

## Severe Haemophilia-A in a Mixed-Breed Dog- A Case Report

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### Case Report

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#### ABSTRACT

This article describes the case of a mixed-breed eight week old dog with severe haemophilia- A. Spontaneous haemorrhage into the subcutaneous tissue, muscles, abdominal cavity and carpal joint were observed in the dog. Primary teeth were replaced physiologically by permanent teeth. Nasal bleeding in the dog was initially neglected and proved to be almost fatal to the animal. The dog was diagnosed with haemophilia A and treated accordingly. However, the dog was euthanized at the owner's request at 5 months due a deteriorating clinical condition.

### INTRODUCTION

Haemophilia A most commonly occurs in purebred dogs, but may also affect mixed-breed dogs and cats. It is a relatively common congenital haemostatic defect in dogs and has been described in the German shepherd, Siberian husky, Dachshund and Maltese terrier<sup>[1]</sup>. Recently, it has also been reported in Malinois and German shepherd-Labrador retriever cross-bred dogs<sup>[2-6]</sup>. The disease is caused by an X-linked recessive gene. It was primarily thought to occur only in humans, until a unique genetic mutation encoding factor VIII was found in the Boxer and German shepherd<sup>[4]</sup>. Since females have two X chromosomes, they may either suffer from haemophilia (they may have two defective factor VIII genes) or they may be carriers (one defective chromosome). Males with a defective X chromosome always develop haemophilia. The clinical symptoms depend on factor VIII activity levels. In dogs, symptoms are usually severe and high mortality rate of affected males. Therefore, dogs usually inherit the disorder when a female carrier is bred with a healthy male. Subsequently, half of the oocytes have factor VIII gene abnormalities and the offspring have a 50% chance of developing a congenital X-chromosome disorder. This causes 50% of males to suffer from haemophilia and 50% of females to be carriers. When an affected male is mated with a healthy female, all the female offspring are asymptomatic carriers. When an affected male and carrier female are mated, female offspring have a 50% chance of developing symptoms or being carriers, while 50% of the male offspring may be sick and the remaining 50% may be healthy<sup>[2]</sup>. The severity of clinical symptoms depends on the reduction in factor VIII activity. Factor VIII plays a key role in coagulation and its deficiency (< 2% of its normal activity) results in severe, life-threatening haemorrhages. Average deficiencies (2-5%) may be less noticeably, but will give symptoms following trauma or surgery. Moderate deficiencies (5-25%) cause mild bleeding tendencies<sup>[2,6]</sup>.

### CASE REPORT

An eight week-old male mixed breed dog weighing 6 kg was presented to the Clinic for a medical check-up. Two days before the visit, the dog was rescued together with its mother and a male and female littermate by an Animal Rescue Organization. The only abnormality in the clinical examination of the dog was moderate weight loss. Antiparasitic drugs against internal and external

parasites were administered and the dog was vaccinated against infectious diseases. After two weeks the dog received a second dose of antiparasitic drugs against internal parasites. Several days later the dog presented to the Clinic with nasal bleeding after having been bitten by another dog during play. The dog was in a good general condition and had minor nasal bleeding from one nostril. There were no visible bite wounds. The dog received ten milligrams of vitamin K1 (phytomenadion) and 50 mg of etamsylate and went home after the bleeding stopped. The next morning the owner returned to the Clinic with the dog, which was very weak, after finding several pools of blood on the floor near the dog's resting place. Clinically, bleeding from the right nostril was observed and the animal showed signs of severe blood loss. A head X-ray, complete blood count and blood biochemistry did not reveal any abnormalities (**Table 1**). Two-hundred and fifty milligrams of tranexamic acid and a whole blood unit were administered to the dog. During blood transfusion, the nasal bleeding stopped. The owner did not agree to further tests and returned to the Clinic after a week to vaccinate the dog. After a few days, bleeding re-occurred from a small cut in the tongue. Right thoracic limb lameness was also observed, which was caused by swelling, pain and limited mobility of the carpal joint, and was suspected to be caused by articular bleeding. The animal was administered 150 ml of fresh frozen plasma and 1 mg/kg of dexamethasone. A complete blood count and coagulation profile were carried out (**Table 2**), which revealed a decreased activity of factor VIII. Based on the medical history and clinical and laboratory examinations, a severe form of haemophilia-A was diagnosed. One month later, the dog presented with large subcutaneous and intermuscular hematomas and hemoabdomen and the dog was euthanised. The dog's mother and littermates did not show any signs of disease and caregivers were advised to neuter the animals.

