

## **Anemia in a black jaguar (*Panthera onca*)**

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### **Case presentation “Blanco”**

#### **Signalment and history**

An 18-year-old male black jaguar (*Panthera onca*) housed in the zoological garden in Rostock, Germany showed reduced feed intake and minor but persistent bleeding from the oral cavity.

#### **Clinical findings**

Clinical evaluation revealed small ulcerative lesions in the oral cavity and bleeding from the mucosa of the lingual frenulum. CT of the head was performed but no abnormalities were found. No ulceration or other abnormalities were noted during endoscopic examination of the esophagus and of the stomach. At abdominal ultrasonography, a diffuse enlargement of the spleen was noted. A tick was removed from the left abdominal wall.

#### **Laboratory findings**

Complete blood cell count (CBC) and biochemical analysis were carried out by the referring veterinarian. Hematological and biochemical examination (see Table) showed a severe non-regenerative normocytic-normochromic anemia, moderate to severe thrombocytopenia, mild lymphopenia and a mild to moderate azotemia. Coagulation times (aPTT and PT) were normal. Feline babesia (*Babesia felis*-PCR) and feline haemotropic mycoplasmas (*M. haemofelis*, *M. haemominutum* and *M. turicensis*-PCR) were tested negative. Feline leukemia virus antigen (FeLV, ELISA) and *Bartonella* spp. PCR were also negative. Urine specific gravity (USG) was 1.038.

Due to the non-regenerative anemia and thrombocytopenia, a bone marrow aspiration sample from the left humerus was submitted for cytological evaluation to the central laboratory, Department of Veterinary Clinical Sciences, JLU, Giessen, Germany.

In the highly cellular bone marrow a moderate erythroid hyperplasia and a few macrophages showing erythrocytrophagosis and occasionally phagocytosis of metarubricytes were observed. The maturation of the erythroid series was orderly. Erythropoietic to myelopoietic ratio was slightly shifted to erythropoiesis. The myeloid series matured orderly to the segmented neutrophil level with increased numbers of members of eosinophilic lineage. Mild megakaryocytic hyperplasia was present. *Interpretation:* In conjunction with the peripheral anemia the findings were consistent with an ineffective bone marrow erythroid hyperplasia. The presence of macrophages demonstrating erythrophagia of mature erythrocytes as well

as of metarubricytes was suggestive for an intramedullary immune mediated haemolytic anemia (IM-IMHA). The mild megakaryocytic hyperplasia in face of peripheral thrombocytopenia could also reflect an immune mediated process. Based on the results an immunosuppressive therapy with prednisolone was recommended.

### Follow-up

Therapy with prednisolone (1.5 mg/kg body weight) was initiated. At the follow-up examinations, the hematocrit value increased almost to the lower reference interval and prednisolone was tapered down gradually. Four months after the initial bone marrow examination, the follow-up hematological examination revealed again a severe anemia and mild to moderate azotemia (see Table). USG was 1.030. Urine protein to creatinine ratio (UPC) was 0.5. During abdominal ultrasonography, a severe splenomegaly was noted.

Core biopsies as well as fine needle aspirations (FNAs) of bone marrow and spleen was collected and submitted to the Institute of Veterinary Pathology as well to the central laboratory, Department of Veterinary Clinical Sciences, JLU, Giessen, Germany, respectively. Pictures are shown on the next page.

