Animal Behavior Case of the Month

This feature is sponsored by the American College of Veterinary Behaviorists. Readers of the *JAVMA* are invited to submit reports, which should include a brief description of a behavioral problem, the evaluation and treatment, and a succinct discussion of the case.

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Statement of the Problem

A cat was examined because of urine marking (spraying) and occasional fights with another cat in the household.

Signalment

The cat (cat 1) was a 4-year-old neutered male domestic shorthair.

History

The owner had owned 3 other cats (13- and 8-year-old spayed female domestic shorthairs [cats 2 and 3] and a 4-year-old neutered male domestic shorthair [cat 4]) when she had obtained this cat 3 years earlier. All cats were kept strictly indoors and were in good health. The owner's primary concern was urine marking of 6 months' duration; the urine marking was severe enough that the owner had considered euthanasia. Cat 1 had no previous history of urine marking and was believed to be the only cat in the household that was marking. It had been observed many times standing with its tail raised, backed up to a vertical surface, and spraying urine. The cat marked at least 15 times per week. Objects sprayed included curtains, windows, computer and stereo components, chairs, a sofa, and, in the garage, the wall near outside air vents. All were vertical surfaces and confined to the ground level floors of the house. There were 2 litter boxes, which were scooped daily and completely changed monthly. All the cats used the litter boxes for urine and feces, and cat 1 reliably covered both. No straining, signs of pain, or blood was seen when the cat urinated. Corrections for spraying were limited to shouting and chasing the cat from the room.

The only contributing factors identified at the onset of spraying were the arrival of several new cats outside and the opening up of cat door access from the house to the unused garage. At this time, cat 1 had begun watching intently out a window overlooking the back yard every night. This window and its curtains were the first places sprayed. Unlike the other household cats, cat 1 would growl and fluff its fur when it saw cats outside.

About this same time, cat 1 began chasing cat 2 for short distances. Cat 2 would turn, hiss, and swat, and cat 1 would usually leave. This occurred in all parts of the house, and twice weekly, it escalated to a fight; neither cat had sustained any injuries from the fighting. Cats 1 and 2 were often together with no reaction, and cat 2 showed no fearful behavior or avoidance of cat 1. Both cats 1 and 2 got along well with the other cats.

Results of a physical examination, CBC, serum biochemical profile, and urinalysis (urine was obtained by cystocentesis) performed a few weeks after the onset of spraying were unremarkable, and bacterial culture of a urine sample did not yield any growth. The owner was advised to provide 3 more litter boxes (without any change in the cleaning schedule) and use an odor elimination product[a] and a synthetic pheromone[b] in previously marked areas. Marking frequency was reduced slightly, but marking was not eliminated. After 2 months, treatment with buspirone (0.92 mg/kg [0.42 mg/lb], PO, q 12 h) was attempted for 2 weeks, along with use of a chemical repellent for outside cats. Little reduction in spraying frequency was seen, and cats 1 and 2 fought more frequently; therefore, treatment with buspirone was discontinued. Two weeks later, treatment with amitriptyline (0.92 mg/kg, PO, q 24 h) was attempted for 2 weeks, but administration was also discontinued because of a perceived lack of effect. Treatment with diazepam (0.37 mg/kg [0.17 mg/lb], PO, q 24 h) was attempted but discontinued after less than a week, because the owner thought that it made the cat drowsy, was ineffective for the spraying, and possibly caused the cat to bite her. After the cat had received diazepam for 3 days, it had become agitated while being petted on the floor, had grasped the owner's hand with its teeth, and then bit the owner's hand and ankle. Both bites punctured the skin but did not require medical care. No other stimuli were identified. The cat had often grasped the owner's hands with its teeth, after lashing its tail, when it was tired of petting, but had not punctured the skin previously. The cat did not grasp the owner with its teeth in any other situations, including while playing or moving. No aggressive or fearful arousal had been seen with pill administration. Results of a urinalysis performed before the day of the behavioral consultation were normal.

