'Battered pets': features that raise suspicion of non-accidental injury

A study of veterinarians' perceptions, and experience, of non-accidental injury (NAI) to pets was undertaken using an anonymous questionnaire distributed to a random sample of 1000 small animal practitioners in the UK. NAI was acknowledged by 91·3 per cent (95 per cent confidence interval, 88·2 to 93·9 per cent) of the 404 respondents who returned questionnaires, of whom 48·3 per cent (95 per cent confidence interval, 43·4 to 53·1 per cent) had either suspected or seen NAI. Four hundred and forty-eight cases were documented, predominantly in dogs (243) and cats (182). Factors either raising suspicion, or facilitating recognition, of NAI included: implication of a particular person, features of the history, referral agency involvement, behaviour of the owner and/or the animal, nature of the injuries, and socioeconomic class of owners. Additionally, sexual abuse and suspected cases of Munchausen syndrome by proxy were recorded.

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INTRODUCTION

Background

In 1962, the *Journal of the American Medical Association* published a paper entitled 'The battered-child syndrome' (Kempe and others 1962). Lynch (1985) wrote that, although physical abuse of children had been documented for centuries, this landmark paper, with its deliberately emotive title, was instrumental in gaining the medical profession's acknowledgement that such abuse of children was a diagnostic possibility. Since then, the problem has been extensively researched; textbooks characterising child abuse are available, and guidelines have been developed to help health professionals to differentiate between genuine accidental injuries and those that have been caused deliberately (Blumenthal 1994a, Meadow 1997a, Hobbs and others 1999a).

Veterinarians have also encountered physical abuse in animals. Cases investigated by the Scottish Society for the Prevention of Cruelty to Animals (Scottish SPCA) between 1986 and 1993, for example, involved examination by no less than 88 veterinarians (Munro 1996a).

Munro (1996b) pointed out the similarity between physical abuse of children and companion animals, and the growing recognition of a link between them – as discussed by Arkow (1994) – and called for the establishment of diagnostic criteria to separate accidental and deliberate injury to animals. Outlines of the clinical and pathological features of physical abuse of animals, emphasising the similarity to the diagnostic pointers that have been developed for child abuse cases, were subsequently published (Munro 1998, 1999).

Terminology

As a consequence of extensive media reporting, most people are familiar with the term 'child abuse', but may be unfamiliar with all the types that can occur.

Meadow (1997b) classifies abuse of children as encompassing:

- physical abuse (synonyms: non-accidental injury [NAI], 'battered-child syndrome');
- sexual abuse;
- emotional abuse;
- neglect (deprivation of the basic necessities of life: food, warmth, shelter, affection).

This terminology is both universally accepted and used, the phrase 'cruelty to children' rarely being heard nowadays. Unfortunately, there is no such universal agreement with regard to animals, and the phrases 'animal abuse' and 'cruelty to animals' are often used interchangeably, without any clear definition as to what either actually means. The situation is further complicated by the fact that human societies maintain separate animal groups, used for different purposes. Thus, treatment considered acceptable in one group of animals may be judged 'abusive' or 'cruel' in another. For example, while the killing of farm animals for food is accepted, and society generally tolerates experimental procedures on small laboratory animals (eg, rats and mice), similar activities conducted on pets would be

judged unacceptable. What precisely falls within the terms 'abuse' and 'cruelty' in animals has been the subject of considerable discussion (Rowan 1993, Vermeulen and Odendaal 1993).

However, in the case of companion animal abuse, the adoption of child abuse terminology eliminates confusion (and may also be applied to appropriate cases in any other type of animal). Use of this terminology promotes a 'common language' and greatly helps mutual understanding when working with medical health professionals. It is therefore the terminology used in this paper, which primarily addresses NAI. It should be noted, however, that the tables in this paper (with the exception of Tables 4 and 5) use the all-encompassing term, 'abuse', because some respondents chose to report sexual abuse cases as well.

The current study

The experience of the 88 veterinarians mentioned above with respect to the Scottish SPCA investigations, indicated that the profession might be party to a large amount of knowledge, that had never been shared, and certainly not collated. This observation led to a decision to carry out a study of the experiences of veterinarians in small animal practice throughout the UK.

