Fatal poisoning in dogs and cats - A 6 - year report in a veterinary pathology service

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Abstract

A retrospective evaluation (1999 to 2004) of all 1,875 necropsies was performed at one Veterinary Pathology Service in Brazil with the aim of characterizing the cases of fatal poisonings in dogs and cats. During this period, 261 (13.9%) cases of dog or cat poisoning were identified. For all animals the exposures were of acute nature, caused by a single substance, occurred by ingestion and the most them were of intentional nature. The main agent was aldicarb responsible for 88.6% of the intoxications in dogs and 95.0% in cats. Other agents were anticoagulants (10.0% in dogs and 0.8% in cats), sodium monofluoracetate (1.4% in dogs) and no specified organic solvent (4.2% in cats).

Key words:
Poisoning.
Aldicarb.
Pesticides.
Dogs. Cats.

Introduction

Pesticides are widely used in industry, agriculture and households. They can be classified according to their use (insecticides, fungicides, herbicides, rodenticides) or to their chemical family (organochlorine, organophosphorous, carbamates, pyrethroids, bipyridilium compounds, inorganic salts) and may be highly toxic to human beings and animals. The widespread and indiscriminate use of these products, especially in developing countries, has been a cause of concern[1].

Three million people are intoxicated by pesticides worldwide every year, resulting in more than 200,000 deaths[2]. Similarly, pesticides represent one of the most important causes of intoxication in animals[3,4]. However, there are few data on the incidence of animal poisoning in Brazil and the full extent of the problem is unknown.

Data collected by the American Association of Poison Control Centers showed that the pesticides were the most common agents implicated in fatal poisoning (264 cases in 396 fatal exposures with a identified category of toxicant)[5]. In the same way, data from 10-year of chemical toxicological analyses carried out in a veterinary laboratory in Barcelona, Spain for 218 in 1,015,000 suspected wild and domestic animal poisonings found that insecticides (carbamates, organophosphates and organochlorine - 46.6%) and rodenticides (anticoagulants and strychnine - 37.9%) were the most frequently involved agents[4].

The National System of Toxicological and Pharmacological Information (SINITOX)[6] provides information about drugs and toxic agents as well as annual reports on occurrence of human intoxication in Brazil. Most recently, that institute is also reporting cases of intoxication in animals. The most recent report available (2003) mentions that 82,716 cases of human intoxication and only 1381 cases of animal intoxication occurred in Brazil. This certainly reflects the underestimation of animal intoxication, mainly when compared with studies done in other countries.

Based on SINITOX reports, pesticides (for both domestic and agricultural use) are the main agents of intoxication in animals, followed by rodenticides, veterinary products and drugs. These proportions are comparable with the ones reported in other countries for both human and animal

intoxication, being pesticides the most common cause of intoxication[4]. The proportion of intoxication by pesticides is even higher when only fatal cases are considered. In Brazil, it is known that highly toxic and illegal pesticides used for intentional poisoning of domestic animals often cause these intoxications.

In other Brazilian study of 250 intoxication cases non-steroidal anti-inflammatory drugs, rodenticides, organophosphorous and carbamate insecticides were the most common agents involved in dog and cat poisoning[7]. However, the incidence of animal intoxication is still underestimated in Brazil, mainly because of the absence of specialized veterinary centers that would systematically collect data, perform toxicological diagnosis and report national statistics.

In this paper we record all cases of cat and dog clinically suspected poisoning occurred from 1999 to 2004 at one Veterinary Pathology Service. We intended to relate these cases including the incidence and the agents more frequently involved in fatal poisoning.

Materials and Methods

We included dog or cat necropsy cases from January 1999 to December 2004 that received clinical or *post mortem* diagnosis of intoxication at the Department of Pathology, School of Veterinary Medicine, University of São Paulo – FMVZ/USP. Medical records were fully reviewed with attention to each animal's age, sex, specie, breed and clinical and laboratorial diagnosis.

Cases which main cause of death was exogenous intoxication were selected. Such diagnosis was based on clinical data, direct detection of toxic agent at necropsy, toxicological tests (positive analytical detection of a toxic agent in tissues, fluids and/or baits using thin-layer chromatography with fluorescence and reagent sprays, high-performance liquid chromatography with ultraviolet light visualization (uv-vis), enzymatic tests, inorganic chemistry assays and biological tests) and macroscopic changes known to be associated with exogenous intoxication. *Post mortem* samples submitted for toxicological analysis were blood, liver as well as the stomach content, if any.

