The Veterinary Journal 201 (2014) 189–195

Contents lists available at ScienceDirect

The Veterinary Journal

journal homepage: www.elsevier.com/locate/tvjl

Infectious diseases in large-scale cat hoarding investigations

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ARTICLE INFO

Keywords:
Dermatophytosis
Hoarding
Streptococcus equi subsp. *zooepidemicus*
Tritrichomonas
Upper respiratory infection

ABSTRACT

Animal hoarders accumulate animals in over-crowded conditions without adequate nutrition, sanitation, and veterinary care. As a result, animals rescued from hoarding frequently have a variety of medical conditions including respiratory infections, gastrointestinal disease, parasitism, malnutrition, and other evidence of neglect. The purpose of this study was to characterize the infectious diseases carried by clinically affected cats and to determine the prevalence of retroviral infections among cats in large-scale cat hoarding investigations. Records were reviewed retrospectively from four large-scale seizures of cats from failed sanctuaries from November 2009 through March 2012. The number of cats seized in each case ranged from 387 to 697. Cats were screened for feline leukemia virus (FeLV) and feline immunodeficiency virus (FIV) in all four cases and for dermatophytosis in one case. A subset of cats exhibiting signs of upper respiratory disease or diarrhea had been tested for infections by PCR and fecal flotation for treatment planning.

Mycoplasma felis (78%), calicivirus (78%), and *Streptococcus equi* subspecies *zooepidemicus* (55%) were the most common respiratory infections. Feline enteric coronavirus (88%), *Giardia* (56%), *Clostridium perfringens* (49%), and *Tritrichomonas foetus* (39%) were most common in cats with diarrhea. The seroprevalence of FeLV and FIV were 8% and 8%, respectively. In the one case in which cats with lesions suspicious for dermatophytosis were cultured for *Microsporum canis*, 69/76 lesional cats were culture-positive; of these, half were believed to be truly infected and half were believed to be fomite carriers. Cats from large-scale hoarding cases had high risk for enteric and respiratory infections, retroviruses, and dermatophytosis. Case responders should be prepared for mass treatment of infectious diseases and should implement protocols to prevent transmission of feline or zoonotic infections during the emergency response and when transferring the rescued cats to other shelters or to adopters.

Introduction

Animal hoarding is a complex human and animal welfare issue that exists in almost every community. Hoarding cases can involve dozens to hundreds of animals, dead and alive, living in squalid conditions (Patronek, 2001). Suspected hoarding cases frequently come to public attention when individuals amass large numbers of animals with good intentions, but lack capacity for providing minimal standards of care (Lockwood, 1994).

While the true prevalence of hoarding is unknown due to the social isolation of hoarders, dismissive responses by potential reporters, and a lack of legal investigative authority or motivation to pursue hoarding cases, an estimated 700–2000 new cases are reported per year (Patronek, 1999). Hoarding occurs among individuals as well as those operating animal shelters, sanctuaries, and rescue groups (Miller and Zawistowski, 2012).

Hoarding conditions are often characterized by an accumulation of animal waste, carcasses, elevated ammonia levels, and garbage, leading to compromised animal welfare and health (Campbell and Robinson, 2001). Animals can be found in overcrowded conditions without provision for adequate food, water, sanitation and veterinary care. As a result, animals seized from hoarding situations frequently suffer from a variety of medical conditions including respiratory infections, diarrhea, parasitism, and skin diseases (Patronek, 2008; Reinisch, 2009).

Legal and humane interventions in large-scale cases can be procedurally cumbersome and costly, often requiring a multi-faceted response involving representatives from animal control, humane societies, veterinary medicine, public health, code enforcement, social services, and law enforcement (Patronek, 2001). When the number

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http://dx.doi.org/10.1016/j.tvjl.2014.05.020
1090-0233/

of animals and the severity of conditions exceed the response capacity of local agencies, a collaborative effort between local and national agencies is often required (Lockwood, 1994).