There were two aims: first, to ascertain the extent of NAI in the dog and cat, as seen in clinical veterinary practice, and, secondly, to ascertain characteristics of individual cases, in an attempt to identify a NAI syndrome (or syndromes).

MATERIALS AND METHODS

Questionnaire design and sampling procedure

Abuse is a sensitive subject and, therefore, to encourage maximum response, an anonymous questionnaire was constructed. This consisted of four sections, involving both 'closed' questions (ie, those with a pre-specified set of answers) and 'open' questions (in which respondents could express their answers flexibly as free text). Copies of the questionnaire are available from the authors.

Section 1

Respondents were asked if they acknowledged NAI and if they had ever suspected, or seen it. If the reply was affirmative, the respondent was asked to proceed to section 2; if not, to proceed to section 3.

Section 2

Blank case reports were provided for up to five cases, with the option of requesting further case sheets. It was emphasised that the provision of the latter would result in loss of anonymity, but assurance was given that all information would be treated as strictly confidential. Each case report gathered information on the approximate date of occurrence, and the species, breed, gender and age (<12 weeks, three to six months, seven months to two years, and >two years) of cases. An open question asked what had made the respondent suspect, or allowed recognition of, NAI, and whether this involved a single episode or more than one episode. Separate areas on each case report were provided for free-text descriptions of injuries seen on specific areas of the body, and a final question asked whether the patient had survived, died of injuries, or been euthanased because of the severity of injuries. Respondents were then guided to section 3.

Section 3

All respondents were asked five questions concerning experience of features of NAI; namely, whether, in their patients, they had noted:

(1) unexplained injuries;
(2) more than one fracture of differing ages in the same animal;
(3) unexplained old rib fractures;
(4) a history inconsistent with the injury;
(5) a previous history of unexplained injury or death with the same owner or family.

These questions were chosen because they covered several features of NAI (including fatalities) in children (Blumenthal 1994b, Hobbs and others 1999b,c).

Respondents were asked to record free-text details for questions 1 and 4.

Section 4

Respondents were asked to document other relevant comments in free text.

A draft questionnaire was tested informally on five of the authors' colleagues to detect ambiguous or unclear questions, and necessary revisions were then incorporated in a pilot questionnaire.

A sampling frame was constructed from the list of members of the British Small Animal Veterinary Association (BSAVA) resident in the UK.

The pilot questionnaire, accompanied by an explanatory letter justifying the study, was then formally tested in a pilot study of 30 practitioners, randomly selected from the sampling frame by simple random sampling, without replacement, using a random-number generator (MINITAB v.12; Minitab, State College, PA). A stamped addressed envelope was included for the questionnaire's return. It was also stated that the questionnaire could be completed collectively by all members of the practice – both veterinarians and nurses – so that the maximum number of suspect cases could be captured, and anonymity clearly guaranteed. Any remaining ambiguities and shortcomings in the questionnaire's design were identified in the questionnaires that were returned. Completed pilot questionnaires were not used in the analysis.

A final sampling frame was constructed, excluding the pilot respondents and duplicate addresses (to avoid the likelihood of more than one member of the same practice being selected). Preliminary sample-size calculations indicated that approximately 400 respondents were required to estimate the percentage of respondents that either recognised or suspected NAI, with absolute precision of ± 5 per cent at the 95 per cent level of confidence, with the conservative assumptions that (1) the percentage equalled 50 per cent, and (2) correction for the finite size

Table 1. Number of cases of abuse reported by respondents

Number of cases	Number of respondents	
	Section 2	Sections 3 and 4
1	95	27
2	40	2
3	30	1
4	16	–
5	13	–
6	1	–

of the study population was not required (Thrusfield 1997). However, previous experience with practitioner-based questionnaires suggested that response rates can be lower than 10 per cent (Thrusfield and others 1998). Correction for non-response was therefore required in order to obtain sufficient returned questionnaires without violating the sample-size parameters. A compromise response rate of 40 per cent was made between such very low rates and the rate achieved by the pilot questionnaire (see Results). Accordingly, 1000 practitioners (a sampling fraction of approximately 25 per cent) were again selected by simple random sampling, without replacement; and the final questionnaire, accompanying explanatory letter, and 'Freepost' envelope for the questionnaire's return were distributed to them. A reminder, consisting of a further copy of the questionnaire, covering letter, and 'Freepost' envelope, was circulated one month later.