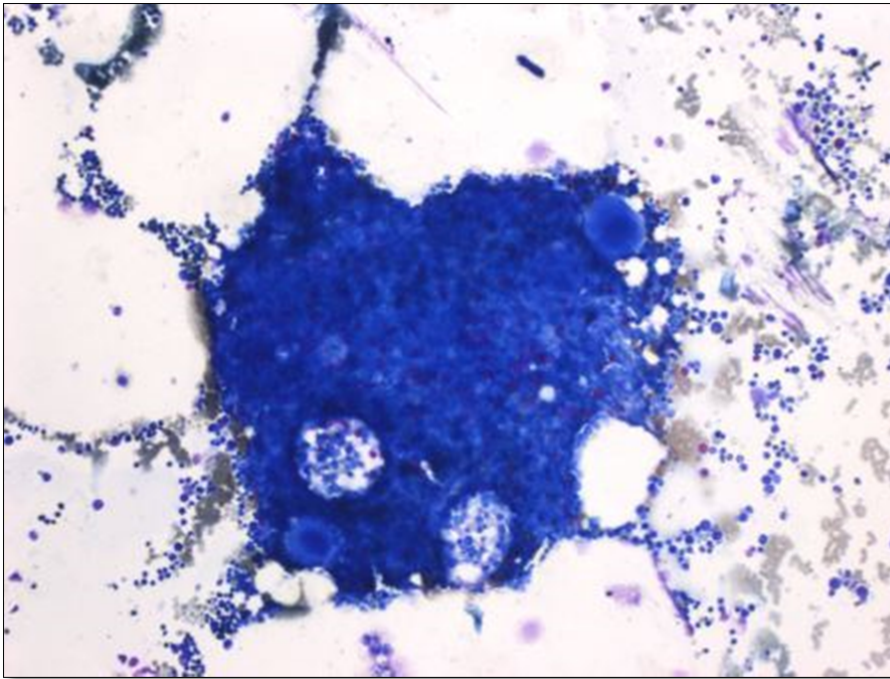
### Laboratory data:

Parameter	Pre-treatment	Follow-up (2 weeks)	Follow-up (2 months)	Relapse (4 months)	Reference interval (domestic cat)
<b>RBC</b> (G/l)	3.0	5.3	6.6	3.47	5-10
<b>Hb</b> (g/dl)	5.6	8.8	9.8	5.6	8-17
<b>Htc</b> %	14.7	27.7	31.6	16.4	28-45
<b>MCV</b> (fl)	48	52	47	47	40-55
<b>MCH</b> (pg)	16.5	16.7	14.7	16.4	13-17
<b>MCHC</b> (g/dl)	34.2	31.8	31.5	34.5	31-35
<b>WBC</b> (G/l)	4.5	11.5	6.36	8.02	6-11
<b>Neutrophils</b> / $\mu$ l	4.1	10.6	6	7.6	3-11
<b>Lymphocytes</b> / $\mu$ l	0.4	0.9	0.4	0.4	1-4
<b>Monocytes</b> / $\mu$ l	0	0	0	0	0-0.5
<b>Eosinophils</b> / $\mu$ l	0.2	1,3%	1%	0.29	0-0.6
<b>Platelets</b> (G/l)	21(clumps+)	104	111	130 (clumps+)	150-550
<b>Reticulocytes</b> / $\mu$ l	34000	-	13000	-	
<b>Creatinine</b> ( $\mu$ mol/l)	256	221	229	305	70-185
<b>Urea</b> (mmol/l)	17.4	17.8	16.4	16.7	3.5-10.7
<b>Phosphate</b> (mmol/l)	1.6	1.2	1.2	1.2	1.1-2.7
<b>Calcium</b> mg/dl)	2.8	2.9	2.7	2.5	2-2.95
<b>T Bilirubin</b> ( $\mu$ mol/l)	6.8	6.8	3.4	6.8	1.7-10.2
<b>ALT</b> (U/l)	242	1910	331	307	20-100
<b>ALP</b> (U/l)	13	15	10	7	10-90
<b>Total protein</b> (g/l)	78	93	86	74	54-82
<b>Albumin</b> (g/l)	3.9	3.6	5.2	5.6	3.1-6.3
<b>Glucose</b> (mmol/l)	6.1	7.6	8.5	9.3	3.8-8.3

