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Case Report

Status-related aggression, resource guarding, and fear-related aggression in 2 female mixed breed dogs

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ABSTRACT

Two household dogs, a 2 year, 8-month-old, spayed female, mixed-breed dog, and a 4 year, 1-month-old, spayed female, mixed-breed dog, presented with a history of aggression toward each other, when in possession of food or other high-value items, and when one approached the other while resting. They responded satisfactorily to treatment with serotonergic drugs, avoidance of provocative situations, and environmental and behavioral modification.

Presentation

KF was a 2.7-year-old, spayed female, 14.5-kg, mixed-breed dog, and LF was a 4-year-old, spayed female, 16.3-kg, mixed-breed dog. KF and LF were presented by their owners for aggression between them when in possession of food or other high-value items, and when LF approached KF while resting.

History and presenting signs

KF was adopted from the local Society For The Prevention Of Cruelty To Animals at 1.5 years of age, and LF was adopted from a local rescue organization at 1 year of age. They lived with their owners, Ms. F. and Mr. Y., and 2 other dogs in a city apartment with 4 rooms (bedroom, living room, dining room, and kitchen). The other 2 dogs living in the apartment were CF, a 7-year, neutered male, mixed-breed dog obtained at the age of 2 years and JF, a 3-year, spayed female, mixed-breed dog obtained at 6 months. CF and JF did not show aggressive interactions between them or toward KF and LF. Historically, all dogs had free access to all the rooms in the apartment. After KF was acquired, there had not been changes in the household. The dogs were walked on a leash outside 3 times per day. The average length of these walks was about 20 minutes.

The owners reported that, although LF had historically growled at the other household dogs around food or other items perceived as highly valuable by her (rawhide, real bones, toys, stolen objects …). KF and the other dogs typically responded by lowering their bodies and moving away and such behavior had not led to fights before the incidents described. The owners also described how KF was often "rough" when playing with the other dogs, jumping on and sometimes mounting them, and attempting to continue the interaction when the other dogs disengaged. This aroused interaction did not escalate into aggression and did not require the intervention of the owners to be interrupted.

Starting approximately 4 months before the behavior appointment, KF had been staring, growling at and attempting to bite LF when near food or toys, or when LF approached her while she was resting. The first incident of aggression between KF and LF that led to a bite occurred 1.5 months before presentation. According to the description provided by the owners, KF and LF were under the dining room table, whereas CF and JF were under the chairs occupied by the owners, when a piece of food dropped. KF displayed piloerection and, with ears forward, stared and lunged at LF, biting her face and neck without breaking the skin. Mr. Y. promptly interrupted the aggressive interaction by yelling "no." He detected

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no serious injuries during a visual inspection of the dogs. CF and JF were alert during the aggressive interaction between KF and LF but remained under their respective chairs. Since this incident, the aggressive behavior had escalated in both frequency and intensity.

A second incident occurred 5 weeks before the behavior consultation. LF, CF, and JF were resting on the bed together with the owners. When KF jumped on the bed, LF was startled and stared at her. KF stared back and, a few second later, KF lunged at LF and engaged in a fight. CF and JF jumped off the bed and left the bedroom. KF and LF bit each other several times. The owners separated the 2 dogs by grabbing and pulling on their bodies. During this interaction, KF bit Mr. Y. in his hand without breaking the skin. LF suffered bite punctures on her face, leg, and eyelid. KF had punctures on her leg and face. After separation, KF was confined to her crate in the dining room. A veterinarian was seen to treat the injuries.

One final incident occurred a month before the consultation, at dinnertime, in circumstances very similar to the first incident described. Also in this case, KF and LF were under the table, while CF and JF were around the table. The owners were not able to confirm if some food had dropped but described that KF stared at LF and stiffened, and then the 2 dogs lunged at each other, snarling and biting. Mr. Y. grabbed KF by her body and pulled her away, while Ms. F. picked LF up. This intervention of the owners did not interrupt the aggressive behavior of KF, who kept trying to reach LF and bit Mr. Y.'s hand, breaking the skin and causing punctures that did not require hospitalization. Both dogs suffered multiple punctures from bites on their face and body that required veterinary treatment. KF was confined to her crate after this incident.

