

CASE STUDY

Anaemia caused by Gastrointestinal Haemorrhage in a Dog

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HISTORY

12yr old [F] Staffordshire Bull Terrier
Ate lino 5 nights ago
Vomiting and collapsed yesterday
Possible access to rat poison

CLINICAL EXAM

Very pale mucous membranes
PCV 10%, TPRO 25g/L?(total protein)
Buccal mucosa bleeding
X-ray - Lino present in stomach and throughout the intestines
Ultra Sound – No free fluid in abdomen, fluid in guts.
Vomiting blood & lino
Faeces tar like and black appearance

MEDICATION

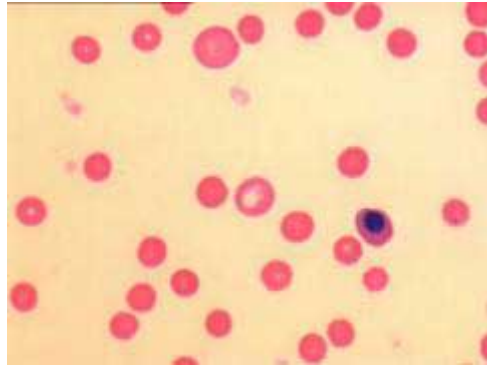
Vik K, Synulox inj, Medron IV, Temegesic

AXIOM

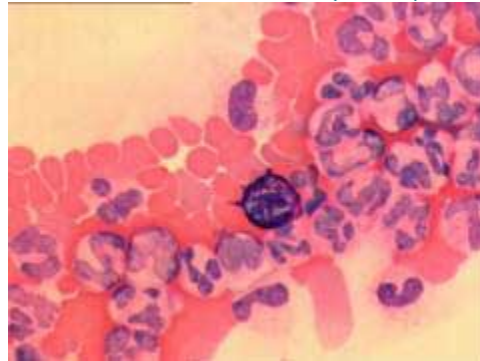
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LABORATORY REPORT



Late normoblast (NRBC)



Mast cell

BIOCHEMISTRY		
Total Protein	L	29.4 g/l
Albumin	L	13.5 g/l
Total Globulin	L	15.9g/l
Sodium		152 mmol/l
Potassium		3.6 mmol/l
Na:K	H	42.22
Chloride		114 mmol/l
Calcium	L	1.93 mmol/l

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Phosphate	H	2.23 mmol/l
Urea	H	13.7 mmol/l
Creatinine		95 umol/l
Total Bilirubin		1.7 umol/l
ALP	H	81 u/l
ALT	H	1.671 u/l
GGT		1 u/l
GLDH	H	180 u/l
Bile Acids	H	14.1 umol/l
CK	H	12,600 u/l
Cholesterol	L	1.9 mmol/l
Triglycerides		0.56 mmol/l
Glucose		4.4 mmol/l
Amylase		665 u/l
Lipase	H	309 u/l

HAEMATOLOGY		
WBC	H	21.8 x10 ⁹ /l
RBC	L	1.39 x10 ¹² /l
Hb	L	2.9 g/dl
PCV	L	10.1 %
MCV		72.7 fl
MCH		20.9 pg
MCHC	L	28.7 g/dl

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Platelets

$\times 10^9/l$

FILM REVIEW

Occasional dohle body seen

Late normoblasts only seen

Anisocytosis +

Polychromasia +

3 mast cells seen

Platelet anisocytosis

Platelet count appears low in film ~100

No clot detected

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PATHOLOGY REPORT

Severe anaemia, appears regenerative but reticulocyte count is advisable for verification of regenerative response.

Blood transfusion may well be indicated depending on clinical signs.

Left shift neutrophilia is suggestive of inflammation or infection.

The presence of a few circulating mast cells is very non-specific and can be seen normally, but can also occur with mast cell tumours, allergy/hypersensitivity responses and parasitism.

Severe hypoalbuminemia could be caused by renal (*e.g. amyloidosis, glomerulone- phropathy*) or GI losses (*e.g. IBD, lymphangiectasia, lymphoma*) and reduced hepatic production.

In view of the history and concurrent anaemia, GI haemorrhage is perhaps the most likely cause of panhypoproteinemia in this case.

The change in calcium and phosphate commonly occur as artefacts.

Uraemia may be pre-renal with creatinine at this level, and measurement of USG should assist further interpretation.

Marked increase in ALT could be caused by extra-hepatic disease, although at this level primary hepatic pathology is more probable.

Marked elevation in CK could be due to the exertion associated with severe vomiting.