Classification of lesions

Injuries reported to cause suspicion of NAI in the dog and cat were grouped, using a modified child NAI classification scheme (Hobbs and others 1999b), into:

- **Superficial lesions.** Bruising, burns and scalds, incised wounds, lacerations, stab wounds, ligatures, avulsed nails, conjunctival haemorrhage, corneal puncture;
- **Deeper lesions.** Epistaxis, haematoma, strangulation (manual/ligature), testicular injury, abdominal muscle rupture, retinal haemorrhage;
- **Fractures/locomotor injuries.** Fractures (including old fractures), stifle ligament injury, amputation, lameness;
- **Internal thoracoabdominal lesions.** Collapsed lung, diaphragmatic rupture, liver rupture, intestinal rupture, intestinal strangulation;
- **Intracranial/spinal conditions.** Brain trauma, paraplegia.

Lacerations (split wounds), incised wounds (cuts) and stab wounds were classified according to standard forensic terminology (Gee and Watson 1989).

Table 2. Features causing suspicion/allowing recognition of abuse in dogs

Feature	Number of occasions recorded
A particular person was implicated	
Boyfriend/husband/partner/adult family member	26
Owner (self admission)	22
Owner's statement, stating NAI but not identifying perpetrator	12
Lodger/neighbour/stranger/other	12
Child in family	7
Total	79
Features in the history	
Witness available	23
History inconsistent with injury (eg, injury too severe for history offered)	20
Violence in the home	14*
Lack of explanation for injury	13
Discrepant history (eg, changed with telling, or from person to person)	10
Lack of history of road traffic accident/possible accident	8
Previous injury/death in another animal, involving same owner/household	5
Violence to an unspecified person	1
Total	94
Reporting agency referral/involvement	
Police/RSPCA/Scottish SPCA	33
Behaviour of owner/animal	
Owner	17
Animal	4
Both owner and animal	1
Total	22
Injuries	
Type of injury	60
Repetitive injury/age of injury	19
Sexual abuse	21
Total	100
Miscellaneous	
Suspected Munchausen syndrome by proxy	4
Failure to have veterinary attention/not usual veterinarian	2
History of road traffic accident but old rib fracture present, with no bone pathology	1
Lack of evidence of coagulopathy	1
Total	8

*Violence was directed against eight women and two children. The remaining four were described only as 'domestic'

Data storage and analysis

The information recorded on the questionnaires was coded alphanumerically and transferred to a custom-built database, using ACCESS 97 (Microsoft, Redmond, WA). Responses to 'open' questions were

Table 3. Features causing suspicion/allowing recognition of abuse in cats

Feature	Number of occasions recorded
A particular person was implicated	
Child in family	15
Boyfriend/husband/partner/family member	9
Lodger/neighbour/stranger	8
Owner's statement, confirming NAI but not identifying perpetrator	5
Owner (self admission)	3
Total	40
Features in the history	
Previous injury/death in another animal, involving same owner/household	16
Witness available	14
History inconsistent with injury (eg, injury too severe for history offered)	13
Road traffic accident/fall/accident not possible/injury occurred in a housed cat	8
Lack of explanation for injury	7
Miscellaneous reasons given by veterinarian (eg, 'Owner's story' [sic])	6
Violence in the home	5*†
History/injuries not considered consistent with road traffic accident/other accident	5
Discrepant history (eg, changed with telling, or from person to person)	2
Violence to police	1
Total	77
Reporting agency referral/involvement	
Police/RSPCA/Scottish SPCA	7
Behaviour of owner/animal	
Owner	9
Animal	3
Friend of owner	1
Total	13
Injuries	
Type of injury	40
Repetitive injury	13
Sexual abuse	5
Total	58
Miscellaneous	
Suspected Munchausen syndrome by proxy	1
No bone pathology on radiography	1
Paracetamol poisoning (multiple cats in household)	1
Several cases seen but no details remembered	1
Total	4

*Violence was directed against four women. The fifth was described only as 'domestic'.
†Includes one case involving three successive kittens in the same house; counted as one case

entered in full. Proportions and their associated 95 per cent confidence intervals (CIs) were calculated using either the exact binomial method or the Normal approximation (when nP or $n[1-P] > 10$, where n = sample size, and P = estimated proportion) (Altman and others 2000), and the results were expressed as percentages.

