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Incidence of Clinical Signs in Poisoned Pets of Thailand: A Retrospective Study

Athip Lorsirigool[1,2*], Yuttana Sudjaroen[2], and Narong Kulnides[2]

[1]*TerdThai Love Pet Clinic, Thonburi District, Bangkok Province, Thailand, 10600*
[2]*Department of Forensic Science, Faculty of Science and Technology, Suan Sunandha Rajabhat University, Thailand, 10300*

*Corresponding author's Email: s63562805002@ssru.ac.th; ORCID: 0000-0003-3854-3732

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ABSTRACT

Clinical signs appear immediately or gradually in poisoned pets. Poisonous agents in pets, especially dogs and cats, have been reported to include human medications (acetaminophen), pesticides (organophosphate and carbamate), insecticides for veterinary use (ivermectin), and food (methylxanthines). The current study investigated the incidence of poisoning in dogs and cats residing in Rayong and Nakhon Ratchasima provinces as well as Bangkok, Thailand, during 2016-2020. The study found a total of 102 poisoned cases of dog and cat, including 58 dogs (56.86%) and 44 cats (43.14%). The poisoned dogs included 39 males (67.24%) and 19 females (32.26%), while poisoned cats consisted of 29 males (65.91%) and 15 females (34.09%). Poisoning was highly diagnosed in mixed breed dogs and domestic short-haired cats. The average age of poisoned dogs and cats was reported as 3.67 ± 1.92 and 3.02 ± 1.72 years, respectively. The most common poisonous agents found in dogs and cats were organophosphate-carbamate groups and acetaminophen. Tachycardia, hypersalivation, dyspnea, and facial swelling were the most common clinical signs observed in poisoned dogs and cats.

Keywords: Cat, Clinical signs, Dog, Poisoning

INTRODUCTION

The clinical signs of poisoning appear immediately or gradually in suspected pets. Toxicity can be divided into three types, including acute, sub-chronic, and chronic. The acute toxicity results from a single exposure or multiple exposures to a poisonous agent and the clinical signs appear within 24 hours. Regarding sub-chronic toxicity, pets present signs of toxicity after consecutive exposure to a low level of poisonous agents over about 1-3 months. In chronic toxicity cases, pets present signs of toxicity in several organ systems after receiving a low level of a poisonous agent for more than three months until toxicity develops (Gupta and Bhardwaj, 2012). In practice, it is difficult to diagnose instances of pet poisoning since most of the clinical signs are non-specific (Cortinovis et al., 2015). Therefore, diagnosis depends on the owner or caretaker's report, complete physical examination, evidence from the scene, and laboratory examination (Cortinovis et al., 2015).

The detection of poisonous agents from serum, secretion, tissue, and content samples in the body is highly accurate and specific, however, it takes time to examine (Caloni et al., 2016). Examination methods for poisonous agents include Thin Layer Chromatography, High-Performance Liquid Chromatography, Gas Chromatograph-Mass Spectrometer, and Liquid Chromatography-Mass Spectrometry (De Siqueira et al., 2015; Lahmar et al., 2019; Avolio et al., 2021). To select an examination method, the veterinarian should know the type of samples and the type of suspected poisonous agents to be tested.

Poisonous agents in pets especially dogs and cats have been previously reported to include human medications (Acetaminophen), pesticides (Organophosphate and Carbamate), insecticides for veterinary use (Ivermectin), and foodethylxanthines (Cortinovis et al., 2015; Avolio et al., 2021). Clinical signs in poisoned dogs and cats vary and are sometimes non-specific, such as vomiting, hypersalivation, seizure, ataxia, facial swelling, and blindness (Lahmar et al., 2019; Adekoya et al., 2020).

Nevertheless, a comprehensive study on poisonous agents in dogs and cats has not yet been undertaken in Thailand. The present study aimed to investigate the incidence of poisoning in dogs and cats in Rayong, and Nakhon Ratchasima provinces as well as those in Bangkok, Thailand, from 2016 to 2020.