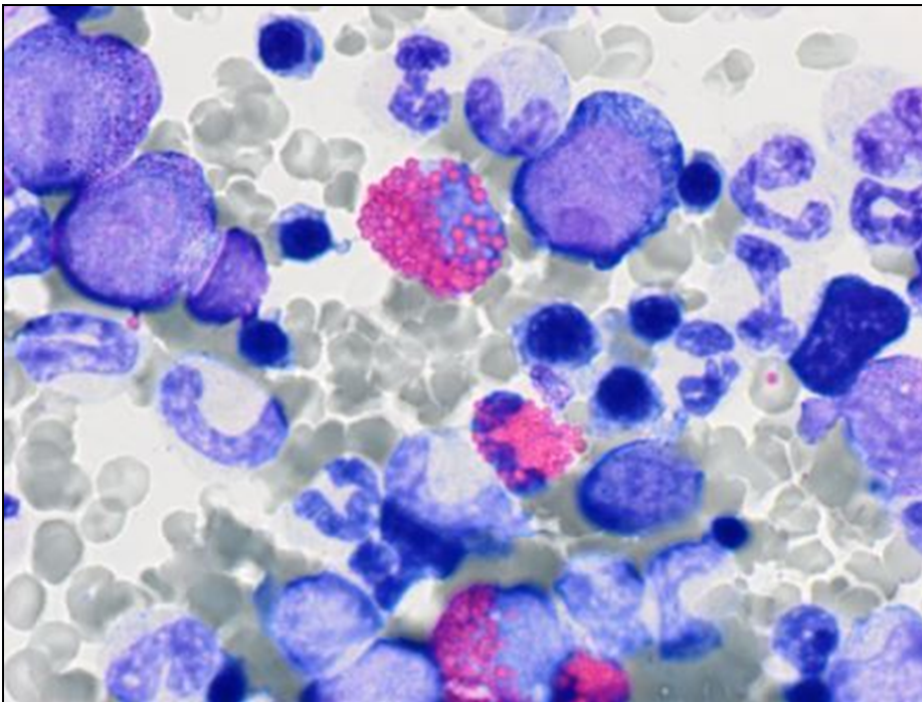
### Questions:

1. What are the main differential causes for the non-regenerative anemia in this case?
2. Which are the likely diagnoses?
3. What further tests could be considered?

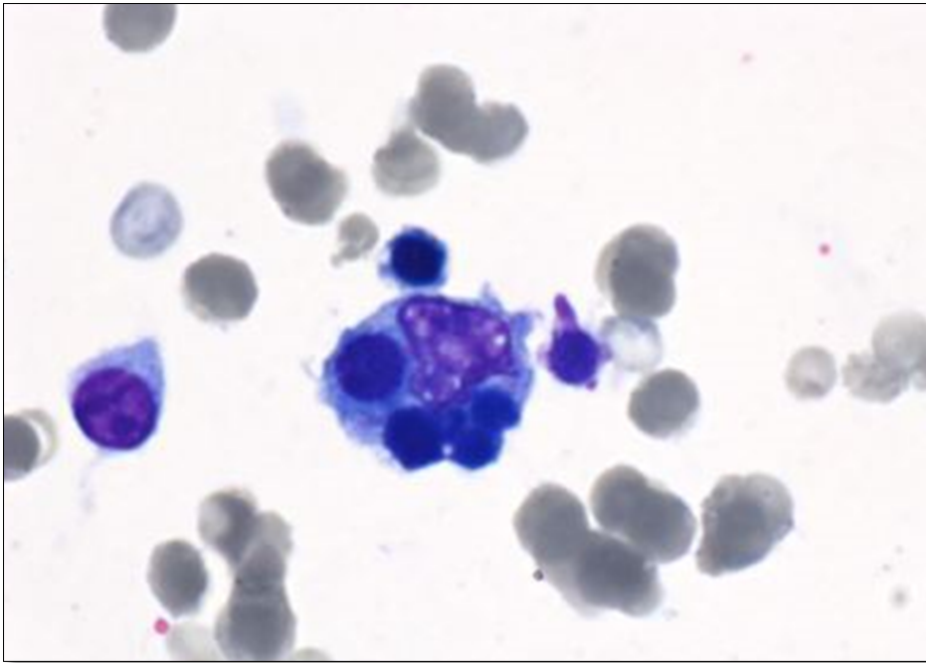
**Figure 1. Bone marrow aspirate, May-Grünwald Giemsa; x100**



**Figure 2. Bone marrow aspirate, May-Grünwald Giemsa; x1000**



**Figure 3. Bone marrow aspirate, May-Grünwald Giemsa; x1000**



**Figure 4. Spleen, FNA, May-Grünwald Giemsa; x1000**

