Feline Upper Respiratory Syndrome

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Feline upper respiratory infection (URI) is perhaps the most frustrating illness facing shelter veterinarians, managers and staff. Many cats are chronically infected, vaccines are partially effective at best, and specific treatments are limited. URI is very easily spread by fomites or droplet transmission, and some URI agents are resistant to disinfection. Factors such as overcrowding, poor air quality, poor sanitation, stress, concurrent illness, parasitism, poor nutrition, and other causes of immunosuppression predispose to disease, and many of these factors are difficult or impossible to completely eliminate in a typical shelter, cattery or rescue home.

In spite of these challenges, some shelters and catteries clearly suffer less from URI than others. Although URI can never be totally eradicated, the frequency and severity of cases can be greatly reduced through a systematic management strategy. Focusing on treatment rather than prevention will result in frustration. Instead it is more prudent to concentrate on reduction of overcrowding, effective cleaning and stress control.

Specific agents most commonly associated with URI

Any of the agents listed below can be a primary cause of URI. Approximately 80-90% of cases are most likely caused by one of the two viruses listed. However, environmental factors and animal immune status play an equally important role in causing actual disease; all the pathogens listed below can also be found in clinically healthy cats.

1. Feline Herpesvirus-1 (FHV-1 - probably the most common)
2. Feline Calicivirus (FCV - perhaps not as common as herpes, but potentially more severe)
3. Chlamydophila felis
4. Mycoplasma spp.
5. Bordetella bronchiseptica

Diagnosis

Most often, a causative agent is not identified in individual cases of URI. Sometimes a best guess can be made based on clinical signs: FCV is more likely to be associated with oral ulceration or limping, FHV-1 is more likely to cause keratitis or corneal ulceration. However, all can cause overlapping signs of URI as well as be isolated from clinically normal cats. Preventative measures (and treatment) tend to be the same for all causative agents. However there are circumstances under which laboratory diagnostics have value. Diagnostic options include viral and bacterial culture and PCR on conjunctival or oropharyngeal swabs (and occasionally other samples, such as tracheal washes or lung tissue). Samples should be obtained from the most prominently affected location. Some circumstances under which diagnostic testing should be considered:

- Unusual signs, severity or frequency of disease in a population of cats
- Legal issues (e.g. hoarding investigation, liability concerns)
- Detect carriers (e.g. low turnover shelter that has recurrent severe disease)
- Individual cat that has not responded to empirical therapy, especially before initiating expensive or risky treatment.

Idexx laboratories now offers a diagnostic PCR panel to look for the five common pathogens listed above (http://www.idexx.com/animalhealth/laboratory/realpcr/tests/furd.jsp)

Prevention of feline URI

Population management

Crowding and the attendant stress is undoubtedly *the single greatest risk factor* for severe respiratory (and other) disease outbreaks in populations. Increased population density leads to a greater risk of disease introduction, higher contact rate, reduced air quality, and often, compromises in housing and husbandry. Unfortunately, crowding in shelters is not uncommon, either due to insufficient facilities to provide even minimal care for the stray population, or (as is increasingly common) a well-intended attempt to decrease euthanasia by housing more animals. Tragically, such efforts may not only fail to improve the number of animals adopted, they may actually lead to increased disease and death[1]. Even in a boarding facility or vet clinic, it is important to anticipate times of peak population, recognize that these will be periods of increased risk for respiratory disease outbreaks, and plan sufficient additional staff so that husbandry is not compromised.