RESULTS

Twenty-three pilot-study questionnaires were returned: a response rate of 76·6 per cent. Final questionnaires were returned by 404 respondents: a response rate of 40·4 per cent, and a sampling fraction of approximately 10 per cent.

Section 1

Three hundred and sixty-nine respondents (91·3 per cent; 95 per cent CI, 88·2 to 93·9 per cent) stated that they acknowledged NAI. The remaining 35 respondents either did not acknowledge NAI (24) or gave no answer (11).

One hundred and ninety-five respondents (48·3 per cent; 95 per cent CI, 43·4 to 53·1 per cent) stated that they had suspected, or seen, NAI. One hundred and ninety-eight respondents said they had not, whereas 11 left this question blank.

Section 2

The 195 respondents, who had either suspected or seen NAI, documented 400 cases: 225 dogs, 168 cats, three horses, one hamster and one rabbit. The remaining two cases were airgun injuries where 'cats and dogs' had been noted as the species targeted. (An additional 48 cases [18 dogs, 14 cats, one rabbit and 15 unspecified species] were recorded in sections 3 and 4 by 30 respondents, 20 of whom had recorded no cases in section 2.)

The number of cases recorded by each respondent varied from one to six (Table 1).

The features that raised suspicion, or allowed recognition, of NAI fell into six categories:

- a particular person was implicated;
- features in the history;
- behaviour of the owner and/or the animal;
- type of injury;
- involvement of a reporting agency (police/animal welfare societies);
- miscellaneous category.

Tables 2 and 3 summarise the number of times that these features (*not* number of animals) were reported in the dog and cat, respectively.

Tables 4 and 5 show the number of injuries (again, *not* number of animals), according to their anatomical sites, in the dog and cat, respectively, that caused suspicion or allowed recognition of NAI. (Full

Table 4. Distribution of injuries causing suspicion/allowing recognition of NAI in dogs

	Number of injuries			
	Superficial lesions	Deeper lesions	Fractures/ locomotor injuries	Internal thoraco-abdominal lesions
Head/neck	8	3	6*	–
Eyes	3	1	–	–
Thorax	11	2	5	–
Abdomen	1	3	–	3
Limbs	5	1	2	–
Skin, widespread	2	–	–	–
Miscellaneous†	1	3	–	–
Totals	**31**	**13**	**13**	**3**

*Includes a litter of five puppies with crushed skulls; counted as one case
†Microwave injuries, severe multiple injuries, testicular (kick) injury

Table 5. Distribution of injuries causing suspicion/allowing recognition of NAI in cats

	Number of injuries				
Location	Superficial lesions	Deeper lesions	Fractures/ locomotor injuries	Internal thoraco-abdominal lesions	Intracranial/ spinal conditions
Head/neck	2	3	4	–	3
Eyes	2	–	–	–	–
Thorax	1	1	1	2	–
Abdomen	1	1	–	3	–
Limbs	3	–	5	–	–
Skin, widespread	3	–	–	–	–
Miscellaneous*	–	3	–	–	1
Totals	**12**	**8**	**10**	**5**	**4**

*Tail injuries (burns and dislocation), decapitation

details of *all* injuries will be reported in a separate publication [Munro and Thrusfield 2001a].)

In the majority of reports, the reason for suspecting abuse was a variable combination of features listed in Tables 2 and 3. This variety is exemplified in the descriptions of cases given below (see 'case examples').

The respondents reported that more than one episode of trauma was involved in suspecting or recognising abuse in 46 dogs (20·4 per cent) and 29 cats (17·5 per cent).

Most animals survived, but some died of their injuries or were euthanased because of the severity of their injuries. Table 6 summarises the outcome for the 400 cases reported in section 2. The outcome for cases reported in sections 3 and 4 was not recorded by respondents.