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MATERIALS AND METHODS

Ethical approval

The present study was approved by Suan Sunandha Rajabhat University-Institute Animal Care and Use Committee (SSRU-IACUC-002/2021).

Study period

The current retrospective study addressed the medical records of poisoned dogs and cats at four local animal clinics from January 2016 to December 2020 in Thailand.

Study area

The local animal clinics include two animal clinics in Rayong province in eastern Thailand, with the province covering an area of 3552 km^2, one animal clinic in Bangkok covering an area of 1569 km^2, and a clinic in Nakhon Ratchasima province.

Data collection

The present study was conducted only on the records of poisoned pets obtained from owner or caretaker reports, evidence from the scene, and a veterinarian who performed an approved examination. The pet details included species (dogs or cats), age, gender, breed, clinical signs, and poisoning agent (noticed by the owner, evidence of toxic substances brought to the clinic, and/or a veterinarian's diagnosis). Substances with a similar structure and action were classified into anticoagulant rodenticides groups, organophosphate and carbamate groups, pyrethrin and pyrethroids groups.

Statistical analysis

Descriptive analysis was used to describe gender, breed, and type of poisonous agent using percentage and mean ± standard deviation in age. Clinical signs were classified according to poisonous agents and species.

RESULTS

A total of 102 complete cases of poisoned dogs and cats were collected, including 58 dogs (56.86%) and 44 cats (43.14%). The suspected dogs included 39 male (67.24%) and 19 female cases (32.26%), while for cats there were 29 males (65.91%) and 15 females (34.09%). The average age of the poisoned dogs and cates were 3.67 ± 1.92 and 3.02 ± 1.72 years, respectively. Dog breeds included 34 mixed breed (58.63%), 5 Shih-tzu (8.62%), 3 Golden Retriever (5.17%), 3 Poodle (5.17%), 2 Thai ridgeback (3.45%), 2 Pomeranian (3.45%), 2 Chihuahua (3.45%), 2 Thai Bangkaew (3.45%), 2 Beagle (3.45%), 1 Yorkshire Terrier (1.72%), 1 Pug (1.72%), and 1 French Bulldog (1.72%). Cat breeds included 40 domestic short-haired (90.91%), 3 Persian (6.82%), and 1 British shorthair (2.27%).

The poisonous agents found in dogs were Organophosphate and Carbamate groups in 20 males and 4 females (34.48% and 6.9%, respectively), Ivermectin in 6 males and 6 females (10.34% and 10.34%, respectively), Anticoagulant rodenticides groups in 5 males and 5 females (8.62% and 8.62%, respectively), Amitraz in 3 males (5.17%), Pyrethrin and Pyrethroid groups in 3 males and 1 female (5.17% and 1.72%, respectively), chocolate in two males (3.45%), Ibuprofen in 1 male (1.72%), Acetaminophen in 1 male (1.72%), and Paraquat in 1 female (1.72%, Figure 1). In cats, the diagnosed poisonous agents included Acetaminophen in 20 males and 10 females (45.45% and 22.73%), Ivermectin in 8 males and 1 female (18.18% and 2.27%, respectively), Anticoagulant rodenticide groups in 2 females (4.55%), Fipronil in 2 females (4.55%), Bufotoxin (toad poison) in 1 male (2.27%, Figure 2).