We now know that having fewer than 5% of cats develop URI in shelter care is an achievable goal. Because of its close association with herpesviral activation and stress, URI is also a bellwether for overall shelter cat health and wellbeing. We cannot provide a humane, safe sheltering experience for cats if a substantial fraction develop illness in our care. Conversely, the measures necessary to control URI can have a widespread impact on overall cat comfort, well-being and even likelihood for adoption. The fear is often raised that housing fewer cats at any one time will result in an increase in euthanasia, but this is not the case. The number of feline lives

saved in a community depends on the number of adoptions and/or reduction of intake by preventing unwanted births or keeping cats in homes. Neither of these numbers will be positively affected by an overcrowded shelter. On the contrary, URI has been linked to higher stress, increased risk for euthanasia and lower save rates on both an individual cat and population level. A shelter full of healthy cats will expend less on medical care, very probably see an increase in adopter interest, and have more resources for prevention that otherwise might have gone into medical care of animals with shelter-acquired illness. Adoption promotions can be planned around predictable surges in intake (such as kitten season) or around special events, rather than implemented only in response to crowding.

An underappreciated strategy for respiratory disease prevention is to simply reduce the amount of time each cat spends in the shelter environment. Length of stay has been shown in several studies to be a significant risk factor for development of feline URI. Reducing length of stay may not be possible (or desirable) in a boarding facility or vet hospital, but management practices that increase length of stay for shelter cats should be carefully assessed to ensure the benefit of these practices outweighs the risk of disease they may create. This could include routine quarantine of apparently healthy animals, delays created by backlogs in behavior assessment or surgery, or failure to move cats to public-viewing areas of the shelter as soon as they are available for adoption. Increased time for each cat in the shelter also contributes substantially to increased crowding with all the associated risks.

Stress reduction

Because clinical signs and shedding of FHV-1 are activated by stress, reduction is crucial to feline URI control. Even moving cats from cage to cage is enough to induce reactivation in some cats. Key control measures for feline URI are "Spot Cleaning" where possible and substantially increasing cage size. Providing hiding places, decreasing noise exposure, using the same familiar staff, and providing toys and scratching surfaces are also important to relieve feline stress. Unnecessary aversive handling should be minimized – the theoretical benefit of interventions that involve handling or forceful medication must be weighed against the certain stress these procedures cause.

Feline socialization programs can be helpful in relieving stress but must be implemented and monitored with care. Being removed from a cage, cuddled by a stranger and carried to an unfamiliar room to play may provide welcome relief from boredom for some cats, but may be highly stressful for others, as well as serving to efficiently spread disease. However, it is likely that most fomite transmission of pathogens occurs by staff during cleaning procedures *not* the public.

Vaccination

Vaccination does not prevent infection or development of a carrier state for any URI pathogen, and many strains of feline calicivirus are vaccine resistant. At best, vaccination reduces severity and duration of disease. Vaccines should be given immediately upon shelter entry for best effect, or at least one week prior to entry for boarding kennels and catteries.

Modified live (MLV) parenteral vaccines are available containing feline herpesvirus, feline calicivirus and feline panleukopenia (FVRCP). Intranasal MLV two-way (FVRC) or three-way (FVRCP) vaccines are also available. Modified live vaccines are generally preferred for the more rapid protection induced (5-7 days parenteral, 3-5 days intranasal). However, modified live vaccines (especially intranasal) may cause mild clinical signs. In shelters that euthanize cats for any sign of URI, the risk of these mild signs must be weighed against the likely benefits of modified live vaccines.

Because URI and panleukopenia vaccines are generally delivered in combination, this is a consideration in vaccine selection. Panleukopenia is recognized with increasing frequency throughout the US, and the superior protection provided by the MLV parenteral vaccine against this disease makes it the best choice in most situations. No data has been published regarding the efficacy of combining SQ modified live with an intranasal modified live vaccine for herpes/calici, although the possibility exists that administration by both routes simultaneously would provide superior protection.