Sexual abuse

Sexual abuse was not included in the questionnaire, but was, nevertheless, reported by some respondents. The number of times this type of abuse featured in dogs and cats is listed under 'Injuries' in Tables 2 and 3, respectively. (A comprehensive account of these cases will be reported in a further publication [Munro and Thrusfield 2001b].)

Munchausen syndrome by proxy (MSBP)

MSBP, first described by Meadow (1977), is a particular type of abuse in which factitious illness is fabricated in a 'proxy', the proxy generally understood to be a child. Again, although this syndrome was not specifically included in the questionnaire, nine possible cases of MSBP, where the proxy was an animal, were identified: six in dogs, two in cats, and one where the species of the animals (over eight in number) was not specified. In six of these cases the respondents had suspected MSBP (four in dogs, one in a cat [Tables 2 and 3, respectively] and the case involving multiple pets). The remaining three were cases in which the features were suggestive of MSBP to the investigators, although the respondents had not identified the syndrome. (All these suspect MSBP cases will form the subject of another publication [Munro and Thrusfield 2001c].)

Firearms injuries

A considerable number of firearms injuries were reported, the large majority being in cats (Table 7). Many reports involved more than one animal.

Section 3

Table 8 summarises the respondents' experience of the putative features of NAI. One hundred and forty-two respondents provided wide-ranging free-text details under 'unexplained injuries'. Respondents were divided in the interpretation of 'unexplained injury'. There were those who classified injuries as unexplained if they occurred without the owner's presence, or if the owner simply said they did not know the cause. For example, several mentioned animals that 'returned home' injured, and others pointed out the independent lifestyle of cats. Twenty-four of the respondents who interpreted unexplained injury in this way considered that a road traffic accident (RTA) or fighting was the likely explanation. Four respondents said it was routine to treat unexplained injuries.

In contrast, others took a narrower view and had a different interpretation. Sixteen, who had previously recorded cases in section 2, used section 3 to specify that they considered that the injuries in their cases had been unexplained. Ten others noted the occurrence of unexplained injuries in housed pets, and one noted a dog which had been alone in a room when the injury happened.

The actual injuries detailed as unexplained were very varied, with no clear emphasis on any particular type, and the contrasting interpretation was again evident, as the following examples illustrate.

'Many injuries seen in small animal practice are "unexplained" (ie they occur when the animal is out of sight). Most of these are cuts/bruises associated with work/play but very few would be suspicious in any way.'

'Cats and dogs with pained and bruised abdomens and rib cage, even in cats with no access to outdoors.'

Eighty-one respondents specified details on 'history not consistent with injury', with the term being generally understood to mean that the history did not fit the injury.The following are examples:

'Burns explained as lying near open fire.'

'Cat supposedly fell off a wall. Extensive bruising and rib fractures. Suspicious of kick.'

'History of enteric disorders but animal bruised and nervous.'

Section 4

One hundred and sixty-seven respondents entered wide-ranging comments, of varying length and content. A summary of those that fell into particular groups follows.

Eleven respondents expressed doubt as to whether cases of NAI would be taken for veterinary attention. Twelve felt that cases would be more likely to be seen at an

Table 7. Number of incidents of firearms injuries

	Dog	Cat	Both dog and cat	Species not specified
Airgun	3	50	2	13
Shotgun	1	4	–	–
Rifle	1	2	–	–
Totals	**5**	**56**	**2**	**13**

Table 6. Outcome of all cases of abuse to the animal (total number of animals in brackets)

Species	Survived	Died	Euthanased because of injuries	Unknown
Dog	164 (225)	33 (225)	18 (225)	10 (225)
Cat	112 (168)	22 (168)	17 (168)	17 (168)
Horse	2(3)	1(3)	–	–
Hamster	1(1)	–	–	–
Rabbit	1(1)	–	–	–

Table 8. Responses to questions in section 3 (percentages in brackets)

Have you seen or experienced any of the following?	Yes	No	No response
Unexplained injuries	206 (51)	162 (40)	36 (9)
More than one fracture, of differing ages, in the animal	74 (18)	295 (73)	35 (9)
Unexplained old rib fractures	97 (24)	269 (67)	38 (9)
History not consistent with injury	107 (27)	244 (60)	53 (13)
Previous history of unexplained injury/death, with same owner/family	49 (12)	315 (78)	40 (10)

animal welfare charity clinic, rather than a private veterinary practice. Five, who specifically worked in clinics run by animal charities, considered they saw more cases of NAI than they would in private practice, and eight stated that they had seen cases because their practices covered patients presented from animal welfare charities. Ten felt that NAI was more common in socially deprived areas, and four (two in 'more affluent' areas and two in small rural communities) felt that their client base minimised the possibility of NAI.