Clinical signs in the poisoned dogs included tachycardia in 40 dogs (68.9%), hypersalivation in 28 dogs (48.28%), fever in 25dogs (43.10%), seizure in 22 dogs (37.93%), tremor in 21 dogs (36.21%), vomiting in 17dogs (29.31%), depression in 14dogs (24.14%), ataxia in 13 dogs (22.14%), diarrhea in 12dogs (20.69%), weakness in 11 dogs (18.97%), dyspnea in 10 dogs (17.24%), tachypnoea in 9 dogs (15.52%), hematemesis in 9 dogs (15.52%), hypothermia in 8 dogs (13.79%), jaundice in 8 dogs (13.79%), hematuria in 3 dogs (5.17%), bloody diarrhea in 1 dog (1.72%), unconsciousness in 1 dog (1.72%), and 1 dog (Yorkshire Terrier) showed no clinical signs despite being poisoned (1.72%). Clinical signs of the poisoned cats included dyspnea in 31 cats (70.45%), facial swelling in 30 cats (68.18%), depression in 20cats (45.45%), hypothermia in 16cats (36.36%), tachycardia in 11cats (25%), cyanosis in 8 cats (18.18%), hypersalivation in 6 cats (13.64%), tremor in 6 cats (13.64%), ataxia in 5 cats (11.36%), vomiting in 4 cats (9.09%), tachypnoea in 3 cats (6.82%), weakness in 3 cats (6.82%), blindness in 3 cats (6.82%), mydriasis in 3 cats (6.82%), seizure in 3 cats (6.82%), fever in 2 cats (4.55%), panting in 1 cat (2.27%), and mouth swelling in 1 cat (2.27%). The classifications of poisonous agents, clinical signs, and species are presented in Table 1.

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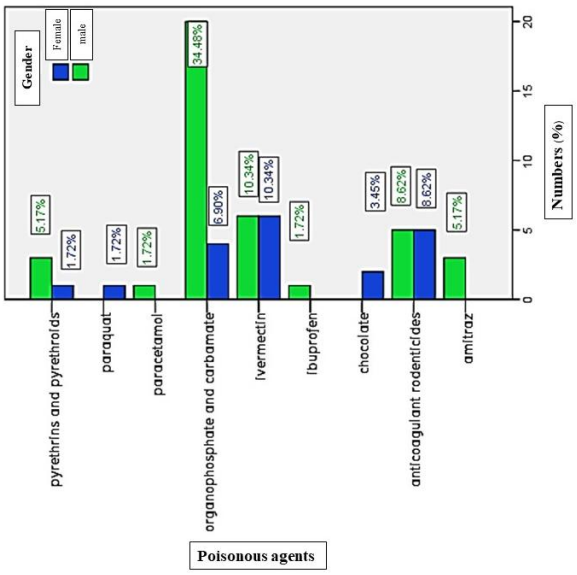

Figure 1. Poisonous agents in 58 dogs during 2016-2020 in Rayong, Bangkok, and Nakhon Ratchasima provinces. The medical record found organophosphate and carbamate groups with the highest incidence.

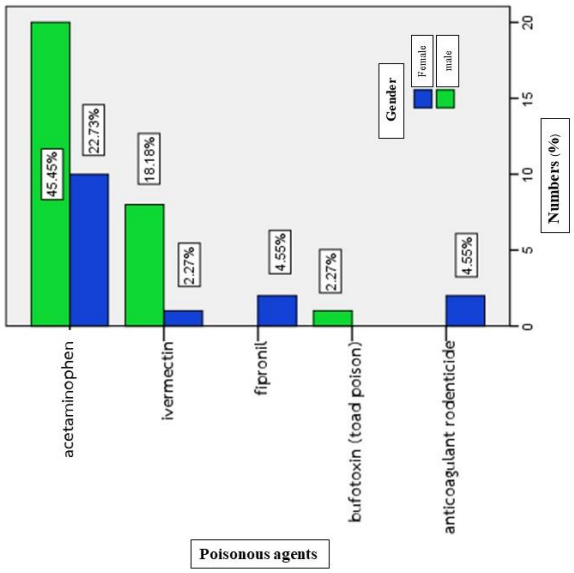

Figure 2. Poisonous agents in 44 cats during 2016–2020 in Rayong, Bangkok, and Nakhon Ratchasima province. Acetaminophen had the highest incidence in cats.