After such incidents, LF showed progressively more fear and wariness around KF. The latter was likely to initiate an aggressive interaction with LF when she was excited, barking, and running around, if off leash, or jumping, if on leash (e.g., before going for a walk). This aggressive display could trigger an aggressive response from LF, if the 2 dogs were in proximity and unrestrained. In an effort to correct KF's aggression and excitability, the owners had tried verbal and physical corrections (staring at the dog, growling at the dog, rolling the dog on his back and holding down ("alpha rolls"), holding the dog on her side, yelling "no," leash corrections), with no effect. Since the aggression between KF and LF had developed, KF was kept in a crate in the dining room and LF was kept in the bedroom behind a closed door when not supervised by the owners. KF and LF spent time in these areas also when not confined, and did not show signs of anxiety when confined. CF and JF tended to stay away from KF since her aggressive behavior had escalated.

When the owners were at home, all the dogs tended to stay nearby; in particular, KF spent more time in proximity of Mr. Y than the other dogs. Both dogs frequently jumped to seek interaction and contact with the owners. However, according to the owners, the proximity of a dog to one or both owners, or receiving attention from the owners, was not a specific trigger of aggression between KF and LF. Aside from the incidental redirected aggression showed toward Ms. Y. when attempting to separate KF and LF during a fight, the 2 dogs did not show signs of aggression directed to the owners.

Before the behavior appointment, KF and LF did not receive formal training classes. The owners had taught them basic verbal cues, such as "sit," using operant conditioning with intermittent reinforcement. Both dogs responded reliably when not excessively aroused, and did not show aggression over treats used as reinforcement.

KF's and LF's medical histories were unremarkable.

Behavioral, physical, and laboratory evaluation

KF and LF were kept on separate leashes during the appointment. Both Ms. F. and Mr. Y. were present, each one holding on one of the dog's leash. KF was active and playful, whereas LF was more vigilant, continually monitoring KF. At one point when 2 toys were offered, the dogs stared at each other and then KF barked and lunged at LF. The toys were removed. Physical examination, including a neurologic and orthopedic assessment, complete blood count, serum chemistry, and urinalyses for both dogs were unremarkable (Tables 1-6). No source of pain was found. LF's laboratory tests showed a mild increase of serum gamma-glutamyl transpeptidase (GGTP) and presence of moderate triple phosphate crystals in the urine. Both findings were considered clinically insignificant because they were not associated with specific clinical signs and/or other hematological or biochemical alterations (Stockham and Scott, 2008a, 2008b).

Diagnoses

Aggressive interactions between household dogs may be the result of fear, social status conflict, resource guarding, inappropriate social skills, and orthopedic pain or other medical problems. Its progression may be also influenced by the outcome of past aggressive interactions, including the response of the owner (De Keuster and Jung, 2009; Landsberg et al., 2013a; Mertens 2002; Overall 2013a).

In KF's case, aggression was consistent with status-related aggression (i.e., aggression due to social status conflict)—which can include resource-guarding behavior—because the aggression was associated with control over resources and had progressed from submissive body postures to overtly aggressive over time. Several factors may have contributed to this progression, including KF becoming socially mature, repeated exposure to punishment, and sensitization to contexts in which LF was present (Landsberg et al., 2013a; Mertens 2002; Overall, 2013a). The lack of a clear social hierarchy in group of dogs, together with the potential influence of factors other than social status in the development of aggression between dogs of the same group, has made some authors questioning the appropriateness of "dominance aggression" or "status-related aggression" as diagnostic categories (Bradshaw et al., 2009; De Keuster and Jung, 2009; Miklósi, 2015). Fear-related aggression was considered as a differential diagnosis for KF. However, it was determined that the primary problem for KF was status-related aggression because of the repeated contexts associated with both resources and excitement, and the absence of posturing consistent with fear (Landsberg et al., 2013a; Mertens 2002; Sherman et al., 1996).

The aggression that LF historically showed toward KF was diagnosed as resource guarding, based on the aggressive behavior that she exhibited toward any dog that approached when she had a

Table 1
Complete blood cells count (CBC) of patient KF

Test	Reference range	Result
Red blood cells	4.8-9.3 × 10^6/μL	7.07 × 10^6/μL
Hemoglobin	12.1-20.3 g/dL	16.1 g/dL
Hematocrit	36%-60%	45.7%
MCV	58-79 fl	65 fl
MCH	19-28 pg	22.8 pg
MCHC	30-38	35.2 g/dL
Platelet count	170-400 × 10^3/μL	383 × 10^3/μL
White blood cells	4.0-15.5 × 10^3/μL	7.8 × 10^3/μL
Neutrophils	2060-10,600	4212
Lymphocytes	690-4500	2886
Monocytes	0-840	234
Eosinophils	0-1200	390
Basophils	0-150	78

MCV, mean corpuscular volume; MCH, mean corpuscular hemoglobin; MCHC, mean corpuscular hemoglobin concentration.