If rodenticide ingestion is suspected then suggest checking clotting times (*APTT & PT*).

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DISCUSSION

The dog in this case was presented with a severe case of anaemia that appears regenerative. A regenerative anaemia is one in which the bone marrow has responded to a demand for red blood cells by increasing production and releasing into the circulation adequate numbers of immature red blood cells (*Reagan et al, 1998*). This can be seen with the increased grade of polychromasia and the presence of late normoblasts (*nucleated red blood cells*) within the film review.

In new methylene blue-stained preparations, polychromatophils are called reticulocytes and will stain bluish-green and contain irregular net-like structures, known as reticulum. The reticulum is irregular clumps of ribosomal RNA and organelles such as mitochondria. A reticulocyte count would confirm and grade the regenerative response in this case.

A significant finding in this case is the reduction of total protein and albumin in the biochemistry results. There are four major considerations for severe hypoalbuminemia: decreased production due to hepatic insufficiency, increased loss due to protein-losing nephropathy, protein-losing enteropathy including gastric protein loss, or loss from cutaneous lesions or haemorrhage. Cutaneous lesions or haemorrhage are usually the easiest cause of hypoalbuminemia to diagnose, because there must be either major haemorrhage or severely inflamed lesions with large amounts of exuding serum (*Feldman, 2000*).

External haemorrhage causes loss of blood cells and protein from any animal. Fluid is rapidly shifted from extra vascular regions into the blood to maintain blood volume, causing a transient hypoproteinemia that will remain until plasma proteins can be replaced by induction of production. Both albumin and globulins tend to decrease equally with blood loss (*Feldman, 2000*).

With severe gastrointestinal haemorrhage urea is usually higher than in this case, but not necessarily so if there is an intestinal obstruction. The increased ALT could be secondary to hypoxia, or primary hepatic injury.

Linoleum flooring can be made of many materials including organic materials or polyvinyl chloride so it would be impossible to assess if any components could be considered hepatotoxic. The elevation of CK could also be due to hypoxia or refractory vomiting.

It is therefore considered that from the results in this case and the presented history of this animal that some degree of gastrointestinal haemorrhage has occurred.

A case by Rohner et al in 2004 presented life threatening intestinal bleeding in a Bearded Collie. This dog showed acute weakness, haematemesis, melaena, painful abdomen, pale mucous membranes, haematocrit of 13% and panhypoproteinemia. This combination of findings similar to the dog in this case was the manifestation of severe gastrointestinal bleeding.

Case 22, in Feldman et al (*2000*) also describes blood loss in an 11 year old Beagle from gastrointestinal haemorrhage. The dog was found to be anaemic with black tar like faeces. Over a period of 3 weeks, iron, vitamin B12 and three whole-blood transfusions were administered. Total plasma proteins of 6.4 g/dl (*normal value in an 11yr old dog would be >7.5 g/dl*) further substantiated blood loss.

The presence of a few circulating mast cells in this case is very non-specific and can be seen normally, but may also occur with mast cell tumours, allergy/hypersensitivity responses as well as in cases of parasitism. A study performed by McManus in 1999 showed that 95.5% of blood smears with mast cells detected were from dogs without mast cell tumours. Interestingly, of these dogs 27% were diagnosed with regenerative anaemia.

The possibility that the dog in this case may have ingested rat poison must also be considered. Moderate to severe thrombocytopenia can occur in dogs that have haemorrhage subsequent to ingestion of

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anticoagulant rodenticide toxins (*Lewis et al, 1997*). It would be advisable that if ingestion is suspected that the clotting times for this animal be checked.

References:

Feldman BF, Zinkl JG, Jain NC, et al. (2000) Schalm's Veterinary Haematology – 5th Edition. P504-507. Lippincott Williams & Wilkins Publishing.

Lewis DC, Bruyette DS, Kellerman DL, Smith SA. Thrombocytopenia in dogs subsequent to anticoagulant rodenticide-induced haemorrhage. *J Am Anim Hosp Assoc* 1997; 33: 417-422.

McManus PM. Frequency and severity of mastocytemia in dogs with and without mast cell tumors: 120 cases (1995-1997). *JAVMA* 1999, Vol 215, No.3: 355-57.

Reagan WJ, Sanders TG, DeNicola DB (1998) Veterinary Haematology, Atlas of Common Domestic Species. Manson Publishing Ltd.

Rohner MM, Glaus TM, Reusch CE. Life threatening intestinal bleeding in a Bearded Collie associated with a food supplement for horses. *Schweiz Arch Tierheilkd.* 2004 Oct; 146(10): 479-82.