Table 1. Classification of poisonous agents, clinical signs, and species

Poisonous agents	Species	Breeds	Clinical signs	Places
Amitraz	dogs (n = 3)	Mixed (n = 3)	Tachycardia, tremor, and ataxia	Bangkok (n = 3)
Anticoagulant rodenticides groups	dogs (n =10)	Mixed (n = 6), Golden Retriever (n = 2), Thai ridgeback (n = 1), Poodle (n = 1)	Depression, vomiting, fever, diarrhea, tachycardia, weakness, hypothermia, jaundice, and hematemesis	Rayong (n = 2), Nakhon Ratchasima (n = 8)
	cats (n = 2)	Domestic Short-Haired (n = 2)	Fever and tachycardia	Bangkok (n = 2)
Bufotoxin (toad poison)	cat (n = 1)	Domestic Short-Haired (n = 1)	Hypersalivation, tachycardia, and mouth swelling	Bangkok (n = 1)
Chocolate	dogs (n = 2)	Yorkshire Terrier (n = 1), French Bulldog (n = 1)	Vomiting, diarrhea and no indication of signs	Bangkok (n = 1), Nakhon Ratchasima (n = 1)
Fipronil	cats (n = 2)	British shorthair (n = 1), Domestic Short-Haired (n = 1)	Hypersalivation, tachycardia, and tachypnea	Bangkok (n = 2)
Ibuprofen	dog (n = 1)	Golden Retriever (n = 1)	Vomiting, diarrhea, tremor, weakness, ataxia, tachycardia, and tachypnea	Bangkok (n = 1)
Organophosphate and Carbamate groups	dogs (n = 24)	Mixed (n = 18), Pug (n = 1), Chihuahua (n = 2), Thai Bangkaew (n = 2), Thai ridgeback (n = 1)	Hypersalivation, fever, tremor seizure, tachycardia, tachypnea, dyspnea, and unconsciousness	Bangkok (n = 3), Nakhon Ratchasima (n = 11), Rayong (n = 10)
Paraquat	dog (n = 1)	Shih-tzu (n = 1)	Depression, vomiting, tachycardia, tachypnea, and weakness	Rayong (n = 1)
Ivermectin	dogs (n =12)	Mixed (n = 2), Poodle (n = 2), Shih-tzu (n = 4), Beagle (2), Pomeranian (n = 2)	Tremor, hypersalivation, vomit, fever, tachycardia, ataxia, tachypnea, and hematemesis	Bangkok (n = 7), Rayong (n = 5)
	cats (n = 9)	Domestic short-haired (n = 8), Persian (n = 1)	Depression, hypersalivation, panting, tachycardia, tachypnea, dyspnea, tremor, ataxia, seizure, blindness, and mydriasis	Bangkok (n = 4), Nakhon Ratchasima (n = 5)
Acetaminophen	cats (n = 30)	Domestic short-haired (n = 29), Persian (n = 1)	Depression, facial swelling, tachycardia, cyanosis, dyspnea, hypothermia, and weakness	Bangkok (11), Nakhon Ratchasima (5), Rayong (14)
	dog (n =1)	Mixed (n = 1)	Vomiting and bloody diarrhea	Bangkok (n = 1)
Pyrethrins and Pyrethroids groups	dogs (n = 4)	Mixed (n = 4)	Hypersalivation, tachycardia, fever, tremor, vomit, diarrhea, and ataxia	Bangkok (n = 3), Rayong (n = 1)

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DISCUSSION

Cases of dog and cat poisoning have been reported in many countries, including Canada, Italy, Nigeria, Tunisia, and Japan (Lahmar et al., 2019; Adekoya et al., 2020; Avolio et al., 2021; Suzuki et al., 2021). In Thailand, dog and cat poisoning is rarely reported and published. During 2020-2016, the obtained results of the present study indicated that the most poisonous agents for dogs were Organophosphate and Carbamate groups (41.38%). This finding was similar to those previously reported in Tunisia, having the highest number of dog poisoning cases, 71.4% (Lahmar et al., 2019). In Italy, the most commonly used poisonous agents for dogs (79.2%) were reported as Anticoagulant rodenticides groups (Avolio et al., 2021). Considering cat poisoning cases, the most common poisonous agent found in the current study was Acetaminophen (68.18%), which differs from reports from Italy with Anticoagulant rodenticides groups as primarily poisoning agents (Avolio et al., 2021).