Responses to suspected large-scale cruelty cases often consist of both forensic and animal rescue components. During the animal rescue, animals are often triaged onsite and then transported to a temporary shelter to await their legal disposition. If the owner loses legal custody of the animals, they might be adopted, transferred to other agencies, or euthanased. Historically, the high prevalence of infectious diseases and lack of socialization of cats seized in large-scale cases often resulted in mass euthanasia in shelters already crowded by pet overpopulation.[1,2] In recent years, responding agencies have invested in the physical and behavioral rehabilitation of seized animals to reduce their euthanasia.[3] This has increased the number of animals eventually placed in homes and the cost of intervening in suspected cruelty cases. The costs have exceeded $1–2 million[4] in the largest cases.[5,6]

Medical conditions complicate the long-term sheltering and adoption of seized animals. Infectious diseases pose a risk to other animals in the shelter and potentially to pets in the community. Some infections could have zoonotic risk to both shelter staff and potential adopters. Knowledge of conditions commonly present in large-scale cruelty investigations would assist with planning for the care of seized animals, including ordering of medical supplies, preparation of shelter protocols, and eventual placement of the animals. Although media reports frequently cite high disease rates from such cases, there are no detailed descriptions of diseases diagnosed in cats seized in cruelty investigations.[5,7]

From November 2009 through March 2012, more than 2000 cats were removed from four cat sanctuaries following reports consistent with animal hoarding. In each case, veterinarians performed intake examinations and screened for infectious diseases as needed to guide treatment decisions for ill cats and to segregate infectious cats housed in temporary shelters. The purpose of this study was to examine the available records of cats removed during the four large-scale cruelty investigations to characterize the infectious diseases of cats with respiratory and gastrointestinal signs and to determine the prevalence of retroviral infections.

Materials and methods

Cat sanctuaries

Case 1

In November 2009, 594 cats were relinquished from a cat sanctuary in Florida following a site assessment that revealed high rates of disease and mortality. The majority of cats were group-housed in indoor/outdoor wire mesh pens. Cats under treatment were housed in a barn in plastic airline carriers. Following relinquishment, cats were examined and sheltered on-site for several weeks pending disposition.

Case 2

In June 2010, 387 cats were relinquished from a Pennsylvania cat sanctuary after an inspection revealed the cats to be housed in overcrowded and unsanitary conditions on the first floor of a two-story commercial building. The majority of cats were group-housed indoors. Following relinquishment, cats were transported to a temporary shelter established at a nearby fairground for intake examinations. There they were housed in stacked wire crates for several weeks pending disposition.

Case 3

In June 2011, 697 cats were seized from a cat sanctuary in Florida. Cats were group-housed in outdoor community pens, barn pens, travel trailers, or indoor wire crates. Cats were transported to several air-conditioned warehouses where intake examinations were performed. Cats were housed in stacked wire cages in the temporary shelter for approximately 3 months until disposition.

Case 4

In February 2012, 696 cats were seized from a Florida cat sanctuary. The majority of cats roamed freely outdoors, with a few dozen housed in pens or trailers designated for diseased animals. Movement of cats among the various housing areas was unrestricted. Cats were triaged in the field and those in critical condition were taken to animal hospitals for care. Cats healthy enough for transport were relocated to a vacant animal shelter where they received intake examinations. The cats were then group-housed two to four per indoor/outdoor run or in individual cages until disposition approximately 6 months post-seizure.

Intake examinations

Intake examinations were performed on all cats on-site at the sanctuary (case 1) or upon arrival at the temporary shelters (cases 2–4). Intake protocols varied between the four cases but all included a physical examination that documented each cat's estimated age, breed, sex, weight, and body condition score. The presence of illness or injuries was recorded.