Thirteen commented that they had never knowingly seen NAI, and four felt NAI would only apply to a tiny minority of cases. Five said they suspected that they had missed cases, and a further five that they had seen cases but could not recall specific details. Two mentioned the difficulty of differentiation between a RTA and NAI.

Thirty mentioned that airgun injury, particularly in cats, was a cause for concern.

The remaining replies were individual, did not fall into specific categories, and covered diverse observations. Examples are: approval that research on NAI was in progress; an observation that 'serious violence' would be necessary to cause fractures; a comment that NAI engendered an unspoken (and very frightening) confrontation in practice, and an expression of gratitude from one respondent (who reported three cases) for the opportunity to voice his/her experiences.

Case examples

Case 1

A crossbred dog, aged three to six months, was presented with repeated soft haematoma-like swellings on the top of the head. Clotting factors and other causes were eliminated. The animal recovered when the owner made the lodger leave.

Case 2

A domestic shorthaired, housed male kitten, aged three to six months, was first presented with a fractured femur, having 'woken up' like that. On the second visit, a fractured tibia was found, the owner again claiming that the kitten 'woke up like that'. No bone pathology was present on radiographs.

Case 3

A Labrador dog over two years old had fractures to several major teeth on the buccal side. There was no history of trauma. Local sources suggested that the owner hit his wife on a regular basis.

Case 4

A Labrador puppy, aged three to six months, was presented with a comminuted fracture of the femur. The puppy was most reluctant to return to her owners after hospitalisation. She ran back into the preparation room and, after being brought back, cowered submissively before the male owner. This was a complete behavioural change from a previously happy in-patient.

DISCUSSION

This study shows that 91 per cent of those responding to the questionnaire acknowledge the existence of NAI, and that 48 per cent had either seen or suspected it. The narrow associated CIs indicate that these are precise estimates.

Further reminders were not justified because it is known that they do not increase response rates, either specifically in veterinary studies (Thrusfield and others 1989, 1998) or generally (Barnett 1991).

The BSAVA sampling frame contained over 4000 names. The RCVS Manpower Survey for the year in which the study was conducted (1998) revealed just over 6000 veterinarians involved in small animal work for greater than 50 per cent of their time (out of 9500 general practitioners). Thus, the sampling fraction comprised approximately 64 per cent of predominantly small animal practitioners, which was considered to be a representative figure.

The response rate was 40 per cent. Caution needs to be exercised with response rates less than 70 per cent because there may then be systematic differences between those that do, and those that do not, respond (response bias) (Thrusfield 1997). In this study, it is plausible that veterinarians did not respond because they neither acknowledged nor suspected/saw NAI. Thus, the sample estimates and their associated CIs may be inflated by an indeterminate amount, relative to the true values in the total population of small animal practitioners. Nevertheless, even if all non-responders neither acknowledged nor suspected/saw NAI (which is highly unlikely) the problem would still be perceived as a major one, with a lower threshold of 40 per cent acknowledging NAI and 20 per cent suspecting/seeing it.

It is interesting to compare the features that were reported to cause suspicion, or allow recognition, of NAI, with the diagnostic pointers for children. These pointers include the following (Blumenthal 1994a, Speight 1997, Hobbs and others 1999a):

- discrepant history (eg, changes with telling or from person to person);

- history not consistent with the injury (eg, injury too severe for history offered);
- abnormal appearance or behaviour of the child;
- unusual parental behaviour;
- certain patterns of injury (eg, cigarette burns, finger tip bruising);
- unexplained injury;
- repetitive injury;
- the child may say something.