The incidence of poising was more in dogs than cats (56.8% and 43.14%), which was in accordance with previous studies in Italy and Brazil as reporting more cases of poisonings in dogs than cats (Caloni et al., 2014; Zang et al., 2018). Among the poisoned cases, the number of males was more than females (66.67% and 33.33%). However, a retrospective study on small animal poisoning during 2010-2016 in Brazil indicated that females were more than males (Zang et al., 2018). This could be due to the difference in the study area as well as owners' preferences (for the animal and the gender) and affordability. Regarding the age, the average age of the poisoned dogs and cats was 3.67 ± 1.92 and 3.02 ± 1.72years, which was in agreement with a previous study indicating poisoning was more common among younger dogs and cats (Berny et al., 2010; Zang et al., 2018). Although mixed dog breeds and domestic short-haired cats were the most suspicious breeds of poisoning, a study by Adekoya et al. (2020) indicated more poisoning cases with exotic breeds than local breeds. This may be related to differences in areas and breeds commonly found in that region.

The most common clinical signs in poisoned dogs were tachycardia (68.97%) and hypersalivation (48.28%), while dyspnea (70.45%) and facial swelling (68.18%) were more apparent in poisoned cats. Poisons of the Organophosphate and Carbamate groups could result in neuropathy (Avolio et al., 2021). In dogs (n = 24), poisoning showed clinical signs similar to previous reports (Avolio et al., 2021), including hypersalivation, fever, tremor, seizure, dyspnea, and unconscious. Toxicity in the Organophosphate and Carbamate groups depends on the chemical substance types, such as malathion, the oral toxicity of which in dogs is 500 mg/kg (Bell et al., 1955). Acetaminophen causes hemolysis and methemoglobinemia (Cortinovis et al., 2015). Poisoned cats (n = 30) showed clinical signs, including facial swelling, dyspnea, and cyanosis. In contrast, dogs (n = 1) showed clinical signs of vomiting and bloody diarrhea. The reported poisonous dose of this agent is less than 60 mg/kg for cats and over 300 mg/kg for dogs (Lascelles et al., 2007). Acetaminophen is commonly provided by cat owners rather than dog owners to their pets. Dogs (n = 12) poisoned by Ivermectin presented tremor, hypersalivation, vomiting, hematemesis, and ataxia, while cats (n = 9) indicated tremor, hypersalivation, blindness, and mydriasis. Previous reports found that Ivermectin toxicity in dogs and cats was related to the status of the P-glycoprotein transport system (P-GP) individual (Gwaltney-Brant et al., 2018). The P-GP is a protein coded by the ATP-binding cassette subfamily B member 1 (ABCB1) formerly multidrug resistance protein 1 (MDR1), while normal P-GP is tolerant to the toxin (Gwaltney-Brant et al., 2018). In some previous studies, Ivermectin had oral toxicity of 1 mg/kg in cats and 80 µg/kg (ABCB1 defective) and 0.2-1 mg/kg (ABCB1 normal) in dogs (Gwaltney-Brant et al., 2018). For the Anticoagulant rodenticide groups, this poisoning involves blood coagulopathy. Poisoned dogs (n = 10) presented jaundice, hematemesis, vomiting, fever, and diarrhea, while cats (n = 2) presented fever and tachycardia. Toxicity depends on the Anticoagulant rodenticide type, such as warfarin, which has oral toxicity of 11-323 mg/kg in dogs and 20-50 mg/kg in cats (Valchev et al., 2008). Poisoning involving Pyrethrin and Pyrethroids groups decreases the intracellular voltage potential, resulting in cellular hyperexcitability (Ensley, 2018). Dogs poisoned with Pyrethrin and Pyrethroids groups (n = 4) showed hypersalivation, tachycardia, fever, tremor, diarrhea, and ataxia. According to the previous report of the toxicity in dogs, clinical signs depend on the Pyrethrin and Pyrethroids type, such as commercial flea and tick spray products containing 0.09% fenvalerate and 9% diethyl-toluamide (DEET) with oral toxicity of 4 mg/kg (Anadón et al., 2009). Amitraz is a poison involving an alpha 2-adrenergic agonist and a Monoamine Oxidase Inhibitor that affects the nervous system and causes cardiovascular system disorder (Yilmaz and Yildizdas, 2003). The oral toxicity has been reported in dogs at 100 mg/kg (Filazi and Yurdakok-Dikmen, 2018). In the current study, dogs poisoned with Amitraz (n = 3) presented tachycardia, tremor, and ataxia as was expected for the dogs orally received Amitraz quantities greater than 100 mg/kg. Fipronil is used in veterinary medicine to prevent and eliminate external parasites, such as ticks, fleas, or mites (Gupta and Anadón, 2018). The mechanism of toxicity inhibition is at the gamma-aminobutyric acid (GABA) receptor-chloride complex (Gupta and Anadón, 2018). In the present study, cats poisoned with Fipronil (n = 2) presented hypersalivation, tachycardia, and tachypnoea which is consistent with a previous report of Fipronil as a moderately toxic substance indicating skin contact alone produces little or no toxicity (Suzuki et al., 2021). The clinical signs of oral toxicity of Fipronil appear when the substance is given in large quantities and over several months Australian Authority Pesticides and Veterinary Medicines (0.2-0.5 mg/kg/day, AAPVM, 2011). The current study indicated that two dogs were poisoned with chocolate given by their owners, one of which (French Bulldog)

