

## A Case of Rodenticide Toxicosis in an English Sheepdog

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**Abstract :** A spayed female English sheepdog, 4-year-old 18.2 kg, was referred to the Veterinary Teaching Hospital of Konkuk University due to the 4-day duration of epistaxis and dyspnea. Ingestion of anticoagulant rodenticides can inhibit the recycling of vitamin K<sub>1</sub>, which reduce the activity of circulating clotting factors. If immediate and appropriate treatment doesn't perform, it may result in depression or death through severe hemorrhage. This report present successful treatment of a 4-year-old spayed female dog with stupor and opisthotonos. Efficient treatment of whole blood transfusion and vitamin K<sub>1</sub> improved clinical signs dramatically. The patient is recovered following treatment and healthy now.

**Key words :** Rodenticide, Vitamin K<sub>1</sub>, English sheepdog.

### Introduction

Anticoagulant rodenticide poisoning is clinically important cause of severe coagulopathy in animals<sup>9</sup>. Animals with rodenticide toxicosis do not always have external signs of hemorrhage such as melena, hematuria, epistaxis, hematomas or excessive bleeding from venipuncture sites.

Most of them have clinical signs of depression, weakness, dyspnea caused by internal hemorrhage involving the lungs, peritoneal or pleural cavities and fascial planes<sup>5</sup>. The purpose of this case report is to show the successful treatment in dog with anticoagulant poisoning.

### Case Presentation

A 4-year-old, 18.2 kg spayed female English sheepdog was referred to the Veterinary Teaching Hospital of Konkuk University because of epistaxis and dyspnea for 4 days. The owner notified the dog usually went out for a walk in the garden and we questioned any possibility of the exposure to an anticoagulant rodenticide. Finally, US army confirmed that rodenticide block was ingested by the patient.

On blood smear examination, Howelly Jolly body were detected. A complete blood count, serum biochemical analysis, and urinalysis revealed acute hemorrhage. Thoracic radiographs showed that there was an increased soft tissue opacity in the mediastinum and right lung consolidation, indicating pulmonary hemorrhage (Fig 1). On coagulation test, Prothrombin Time (PT) and activated partial prothrombin time(aPTT) were prolonged (Table 1).

The treatment of The vitamine K<sub>1</sub> (phytonadione, 2.0 mg/kg, IV, BID) and furosemide (2 mg/kg, IV, BID) was initiated to stop bleeding. Although several efforts were made, the dogs condition was deteriorated after the 5 days, manifested by conjunctival hemorrhage, bilateral miosis, and epi-

sodic hypersalivation. The dog was blind and stuporous. Firstly, Glypural<sup>®</sup> (glycerin 30 g CRI, BID ) was administered to decrease Intracranial pressure and the edematous eyelids were improved gradually. On next day, 700 ml of fresh whole blood in the SGT 1(-) B type, which was diagnosed with anti-serum in Shigeta Animal Pharmaceuticals Inc., were trans-



**Fig 1** Pulmonary hemorrhage was noted on the bilaterally caudal lung lobes on the dorsoventral(DV) view.

**Table 1.** Coagulation profile in a English sheepdog poisoned by rodenticide

Items tested	Patient	Reference
Prothrombin Time (PT)	9.8 sec	6.2~8.2 sec
activated partial prothrombin time (aPTT)	19.8 sec	9~12 sec

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fused to treat coagulopathy.

Supportive treatment in the form of IV administration of fluids (Hartman plus dextrose 50 ml/hr IV) was initiated and oxygen was supplemented with the rate of 100 ml/kg/min. During the patients urination, the patient showed severe pain and hemoglobinuria on the dipstick test. The sign of nystagmus and opisthotonos appeared and sludge was induced with the urine after 3 days.

After a few days, the clinical signs had improved dramatically, the coagulation time were normal, and the dog was eating and drinking well.

Antibiotic (cephradine at 15 mg/kg IV, TID) and thiamine therapy (1 mg/kg, PO every 12 hours) were continued for at least 6 weeks or more. In addition, treatment with vitamin K<sub>1</sub> (1.67 mg/kg, PO, TID) was continued for 40 days.

### Discussion

Rodenticide functions as an anticoagulant by interfering with vitamin K in the formation of vitamin K-dependent coagulation factors II, VII, IX, and X<sup>6</sup>. The resultant coagulopathy usually requires administration of vitamin K<sub>1</sub> to restore activity of these clotting factors.