**Table 1.** Complete blood count after severe nose bleed.

Parameter	Result	Unit	Range
WBC	24.7	G/l	6.0-12.0
RBC	1.22	T/l	5.50-8.50
HGB	1.8	mmol/l	8.1-11.8
HCT	0.085	L/L	0.370-0.540
PLT	257	G/l	160-430
MCV	69	fl	64-74
MCH	1.45	fmol	1.36-1.67
MCHC	20.9	mno/l	21.1-22.3
RDW	16.5	%	14.0-17.0
MPV	8.4	fl	6.7-11.1
%LYM	9.0	%	12-37
%MONO	3.1	%	3-10
%NEU	87.9	%	60-90
LYM	2.2	G/l	0.7-5.5
MON	0.7	G/l	0.2-1.5
NEU	21.8	G/l	3.6-13.5

**Table 2.** Complete blood count and coagulation profile.

Parameter	Result	Unit	Range
WBC	16.9	G/l	6.0-12.0
RBC	4.91	T/l	5.50-8.50
HGB	7.08	mmol/l	8.1-11.8
HCT	0.345	L/L	0.370-0.540
PLT	286	G/l	160-430
MCV	70.3	fl	64-74
MCH	1.43	fmol	1.36-1.67
MCHC	20.1	mno/l	21.1-22.3
RDW	16.5	%	14.0-17.0
MPV	8.4	fl	6.7-11.1
%LYM	17.4	%	12-37
%MONO	8.53	%	3-10
%NEU	69.3	%	60-90
%EOS	3.36	%	0.010-6.00
%BASO	0.370	%	0.001-1.00
LYM	2.96	G/l	0.7-5.5
MONO	1.44	G/l	0.2-1.5
NEU	11.7	G/l	3.6-13.5
EOS	0.568	G/l	0.,04-0.60
BASO	0.063	G/l	0.001-0.100
APTT	34.2	sek	14.0-20.0
PT	9.4	sek	0.010-12.0

INR	0.89		0.840-1.15
TT	16.7	sek	0.010-18.0
Fibrynogen	2.72	g/l	1.20-2.90
Factor VIII	1.2	%	60.0-150.0
von Willebrand factor	102	%	50.0-200.0
Reticulocytes	0.4	%	0.140-1.49
Reticulocyte index	0.291	%	
Reticulocytes	0.020	T/l	0.001-0.060

This case of haemophilia-A confirms earlier reports of the disease in mixed-breed dogs <sup>[2]</sup>. The diagnosis of the disease in the described case was difficult because the origin of the dog's mother was unknown. The prognosis for dogs with severe haemophilia (< 2% of the normal factor VIII activity) is poor, and euthanasia is usually advised <sup>[2]</sup>.

## REFERENCES

1. Mischke R, et al. Haemophilia A in the dog. Symptoms, blood coagulation analysis and therapy. Berl Munch Tierarztl Wochenschr. 1996;109:279-287.
2. Aslanian ME, et al. Clinical outcome after diagnosis of hemophilia A in dogs. J Am Vet Med Assoc. 2014;245:677-683.
3. Barr JW and McMichael M. Inherited Disorders of Homeostasis in Dogs and Cats (review). Top Companion Anim Med. 2012;27:53-58
4. Christopherson PW, et al. Two novel missense mutations associated with hemophilia A in a family of Boxers, and a German shepherd dog. Vet Clin Pathol. 2014;43:312-316.
5. Clark PA, et al. Haemophilia A in a litter of Siberian huskies. N Z Vet J. 2000;48:60-62.
6. Gavazza A, et al. Hemophilia A in a Belgian Shepherd Malinois dog: Case report. Res Vet Sci. 2014;97:96-98.