With the exception of the obvious fact that an animal can never say anything, it is clear there are strong similarities between NAI in animals and children: both include similar features in the history, behavioural observations (owner/parent and animal/child), and certain types of injury, including repetitive injury (Tables 2 and 3). *No single feature is diagnostic; rather, it is a combination that raises suspicion, and this combination is variable.*

Implication of a particular person

It is worth noting that a family member was often implicated by the person presenting the animal for examination, and the owners of 22 dogs and three cats actually admitted harming their pet themselves (Tables 2 and 3). (In five of the cases where an owner was responsible, the respondent specifically mentioned that the admission came after the possibility of abuse was discussed with the owner.) This feature is notably absent from the list of diagnostic pointers for NAI in children.

Features in the history

Violence in the home

Violence against family members was reported as a feature raising suspicion in animal cases (Tables 2 and 3). This is interesting. Society – and the agencies charged with prevention of violence in the home – have traditionally compartmentalised acts of violence in the home into three areas: child abuse, domestic abuse (usually implicitly understood to be acts against women) and animal abuse (Ascione and Arkow 1999). It is therefore unusual, for instance, for a physician investigating a case of suspected child abuse to consider whether violence is also being perpetrated against an adult family member – let alone the family pets. But respondents in this study have cited 21 instances of violence towards people as a feature that aroused suspicion of NAI in their animal patients and, in 19 of these, the violence had been directed towards a family member: 12 women, two children and five described only as 'domestic' (Tables 2 and 3). This is consistent with the study of Deviney and her colleagues (1983), which demonstrated a statistically significant relationship between abuse to children and pets in the same household, and also a survey of womens' refuges in which 38 per cent of abused women reported that their abusers had also injured their pets (Anon 1997).

History inconsistent with injury

The 'explanations' given by owners to account for their pets' injuries merit attention; the similarity to those given by parents is striking. Hobbs and others (1999b) write 'One of the commonest explanations offered for an injury is that the child fell. A history of a fall from an elevated surface or downstairs is commonly encountered.' Parents have also stated that the child 'deliberately stood against radiator' or 'fell into the fire' (Hobbs and others 1999d). In the present study, owners claimed that the animal 'fell downstairs', 'fell off the sofa', 'fell from child's arms', 'fell off the bed', 'fell off the steps', 'sat too close to the radiator', 'lay too close to the fire', or simply just 'fell'. Respondents found these statements somewhat hard to believe. As one respondent noted, 'Cats do not fall downstairs'. Thus, the presentation of injuries that are markedly inconsistent with the history that is given is a major feature of NAI in both children and animals.

Lack of history

When respondents mentioned RTAs, sometimes it was to point out that it was the very fact of the lack of history of a RTA (or, indeed, the possibility of any form of accident) that was suspicious (Tables 2 and 3). For example, one respondent reported an initial assumption that the injuries to a cat had been caused by a RTA, but on the patient's second presentation 10 days later (for a different injury), was astonished to discover that the cat was never allowed out. The owner had no explanation for the injuries and then took the cat, with a third and different injury, to another surgery two weeks later. Respondents were also sometimes of the opinion that the actual injuries were not consistent with a RTA or other accident. One respondent described two cats that had been euthanased with similar injuries (suspected collapsed lungs) over the previous year. Neither cat showed any external injury, nor were the nails broken, and the respondent felt this cast doubt on the possibility of a RTA. Both animals, it was noted, were from the same address. Possibly, the lesson is that, although RTAs are common, especially in dogs allowed to roam freely and cats which are not housebound, it would be prudent not to assume a RTA, particularly in circumstances when some features, on due consideration, may suggest otherwise.

Behaviour of the owner and/or animal

The behaviour of the owner was mentioned as a feature that raised suspicion (Tables 2 and 3). Descriptions included phrases such as ' implausible and aggressive', 'obvious discomfort and embarrassment', 'uneasy', 'reluctant to give history', 'lack of concern', 'angry on questioning' and 'not reacting as expected to news (of a stab wound)'.

Fewer respondents mentioned the behaviour of the animal as causing suspicion (Tables 2 and 3); when it was noted, descriptions such as 'fear of owner', 'dull demeanour', 'became very timid with humans', 'depressed', 'psychological damage' were given. One respondent wrote that, in general, this was a difficult area and that, if the animal appeared happy in the presence of the owner, one tended to assume NAI was unlikely. It may be that this is a general, and possibly a natural, assumption. However, many an animal

welfare officer has felt considerable frustration at the sight of an animal giving a rapturous welcome to an owner known to have been abusive. It would seem that the behaviour of animals proven to have been abused is an area that would benefit from research by specialists in companion animal behaviour.