History taking, physical examination, and determination of coagulation times were helpful for confirming a diagnosis of anticoagulant rodenticide toxicosis in this case. In addition, good history taking was important to diagnose this toxicosis. Misdiagnosis or treatment delay often causes morbidity and mortality<sup>6</sup>, whereas timely institution of appropriate treatment is likely to result in complete recovery. The key points in treatment were immediate replacement of active coagulation factors for dogs with severe toxicosis. Administration of vitamin K<sub>1</sub> for a sufficient period counteracted long-term anticoagulant effects in this case. The delay in recognizable therapeutic effect seems to relate to vitamin K<sub>1</sub>'s mechanism of action, which involves promoting endogenous hepatic biosynthesis of vitamin K-dependent clotting factors<sup>3,7</sup>.

Consequently, immediate treatment of an acutely hemorrhaging animal with rodenticide toxicosis generally requires the administration of whole blood, fresh plasma, or fresh frozen plasma, and Vitamin K<sub>1</sub><sup>10</sup>. Blood transfusion provides active coagulation factors and is indicated for dogs with signs of respiratory distress or signs of acute blood loss anemia<sup>10</sup>. Vitamin Ks therapeutic effect on hemostasis is never immediate. A positive effect on the activation of clotting factors

generally does not occur until 3 to 12 hours following parenteral administration of vitamin K<sub>1</sub>, regardless of whether it is administered intramuscularly, subcutaneously or I.V.<sup>3,9</sup>.

### Conclusions

In case rodenticide toxicosis, immediate treatment with Vitamin K and whole blood or fresh plasma, or fresh frozen plasma should be initiated and long-term treatment is a crucial factor when treating the anticoagulant toxicosis. In addition, premature cessation of treatment may result in severe pulmonary or body cavity hemorrhage or death.

### References

1. Bailiff NL, Norris CR. Clinical signs, clinicopathological findings, etiology, and outcome associated with hemoptysis in dogs: 36 cases (1990-1999). *J Am Anim Hosp Assoc* 2002; 38(2): 125-33.
2. Blocker TL, Roberts BK. Acute tracheal obstruction associated with anticoagulant rodenticide intoxication in a dog. *J Small Anim Prac* 1999; 40: 577-80.
3. Burgess TM, Meyer EK, Bataller N. Practitioner report involving intravenous use of vitamin K1 prompts label review and revision. *J Am Vet Med Assoc.* 2001; 218: 1767-70.
4. Lisciandro GR, Brooks M, Catalfamo JL. Contact factor deficiency in a German Short haired Pointer with clinical evidence of coagulopathy. *J Vet Intern Med.* 2000; 14: 308-10.
5. McGuire NC, Williams J, Marks SL. What is your diagnosis? Rodenticide poisoning in a dog. *J Am Vet Med Assoc.* 1999; 214: 157-8.
6. Monnet E, Morgan MR. Effect of three loading doses of warfarin on the international normalized ratio for dogs. *Am J Vet Res.* 2000; 61: 48-50.
7. Mount ME. Diagnosis and therapy of anticoagulant rodenticide intoxications. *Vet Clin North Am Small Anim Pract* 1988;18:115-130.
8. Murphy MJ, CVT Update : The anticoagulant rodenticides. In: Kirk RW, ed. *Current veterinary therapy X*. Philadelphia : WB Saunders Co, 2000;211-212
9. Peterson J, Streeter V. Laryngeal obstruction secondary to brodifacoum toxicosis in a dog. *J Am Vet Med Assoc.* 1996; 208: 352-4.
10. Sheafor SE, Couto CG. Anticoagulant rodenticide toxicity in 21 dogs. *J Am Anim Hosp Assoc.* 1999; 35: 38-46.

## 잉글리쉬 쉽독에서 발생한 살서제 중독치료 예

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**요 약** : 4년령의 잉글리쉬쉽독이 4일간의 호흡곤란과 비출혈로 본 건국대학교 수의과대학 동물병원에 내원하였다. 항응고제인 살서제의 섭취는 vitamine K1의 재생을 방지하여 순환 응고인자의 활성을 감소시킨다. 따라서 살서제에 중독이 되었을 때, 빠르고 적절한 치료가 수행되지 않으면 심각한 출혈로 인해 의식불명에 빠지고 심지어는 생명을 위협하기도 한다. 본 증례에서는 의식혼탁과 후궁반장의 임상증상을 보이는 4년령의 중성화된 개의 성공적인 치료를 보고하고자 한다. 적절한 수혈요법과 vitamin K1를 이용한 효과적인 치료를 실시하여 임상증상의 현저한 개선을 보였으며, 환축은 현재 완치되어 건강한 삶을 살고 있다.

**주요어** : 살서제, Vitamine K1, 잉글리쉬쉽독.