Results and Discussion

5,692 necropsies between 1999 and 2004 from different animal species were performed in the Veterinary Pathology Service including 1,875 dogs or cats necropsies. Among these 1,875 cases, 261 (14.0%) received the *ante* or *post mortem* diagnoses of poisoning. The frequency of fatal intoxication was 9.4% (141/1497) in dogs and 31.7% (120/378) in cats. Median age was 24 months (interquartile range 48) for dogs and 17 months (interquartile range 18) for cats. In dogs, 46.4% were male and 53.6% were female. In cats, 47.7% were male and 52.3% were female. Mixed-breed dogs represented 39.4% of the sample and mixed-breed cats, 94,4%. In dogs, the most commonly intoxicated breeds were German shepherd (19.0%), Poodle (14.3%) and Pinscher (9.5%) (Table 1). Siamese was the most common affected breed in cats.

As showed earlier, it was found a difference between species regarding the occurrence of toxic death. Such fact can be explained by different behavior between cats and dogs, being the cats more independent and less restrict to a definite space. Consequently, they are more susceptible to become victims of poisoning when tasteless and odorless toxic agents are mixed with tasty foods. In spite of being very selective in their alimentary pattern, cats can not notice the presence of the poison mixed with food, as aldicarb that is often mixed with fish that has strong odor and flavor.

Both sexes were equally affected, matching the overall proportion of necropsied animals. As previous observed by Motaz-Guzmán et al.[8] regarding the animal age, the most intoxicated ones where those younger than 5 years, what reflects both the population distribution by age and the fact

that younger animals tend to be more active.

Regarding the breed definition, no difference was found between the poisoned animals and the overall sample of necropsied animals during this 6-year period. Most of the dogs can be classified in a specific breed while most of the cats do not belong to any defined breed, probably reflecting the local prevalence. Comparing the distribution per breed in the total number of necropsies and in the total number of intoxications (Table 1), it can find that despite being Poodle the most common breed in this service, German Shepherd was the most commonly intoxicated breed. It may be due to being German Shepherd a guard-dog and presenting a protector behavior. On the other hand, Poodles e Pinschers are usually companion dogs that bark excessively, becoming targets to criminal poisoning.

Table 1 – Most common breeds of poisoned dogs. Veterinary Pathology Service, FMVZ/USP - Brazil (1999-2004)

Breeds	Total of necropsies (1,113)	Intoxicated dogs (84)
Poodle	184 (16.5%)	12 (14.3%)
German Shepherd	111 (10.0%)	16 (19.0%)
Pinscher	48 (4,3%)	8 (9.5%)

For all animals the exposures were of acute nature, were caused by a single substance, occurred by ingestion and the home was the primary setting of the poison exposure. Most of the fatal poisonings recorded were of intentional nature (90.6% in dogs and 99.1% in cats).

Four categories of toxicants were responsible for the fatal poisoning cases (Table 2). The main agent was aldicarb responsible for 88.6% of fatal intoxication in dogs and 95.0% in cats. Among these cases, the most frequent historic data was the sudden death (50.7%), showing the acute and grave nature of these cases and the fact of the most occurrence were at night, reducing chances of an adequate and emergency veterinary care. Among the symptoms table 3 displays the clinical data collected from the medical records of 136 aldicarb-intoxicated animals (in 103 cases the symptoms and others data were unknown).

Aldicarb is one of the most potent pesticides used worldwide and must be delivered and utilized under strict control. It is a cholinesterase inhibitor and the common symptoms of poisoning in animal include increased salivation, lacrimation, urinary incontinence, diarrhea, emesis, weakness, respiratory distress, tremors, muscle fasciculation, convulsion and death[9]. In spite of the restricted use to agriculture, aldicarb was the most frequent cause of intoxication in the present series. Such finding can be explained by the fact that in spite of have its use restrict to agriculture, aldicarb is largely

Table 2 - Category of toxic agents implicated in poisoning cases. Veterinary Pathology Service, FMVZ/USP - Brazil (1999-2004)