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presented clinical signs, including vomiting and diarrhea, while the other (Yorkshire Terrier) presented no clinical signs after ingestion. The poisoning substance of chocolate is theobromine which primarily affects the central nervous system, cardiovascular system, and respiratory system (Cortinovis and Caloni, 2016). Clinical signs have been reported to appear in dogs after chocolate ingestion of 20 mg/kg (Cortinovis and Caloni, 2016). Ibuprofen poisoning was found in one dog (Golden Retriever) which presented clinical signs of vomiting, diarrhea, tremor, weakness, and ataxia. This substance inhibits cyclooxygenases and decreases the production of prostaglandins (Bolfer et al., 2014). Previous reports found that Ibuprofen toxicity in dogs can be seen at 50 mg/kg (Cortinovis et al., 2015). Paraquat poisoning was found in one dog (Shih-tzu) with clinical signs of depression, vomiting, tachycardia, tachypnoea, and weakness, which was in accordance with the previously reported effects of superoxide radical and cell death (Fukushima et al., 2002). Although the oral toxicity of Paraquat is unknown in dogs, it is still higher in dogs than cats (35-50 mg/kg in cats, Cope, 2004). Bufotoxin (toad poison) was found in one cat and the clinical signs included hypersalivation, tachycardia, and mouth swelling. Previous reports found clinical signs in dogs, including gastrointestinal, cardiac, and neurological problems, but low mortality was observed after intoxicated (Barbosa et al., 2009). In the current study, medical records of clinical signs in poisoned dogs and cats included factors causing discrepancies, such as examinations by different veterinarians, period of exposure to the poisoning agent, the amount of poisoning agents received, and pet health status before the poisoning. As far as the authors are concerned, the current study is one of the first on the incidence and clinical signs of poisoned pets in Thailand.

CONCLUSION

In the present study, organophosphate-carbamate groups and acetaminophen were highly reported as poisonous agents in dogs and cats between January 2016 and December 2020. Poisoning was mostly diagnosed in mixed breed dogs and domestic short-haired cats. Tachycardia, hypersalivation, dyspnea, and facial swelling were the most common clinical signs in dogs and cats.

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Competing interests

The authors declare that there is no competing interests.