Physical Examination Findings

The cat weighed 5.4 kg (12 lb). No abnormalities were detected on physical examination.

Diagnosis

Urine marking was diagnosed on the basis of the cat's typical marking posture (tail raised and backed up to the object being marked), its continued use of the litter boxes for urination and defecation, the fact that urine was deposited only on vertical surfaces, and the potential social significance of targets, such as the

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downstairs windows. Although urine marking is not usually associated with medical conditions,[1] abnormalities have been detected in cats that spray.[2,3] However, cat 1 did not have any evidence of urinary tract or systemic diseases (including polyuria and polydipsia), as determined on the basis of history and results of physical examination, a CBC, a serum biochemical profile, and urinalyses.

Intercat aggression was also diagnosed on the basis of cat 1's agonistic reactions to outside cats and cat 2. Hierarchy, territoriality, fear, and individual distance defense have all been discussed as potential motivations for intercat aggression.[4-8] With the outside cats, no definitive motivation was determined, as confinement indoors prevented direct interactions. With cat 2, the absence of flight made fear less likely as a cause of the intercat aggression.[6] The lack of relentless pursuit combined with the fact that the cats had lived together peacefully for several years made territoriality less likely.[5] Hierarchical issues, an unobserved incident of redirected aggression, or a classically conditioned fearful response to the presence of the other cat could all explain the agonistic behavior.[4] Intercat aggression was left as the diagnosis, because defining the complex social relationships between cats can be difficult.[6]

Differential diagnoses for cat 1 biting the owner included petting-, play-, and fear-related aggression. Petting-related aggression was diagnosed, because the biting only occurred in the context of petting and, although the cat often solicited handling, tail lashing always proceeded the biting. Play aggression was unlikely, as the cat had never bitten while playing and the biting did not initiate with movement. Fear was also unlikely, as the cat had not demonstrated fearful body postures with the owner. Disinhibition of agonistic responses by the diazepam could have accounted for the increased bite force (enough to puncture) and the bite to the ankle,[9,10] as punctures had never occurred before or since the medication, but the greater force of the bites may also have been the result of increased arousal in that particular instance.

Treatment

A comprehensive treatment plan was recommended. Some suggestions that had been made previously were to be implemented more thoroughly, and additional suggestions were made. To maximize the chance for success, particularly in view of the owner's waning tolerance, a decision was made to implement as much of the treatment plan as possible at the same time. Then, if things went well, the modifications that were most difficult to live with could be relaxed on a trial basis.

To remove potential odor stimuli, urine-soiled areas were to be identified and either thoroughly cleaned with a bacterial-enzymatic product[c] or removed. Increased litter box access and hygiene was recommended, despite the absence of inappropriate elimination, because there may be an association between litter box aversion and spraying.[11] Five boxes (at least 1 per floor) were to be provided, and litter boxes were to be scooped daily, with the litter completely changed weekly. Use of the synthetic pheromone was resumed, according to label directions, as it may reduce marking.[3] Previously sprayed areas were made uncomfortable for the cat to posture for spraying (eg, by placing an upside-down carpet runner with the projections up in front of the area) or were changed into areas where the cat would play or obtain treats. Any direct physical or harsh verbal punishment was to be avoided. The owner was instructed that if she saw the cat about to mark, she was to use a spray of water to startle the cat and then redirect the cat to a play object or have the cat perform a pretaught operant behavior for a food reward. This operant behavior was also intended to help reduce any unease the cat might have around the owner resulting from previous punishment.

Aggression directed towards outside cats and their contribution to marking was controlled by deterring cats from the area immediately surrounding the house, thus avoiding visual or olfactory stimuli.[11] Installing a motion-activated sprinkler, covering up any potential toileting areas, and removing any sources of interest, including food, garbage, and bird feeders, were suggested. The windows were covered with paper any place cat 1 might see outside cats, and windows on the ground floors were to be kept closed. Access to the garage was curtailed, and cat 1 was to be restricted to the upper floor at dusk and dawn and during the night.

