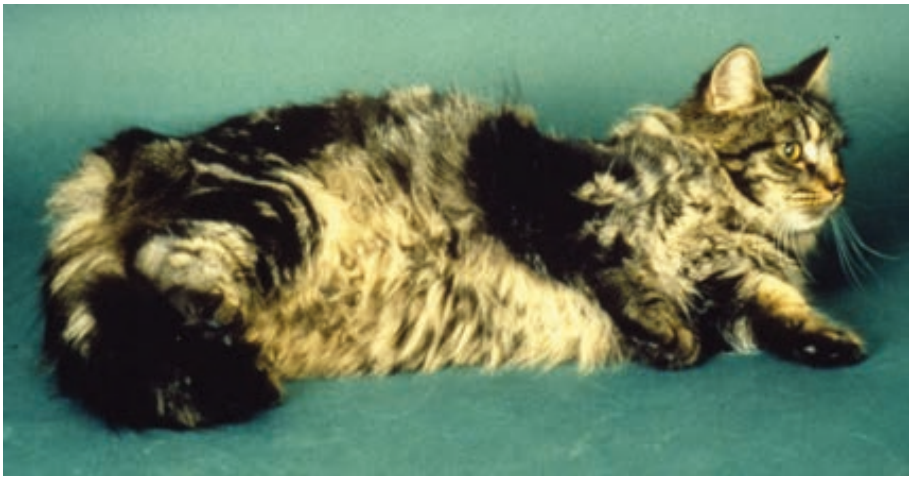
Diagnostic imaging was unremarkable. Bone marrow cytology and histopathology were both indicative of acute erythroblastic leukaemia. FeLV PCR of the bone marrow was negative.

Diagnosis

Acute erythroblastic leukaemia

Outcome

Chemotherapy induction was instigated using cytosine arabinoside and doxorubicin. Several days into the induction marked neutropenia was noted (0.27x109/l).



Chemotherapy was therefore suspended, and prophylactic antibiotics were given. A week later the neutrophil count had normalised, and the chemotherapy induction was completed. The PCV and platelet count remained low (10.8% and 40x109/l respectively) and, following cross matching, a second blood transfusion was given. A maintenance chemotherapy protocol with cytosine arabinoside and doxorubicin was continued and two weeks following discharge the haematocrit had gradually increased to 19.7% and the platelet count had improved (60x109/l). The cat continued to do well for two months, but then became acutely weak and dyspnoeic with a PCV of 9%. The owners opted for euthanasia at this stage.

Erythroblastic leukaemia is a myeloproliferative disease which is characterised by malignant transformation and excessive proliferation of erythroid precursors in the bone marrow. As in this patient, it generally results in severe non-regenerative anaemia with nucleated erythrocytes present in the peripheral circulation. Erythroblastic leukaemia is rare in cats but, in the few published case reports, concurrent FeLV infection is a common finding and the prognosis is poor.

Reason to refer

#32

We offer telephone advice by a clinician prior, during and after referral so you get the support you need for your patient