Injuries

Type of injury

In children, some forms of injury are virtually pathognomonic for abuse. These include the characteristic patterns of fingertip bruising, cigarette burns and lash marks. Retinal haemorrhages, unexplained subdural haematomata and torn lingual frenula are highly suggestive of NAI (Speight 1997). Tables 2 and 3 record that certain types of injury raised suspicions in the present study. This was often because of their association with other features noted by the respondent (eg, a history inconsistent with the injury). For example, one owner who presented a kitten with avulsed nails on all four feet stated that the kitten 'had been dropped into a hot bath', but there were no signs of scalding. The respondent considered that the injury was inconsistent with the history and that the owner's behaviour was suspicious. (Hobbs and others [1999b] describe a similar injury in children, with fingernails or toenails being pulled out.) Sometimes respondents said that the very 'nature' or 'extent' of the injury had caused suspicion. In one such case, a young adult spaniel was presented with fractured ribs, scleral bruising and bleeding from the mouth, and required euthanasia. The dog had not been involved in a RTA, and the owner claimed that the dog had 'fallen downstairs'. When confronted, the owner admitted injuring the dog.

Repetitive injuries

Repetitive injuries (Tables 2 and 3) aroused particular suspicion and this study suggests that they are important. In these cases, either (1) the animal was presented at the surgery more than once with injuries, or (2) different ages of injury were noted at initial examination. Sometimes the initial injury seemed innocent, but suspicions were aroused when the animal was presented again. Some of these animals were presented several times, each time with a different injury. One cat was presented on several separate occasions, with a variety of injuries: twice with a fractured femur (of the same leg), once with a fractured jaw, and on several occasions with scleral haemorrhages. The respondent considered that these repeated injuries were suspicious and noted that the owners were most reluctant to return the cat for postoperative care, although the surgery was within a very short distance of their home. The cat was also very frightened of men. Another respondent reported a series of fractures, occurring over several years, in small pedigree dogs. These ceased when the breeder's husband died, the breeder later admitting that her husband had been responsible.

Multiple occurrences in the same household

Respondents were concerned about the presence of another animal in a given household, which had also suffered injuries, or died (Tables 2 and 3), sometimes in unexplained circumstances. This was a particularly noticeable feature in some feline cases, and often the patients were very young, being under 12 weeks old. One such kitten presented on the first visit with a haematoma on the top of the head. The owner claimed that 'a speaker had fallen on the kitten's head'. On a second visit the kitten was comatose, with fatal head injuries. This time the history given was that the kitten 'just collapsed'. One month later, a second kitten from the same house was presented with severe head injuries and was euthanased. Again the history was one of 'sudden collapse'. Another owner, with an unexplained death of a dog one month earlier, brought a second dog which had conjunctival haemorrhages. There was no history of a RTA and no laboratory evidence of coagulopathy. When presented with these facts the owner said that a boyfriend had shaken the dog.

Socioeconomic class of owners

Some respondents considered that cases of NAI were more common in areas of social deprivation than in more 'affluent' areas, and that animal welfare charity clinics saw more cases than private veterinary clinics (section 4 comments). However, two respondents each reported a case in which the person injuring the animal had a highly educated professional background. There may again be parallels with children. Gillham (1994) states that the parents of physically abused children are more likely to be 'lone or in a "reconstituted" partnership, unemployed or of low socioeconomic status'. Meadow (1997b) agrees, writing that child abuse (using the term in its general sense) 'is more likely in those who are socially deprived and in families without a wage earner', but adding that 'it is important to recognise that it occurs in all layers of society'.

Conclusions

NAI can only be overcome if it is recognised. Many veterinarians are already aware of its existence; this paper documents the features that should be helpful when dealing with animals in which NAI may be a cause of injuries.

Eleven respondents questioned whether cases of NAI would ever be presented at the surgery. This study dispels that belief; it is quite clear that they are.

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