Desensitization and counterconditioning (DS-CC) was recommended to decrease aggression between cats 1 and 2, with preferred foods used to reward calm, relaxed behavior. First, the cats were to be kept widely separated. Over a period of many sessions, they were moved closer together gradually enough to avoid any signs of anxiety or aggression. The owner was not willing to separate the 2 cats, so avoiding situations where aggression had been seen, along with providing food, treats, or play when they were together, was recommended. As with spraying, early interruption of agonistic interactions and providing an alternative behavior were recommended. Increasing the area available for the cats to visually space themselves and providing abundant cat resources were recommended.[8] Direct or video observation to find out what might precipitate fights was recommended but not done.

Potential serious health consequences of cat scratches and bites and how to identify and safely handle cat 1 when it was aggressively aroused were discussed.[12] For petting-related aggression, early signs of agitation were described, and the owner was advised to avoid all situations that involved cat 1 placing its mouth on her or direct play with hands and feet. The only petting was to be done in structured DS-CC sessions. Treats were to be paired with increasing, but initially very low, levels of petting. Only calm, relaxed behavior would be rewarded, and DS-CC was to be done in a location where the cat could move away.

Paroxetine (0.92 mg/kg, PO, q 24 h), 1 of several medications suggested for urine marking and certain types of intercat aggression,[1,6,10,13] was prescribed to reduce cat 1's reactivity to social and environmental stimuli. Treatment for 4 to 5 months as a supplement to the treatment plan was recommended, with the dosage to be slowly tapered after the cat's behavior had improved. The fact that this was an extralabel use and

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the potential adverse effects of paroxetine were discussed. A selective serotonin reuptake inhibitor was chosen as a distinct class from medications previously used. Paroxetine has a fast rate of onset and is relatively inexpensive when used in cats. Buspirone, which was used in this cat for an inadequate time,[6] could have caused a detrimental change in cat 1's social interactions with cat 2.[1] Although amitriptyline had not been administered for a sufficient time,[14] it also had been ineffective. Diazepam was not chosen because of the potential increased risk of biting. Cat 2 was not given any medication, as this cat did not show fearful reactivity.

Follow-up

The owner reported by telephone 6 weeks later that she had seen only 2 new urine marks during the previous month. She had been working on the treatment plan and was pleased with the result. She was successfully keeping outside cats away from the house, and cat 1 was not as intent on staring out the windows, so she had just removed the papers from the windows. No adverse effects associated with the medication were seen. The owner had completely avoided having cat 1 grasp her with its teeth, and no fights between cats 1 and 2 had been seen.

After 7 months, the owner reported that urine marking was no longer detected and that there was no aggression while cat 1 was being petted. New furniture was not marked. The owner was no longer doing formal DS-CC sessions between cats 1 and 2. Cat 1 still chased cat 2, but this was observed less than once monthly, and no fights had been seen. Cat 1 had gained a small amount of weight. The serious consequences if cat 1 again began to mark, the upcoming spring season when marking had first begun, and the lack of adverse effects were cited by the owner as reasons why she wanted to continue paroxetine treatment for a few more months. The unknown safety of longer-term use was discussed, and a follow-up CBC and serum biochemical profile were recommended but declined. The owner was reminded to taper the dosage of paroxetine slowly over several weeks[15] and to attempt to minimize triggers for marking during the withdrawal period. Regarding aggression towards cat 2, the owner felt that neither cat was harmed by the fights and was content to have the situation remain unchanged.

[a]Outright Pet Odor Eliminator, The Branton Co, Dallas, Tex.
[b]Feliway, Abbott Laboratories, North Chicago, Ill.
[c]Anti-Icky-Poo, MisterMax Quality Products, Lakeside, Calif.

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