Cats were photographed, vaccinated, treated for internal and external parasites, and blood was collected for retroviral testing. Specimens were collected from a subset of the cats exhibiting signs of respiratory (ocular or nasal discharge, sneezing, coughing, conjunctivitis, or blepharospasm) or gastrointestinal (diarrhea) disease. The criteria for performing diagnostic testing varied between cases and were based on the participating agency's medical protocols and the decisions made by the supervising veterinarians.

Respiratory specimens were collected at the time of intake examination. Fecal specimens were usually collected during the first 5 days of housing at the temporary shelters when diarrhea was observed. A small subset of 15 cats from case 4 were sampled 14 days post-intake to the temporary shelter due to persistence of diarrhea despite anti-parasite treatments (pyrantel pamoate, praziquantel, ponazuril) administered during the intake examination.

Serological testing

In all cases, cats were tested for feline leukemia virus (FeLV) antigen and feline immunodeficiency virus (FIV) antibody with a commercially available ELISA (SNAP Feline Triple Test or SNAP Combo Test, IDEXX Laboratories) using whole blood. Testing for *D. immitis* antigen (SNAP Feline Triple Test, IDEXX Laboratories) was performed in the majority of cats 7 months and older in two of the four cases.

Testing of cats with respiratory disease

Diagnostic specimens from cats with signs of respiratory disease were collected by swabbing the conjunctiva for PCR detection of pathogens. One specimen was collected by rolling a dry polyester swab (Fisherbrand, Thermo Fischer Scientific) in the ventral conjunctival sac and a second swab was collected by rubbing a dry swab around the oropharynx. The paired swabs from each cat were placed together in a sterile dry polystyrene vial for pooled analysis and labeled with pertinent specimen identification information such as specimen collection date, animal identification, and agency name. Fresh latex gloves were worn during specimen collection for each cat and the vial containing the paired swabs was placed in an individual plastic self-sealing bag to reduce cross-contamination prior to testing. The specimens were stored at 4 °C pending analysis within 72 h of collection by a commercial reference laboratory (Feline Upper Respiratory Disease RealPCR Panel, IDEXX Laboratories).

Respiratory specimens were tested by real-time PCR for feline herpesvirus type 1 (FHV) glycoprotein B (*gB*) gene, S66371; feline calicivirus (FCV) ORF 1 gene, AF109465; influenza virus H_1N_1 type A influenza hemagglutin HA gene, GQ229373; *Streptococcus equi* subspecies *zooepidemicus* (SEZ) AroA, 3-phosphoshikimate 1-carboxyvinyltransferase gene, FM204884; *Bordetella bronchiseptica* hemagglutinin fusion protein gene (*FhaB*), AF140678; *Mycoplasma felis* single-stranded rRNA-internal transcribed region 1 (ITS-1) gene, AF443608; and *Chlamydophila felis* outer membrane protein A (*OmpA*) gene, AP00686. Real-time PCR was performed with seven quality controls, including PCR-positive controls, PCR-negative controls, negative extraction controls, DNA pre-analytic quality control targeting the host 18S rRNA gene complex, RNA pre-analytic quality control targeting the host 18S rRNA gene complex,

[1] See: http://www.examiner.com/article/85-pets-removed-from-hoarder-70-euthanized (accessed 14 May 2014).
[2] See: http://www.wyomingnews.com/articles/2010/02/08/featured_story/01top_02-08-10.txt (accessed 14 May 2014).
[3] See: http://www.aspca.org/about-us/press-releases/aspca-opens%20behavioral-rehabilitation-center-help-animal-victims-cruelty (accessed 14 May 2014).
[4] $1 = approx. £0.59; €0.73 as at 17 May 2014.
[5] See: http://www.gainesville.com/article/20120329/ARTICLES/120329495 (accessed 14 May 2014).
[6] See: http://www.huffingtonpost.com/ed-sayres/hundreds-of-caboodle-ranc_b_1747467.html (accessed 14 May 2014).
[7] See: http://www.jsonline.com/199430911.html (accessed 14 May 2014).