A MLV *Bordetella* vaccine for cats is available, but is not generally recommended for shelters except when repeated problems are demonstrated by laboratory diagnostics. However, several shelters have reported success in decreasing kitten deaths due to *Bordatella* pneumonia when using this vaccine. Killed and modified live vaccines are available for *C. felis* (often given in combination with FVRCP). This vaccine is not generally recommended, as it has a short duration of effect, is only partially effective, and may have a relatively high frequency of adverse reactions. Frequent recognition of clinical *Bordetella* or *Chlamydophila* in cats is often an indicator of overall husbandry problems, and prevention should focus on improvement of environmental management, rather than control of these agents specifically. For more information on vaccination for feline URI, see the American Association of Feline Practitioners (AAFP) 2008 Vaccine Guidelines, available online. This document includes specific recommendations for shelter cats.

Disinfection

Most URI pathogens survive in the environment no more than a few hours (FHV-1) to a few weeks (*Bordetella*) and are inactivated by routinely used disinfectants. Feline calicivirus is a notable exception, and may survive for up to a month or even longer in dried discharge. FCV is inactivated by household bleach (5% sodium hypochlorite) diluted at 1:32, or by potassium peroxymonosulfate (Virkon® or Trifectant®). Hand sanitizers containing 60-90% ethanol and propanol are more effective than other alcohols. Since the stress and fomite transmission associated with cleaning a typical box style single cat cage may outweigh the benefit of thorough disinfection, cages should be spot-cleaned while cats are in residence, and thoroughly cleaned, disinfected and dried between residents.

Isolation

Many cats shed URI pathogens without showing clinical signs, hence the need for careful hygienic precautions even when handling apparently healthy cats. Cats with active signs of infection are likely to be shedding much greater amounts, and isolation of these cats from the general population is a requirement for even a minimal disease control program. Many cats are still shedding increased amounts for a few weeks following recovery. Although not always practical, ideally these cats will not be mixed directly back into the general population, or at least not with vulnerable populations such as kittens or recent arrivals.

Monitoring and population management

Countless dollars, hours and endless heartache are spent in efforts to control URI in shelters, yet we often rely solely on vague clinical impressions to determine whether our efforts are justified by the result. We would never think of doing this with an individual patient. Before even starting treatment, baseline measurements are taken to determine the initial condition. These include qualitative observations and quantitative measures such as temperature, pulse, CBC and blood chemistry results. Even in the most constrained circumstances, we would not think of initiating treatment without at least performing a thorough physical exam, and in all but the most minor cases we recheck baseline values to ensure response to treatment.

Just as we do for the individual patient, we need measures to monitor the success of our "population treatment plan". Although this sounds simple enough, this crucial aspect of population disease control is often overlooked. As in the individual patient, we need both quantitative and qualitative information: how many cats are sick (out of how many at risk), for how long, how bad is it, what are the prevailing signs? Population management by keeping statistics and conducting daily population rounds will help tremendously in lessening shelter caused feline URI.

References

Gourkow, N., Factors affecting the welfare and adoption rate of cats in an animal shelter. 2001, University of British Columbia.

Klahn, S., et al. Factors Related to Feline Respiratory Disease Complex In An Open Admission Shelter. in Merck/Merial National Veterinary Scholar Symposium. 2005. Baton Rouge, Louisiana

Borrud, H. and T. Prophet, No Kill Movement Killing Some Pets, in Victorville Daily Press. 2007: Victorville, CA.

Scarlett, J.M. Upper respiratory tract infections in cats in animal shelters. in Cornell Feline Symposium. 2003. Ithaca, NY.

Bannasch, M.J. and J.E. Foley, Epidemiologic evaluation of multiple respiratory pathogens in cats in animal shelters. J Feline Med Surg, 2005. 7(2): p. 109-19.

Gaskell, R.M. and R.C. Povey, Experimental induction of feline viral rhinotracheitis virus re- excretion in FVR-recovered cats. Vet Rec, 1977. 100(7): p. 128-33.

Scott, F.W., Virucidal disinfectants and feline viruses. Am J Vet Res, 1980. 41(3): p. 410-4.

Eleraky, N.Z., L.N. Potgieter, and M.A. Kennedy, Virucidal efficacy of four new disinfectants. J Am Anim Hosp Assoc, 2002. 38(3): p. 231-4.