Ethical consideration

Ethical issues such as plagiarism, misconduct, information fabrication and/or falsification, consent to publish, double publication and/or submission, and redundancy have been verified by the authors

Authors' contribution

Athip Lorsirigool collect and analyze data, wrote a manuscript, and submission. Athip Lorsirigool, Yuttana Sudjaroen, and Narong Kulnides read and approved the final manuscript.

REFERENCES

Adekoya OA, Adenubi OT, Adebayo OO, Adebowale OO, Oyewusi JA, and Olukunle JO (2020). Retrospective study of suspected canine poisoning cases at the veterinary teaching hospital, Federal University of Agriculture, Abeokuta, Nigeria (2009-2019). Open Veterinary Science, 1(1): 30-37. DOI: https://www.doi.org/10.1515/ovs-2020-0102

Anadón A, Martínez-Larrañaga MR, and Martínez MA (2009). Use and abuse of pyrethrins and synthetic pyrethroids in veterinary medicine. The Veterinary Journal, 182(1): 7-20. DOI: https://www.doi.org/10.1016/j.tvjl.2008.04.008

Australian Authority Pesticides and Veterinary Medicines (AAPVM) (2011). Safety of fipronil in dogs and cats: A review of literature. Veterinary Medicines. Available at: https://johnsonvet.com/wp-content/uploads/2019/05/15191-fipronil-prf-vol2-animal-safety-literature_0.pdf

Avolio R, Andreoli T, Ercolini C, Mignone W, Beltrame R, Razzuoli E, Modesto P, Zoppi S, Crescio MI, and Ostorero F (2021). Retrospective data analysis of animal poisoning events in Liguria. Veterinary Animal Science, 13: 100178. DOI: https://www.doi.org/10.1016/j.vas.2021.100178

Barbosa CM, Medeiros MS, Riani Costa CCM, Camplesi AC, and Sakate M (2009). Toad poisoning in three dogs. Journal of Venomous Animals and Toxins Including Tropical Diseases, 15: 789-798. DOI: https://www.doi.org/10.1590/S1678-91992009000400016

Bell R, Price M, and Turk E (1955). Toxicity of malathion and chlorthion to dogs and cats. Journal of the American Veterinary Medical Association, 126(937): 302-303. Available at: https://pubmed.ncbi.nlm.nih.gov/14353786/

Berny P, Caloni F, Croubels S, Sachana M, Vandenbroucke V, Davanzo F, and Guitart R (2010). Animal poisoning in Europe. Part 2: Companion animals. The Veterinary Journal, 183(3): 255-259. DOI: https://www.doi.org/10.1016/j.tvjl.2009.03.034

Bolfer L, McMichael M, Ngwenyama TR, and O'Brien MA (2014). Treatment of ibuprofen toxicosis in a dog with IV lipid emulsion. Journal of the American Animal Hospital Association, 50(2): 136-140. DOI: https://www.doi.org/10.5326/JAAHA-MS-5979

Caloni F, Cortinovis C, Pizzo F, Rivolta M, and Davanzo F (2014). Epidemiological study (2006-2012) on the poisoning of small animals by human and veterinary drugs. Veterinary Record, 174(9): 222-222. DOI: https://www.doi.org/10.1136/vr.102107

Caloni F, Cortinovis C, Rivolta M, and Davanzo F (2016). Suspected poisoning of domestic animals by pesticides. Science of the Total Environment, 539: 331-336. DOI: https://www.doi.org/10.1016/j.scitotenv.2015.09.005

Cope R (2004). Helping animals exposed to the herbicide paraquat. Veterinary Medicine, 99(9): 755-762. Available at: https://www.aspcapro.org/sites/default/files/r-vetm0904_755-762.pdf

Cortinovis C, and Caloni F (2016). Household food items toxic to dogs and cats. Frontiers in Veterinary Science, 3: 26. DOI: https://www.doi.org/10.3389/fvets.2016.00026