Agent	Dogs (141)	Cats (120)
Aldicarb	125 (88.6%)	114 (95.0%)
Anticoagulants	14 (10.0%)	1 (0.8%)
Sodium fluoracetate	2 (1.4%)	-
Organic solvent	-	5 (4.2%)

Table 3 – Most common clinical symptoms and other informations reported in the medical records of the 136 aldicarb-intoxicated animals. Service of Necropsy, Department of Pathology, FMVZ/USP - Brazil (1999-2004)

Clinical symptoms and other informations	N (%)
Sudden death	69 (50.7)
Neighbourhood´s animal death	56 (41.2)
Sialorrhea	39 (28,7)
Vomit	29 (21,3)
Toxic agent close to the animal	19 (14.0)
Seizure	17 (12.5)
Tremors	13 (9.5)
Diarrhea	12 (8.8)
Incoordination	8 (5.9)
Respiratory distress	8 (5.9)
Motor agitation	4 (3.0)
Prostration	4 (3.0)
Barking	3 (2.2)
Hematoquezia	3 (2.2)
Oral hemorrhage	3 (2.2)
Weakness	3 (2.2)
Anorexia	2 (1.5)
Epistaxis	2 (1.5)
Fever	2 (1.5)
Miosis	2 (1.5)
Myoclonus/fasciculation	2 (1.5)
Tenesmus	2 (1.5)
Toxic agent in use in home	2 (1.5)
Hematemesis	1 (0.7)
Pelvic muscular rigidity	1 (0.7)

and illegally sold as household rodenticide, due to its low cost and known lethal effect in animals. Those facts, added to inefficient commercialization control are responsible for aldicarb is being very often involved in severe intoxication in humans and animals, being almost the exclusive agent for lethal intoxication of companion animals

During the necropsies, granulate powder was found in the stomach content of all 239 fatal poisoning caused by aldicarb and the most common affected organs were

lung (92.0%), liver (67.3%), kidney (46.0%) and bowel (35.1%). All these cases were of malicious nature and as the pattern found by Frazier et al.[10] the baits most commonly used were red meat or other grocery meats (i.e., sausages) for dogs and fishes for cats.

Other agents were anticoagulants (10.0% in dogs and 0.8% in cats), sodium fluoroacetate (1.4% in dogs) and no specified organic solvents (4.2% or five cases in cats of the same property). The anticoagulant agents are easily available since they are legally sold as rodenticides. Although, when compared with aldicarb, anticoagulants are known to be less toxic and require more time to cause clinic manifestation being possible the complete reversion of signs if the animal receive adequate and urgent care.

Poisoning undoubtedly remains a serious cause of morbidity and mortality for companion animals. Pesticides, mainly organophosphates and carbamates are the most common cause of poisoning in animals[2,3,4,5,8,11]. Overall, this work found similar results with what has been published in previous studies. However, as pointed out by Frazier et al.[10] the number of cases presented here significantly underestimates the total number of actual animal intoxications because only a portions of animal fatalities are submitted to a veterinary service and local veterinarians may successfully treat the cases of subletal poison exposure.

Moreover, the presented data as well as previous series in the literature[4,8,10,12] that address the potential damage of illegal use of aldicarb over human and animal health claim for urgent effort towards eradication of illegal use of aldicarb as well as organization of educational programs for adequate and safe use of pesticides.

Intoxicação fatal em cães e gatos - Casuística de seis anos de um serviço de patologia veterinária

Resumo

Um levantamento retrospectivo (1999-2004) de 1.875 necropsias foi realizado em um Serviço de Patologia Veterinária brasileiro com o objetivo de caracterizar os casos de intoxicação fatal em cães e gatos. Durante este período, 261 (13,9%) cães e gatos tiveram como *causa mortis* a intoxicação exógena. Em todos os casos, a intoxicação foi de caráter agudo, causada por um único agente tóxico e, na maioria das vezes, de natureza intencional. O carbamato aldicarb foi o agente tóxico mais comum em ambas espécies, sendo responsável por 88,6% dos casos de intoxicação em cães e 95.0% dos casos em gatos. Outros agentes tóxicos encontrados foram o fluoroacetato de sódio (1,4% - em cães) e um solvente orgânico não especificado (4,7% - em gatos).

Palavras-chave:
Intoxicação.
Aldicarb.
Praguicidas.
Cães. Gatos.

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