Cortinovis C, Pizzo F, and Caloni F (2015). Poisoning of dogs and cats by drugs intended for human use. The Veterinary Journal, 203(1): 52-58. DOI: https://www.doi.org/10.1016/j.tvjl.2014.11.004

De Siqueira A, Salvagni FA, Yoshida AS, Gonçalves-Junior V, Calefi AS, Fukushima AR,

De Souza Spinosa H, and Maiorka P (2015). Poisoning of cats and dogs by the carbamate pesticides aldicarb and carbofuran. Research in Veterinary Science, 102: 142-149. DOI: https://www.doi.org/10.1016/j.rvsc.2015.08.006

Ensley SM (2018). Pyrethrins and pyrethroids. Veterinary toxicology. Academic press. Third edition. Elsevier, 39: 515-520. DOI: https://www.doi.org/10.1016. B978-0-12-811410-0.00039-8

Filazi A, and Yurdakok-Dikmen B (2018). Amitraz. Veterinary toxicology. Academic press. Third edition. Elsevier, 41: 525-531. DOI: https://www.doi.org/10.1016/B978-0-12-811410-0.00041-6

Fukushima T, Tanaka K, Lim H, and Moriyama M (2002). Mechanism of cytotoxicity of paraquat. Environmental Health Preventive Medicine, 7(3): 89-94. DOI: https://www.doi.org/10.1265/ehpm.2002.89

Gupta D, and Bhardwaj S (2012). Study of acute, subacute and chronic toxicity test. International Journal of Current Biomedical Pharmaceutical Research, 2(2): 290-289. Available at: https://currentscidirect.com/ijcbpr/Manuscript_file/IJCBPRJR240.pdf

Gupta RC, and Anadón A (2018). Fipronil. Veterinary toxicology. Academic press. Third edition. Elsevier, 42: 533-538. DOI: https://doi.org/10.1016/B978-0-12-811410-0.00042-8

Gwaltney-Brant SM, DeClementi C, and Gupta RC (2018). Macrocyclic lactone endectocides. Veterinary Toxicology. Academic press. Third edition. Elsevier, 43: 539-550. DOI: https://www.doi.org/10.1016/B978-0-12-811410-0.00043-X

Lahmar R, Berny P, Mahjoub T, and Ben Youssef S (2019). Animal pesticide poisoning in Tunisia. Frontiers in Veterinary Science, 6: 369. DOI: https://www.doi.org/10.3389/fvets.2019.00369

Lascelles BDX, Court MH, Hardie EM, and Robertson SA (2007). Nonsteroidal anti-inflammatory drugs in cats: A review. Veterinary Anaesthesia Analgesia, 34(4): 228-250. DOI: https://www.doi.org/10.1111/j.1467-2995.2006.00322.x

Suzuki T, Hirai A, Khidkhan K, Nimako C, Ichise T, Takeda K, Mizukawa H, Nakayama S, Nomiyama K, and Hoshi N (2021). The effects of fipronil on emotional and cognitive behaviors in mammals .Pesticide Biochemistry Physiology, 175: 104847. DOI: https://www.doi.org/10.1016/j.pestbp.2021.104847

Valchev I, Binev R, Yordanova V, and Nikolov Y (2008). Anticoagulant rodenticide intoxication in animals–a review. Turkish Journal of Veterinary Animal Sciences, 32(4): 237-243. Available at: https://journals.tubitak.gov.tr/veterinary/abstract.htm?id=9608

Yilmaz HL, and Yildizdas D (2003). Amitraz poisoning, an emerging problem: Epidemiology, clinical features, management, and preventive strategies. Archives of Disease in Childhood, 88(2): 130-134. DOI: http://www.dx.doi.org/10.1136/adc.88.2.130

Zang L, Bing RS, de Araujo ACP, and Ferreira MP (2018). A retrospective study of small animal poisoning at the veterinary medical teaching hospital from South region of Brazil. Acta Scientiae Veterinariae, 46(1): 7. DOI: https://www.doi.org/10.22456/1679-9216.84787

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