

USING WHAT WE KNOW ABOUT FELINE UPPER RESPIRATORY TRACT DISEASE COMPLEX

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Feline Upper Respiratory Disease Complex (FURDC) is a disease borne, for the most part, of stress and overcrowding. FURDC is seen most commonly in shelters, rescues, multi-cat households, catteries or in cats who have just come from any of the above environments. In general, it is a problem best approached from a population medicine perspective with prevention as the goal. Populations may be found almost anywhere FURDC is present and vice versa. If you care about FURDC, you care about population medicine and “herd health”.

While respiratory disease in most house cats resolves relatively easily and often without treatment, FURDC is the second most common reason for euthanasia in shelters. Many cats develop chronic sequellae. In a large proportion of shelters it is endemic. In some, disease is almost inevitable.

FURDC has many potential impacts on adopters’ pets and private practices that work with shelters and rescue groups as well as the groups themselves. Because the population of cats in most communities still far outnumbers the adoptive homes available, many newly adopted cats come from overcrowded environments incubating or shedding infectious disease. Many cats present to clinics with fulminant clinical signs and a heart broken new owner.

Understanding the “herd health” pathogenesis of FURDC helps to understand how best to plan for prevention.

CASE DEFINITIONS: WHAT DO WE MEAN WHEN WE SAY UPPER RESPIRATORY DISEASE?

What we are really talking about is a disease complex with many systemic implications and influenced by several pathogenic agents, infectious dose, animal immune status, environmental factors and stress. Because of the complexity of the disease process I prefer to talk about **Feline Upper Respiratory Disease Complex (FURDC)**.

HOW DOES IT HAPPEN

- Viruses (80-90%)
- Bacteria
- Modified live vaccines (mild signs in most cases)
- FeCV, FIV, fungal infection, polyp, piece of grass snorked up into nasal passages...
- *Just because it's one of the viruses the great majority of the time, don't forget to rule out less likely causes in a cat that is not getting better!*

FURDC transmission

- **Fomites**
- Direct contact
- Droplet (4-5 feet)

Cat to cat transmission plays a clear role in group housing situations.

In caged environments, FURDC transmission occurs via fomites rather than aerosol spread, as is commonly thought. This has been demonstrated for herpesvirus and calicivirus. When cats were kept in open sided wire cages in a common air space separated by 6 feet, there was no transmission, when healthy cat cages were cleaned first and fomite transmission was strictly controlled. When cleaning was random, with sick cats being cleaned first some of the time, transmission occurred frequently.

Virus can be easily transmitted on clothing, particularly if it is present on hair picked up by caretaker's clothing. Because cats groom themselves, virus present in saliva or respiratory secretions is likely present on hair. In outbreaks of virulent systemic feline calicivirus, pet cats belonging to veterinary technicians have been fatally infected, presumably via virus transported on clothing or shoes.

CLINICAL FACTORS: ENVIRONMENTAL CONTRIBUTORS TO FURDC

OVERCROWDING, poor sanitation, poor ventilation, poor nutrition, concurrent disease, parasitic infestation, fear and STRESS all contribute to increased risk of disease.

COMMON ETIOLOGIC AGENTS of FURDC

Feline Herpesvirus

- Not highly variable
 - Some variation in predominant clinical signs
 - i. For instance, there may be some strains that cause more conjunctivitis, versus some strains that cause more sneezing
 - Some variation in clinical signs are due to a cat's individual immune system
 - i. For example, a cat with herpetic ulcers is not particularly likely to give another cat herpetic ulcers. Development of ulcers in the eyes has more to do with that cat's immune system than variation in the herpesvirus.
 - Vaccine resistant strains have not been reported.
- Not hard to kill; inactivated by all commonly used disinfectants
- Incubation about a week
- Persists in nerve roots in 80-90% (all?) of recovered cats
- Reactivated by stress in 50% of chronically infected cats, with or without signs
- **Distinctive clinical signs:**
 - Affects the cornea more than other URI agents

Feline Calicivirus (FCV)

- Highly variable
 - Variable signs are common; some strains are more likely to cause limping, some more likely to cause oral ulcers, some cause very severe disease, some are mild, etc.
 - Vaccine resistant strains are common
- Hard to kill
 - Inactivated by bleach, potassium peroxymonosulfate
 - Persists for weeks if not inactivated by disinfection
- Incubation 1-5 days (can be shorter than herpesvirus)
- 50% shed at least 75 days post-recovery regardless of stress
- Long term healthy appearing carriers can perpetuate severe disease

Feline Calicivirus: distinctive clinical signs

- More likely to be associated with oral ulcers or inflammation than other URI agents
 - May be acute or chronic
 - Intranasal vaccine has been anecdotally reported to cause nasal ulcers
- Some strains associated with pain and swelling in multiple joints

Virulent Systemic Feline Calicivirus

- Rapid onset (1-3 days) with swelling of the face and/or limbs, areas of hair loss and skin ulceration and oozing in adult, vaccinated cats.
- ~ 50% mortality
- Jaundice that appears infectious
- “Peracute hepatic necrosis with hepatocellular individualization” commonly reported on necropsy

BUT...Dying cats in a shelter with or without FURDC think panleukopenia until proven otherwise!

Bacterial Infections:

Primary

Chlamydophila felis

The obligate intracellular bacteria formerly known as *Chlamydia psittici*, var. *felis*

- Reservoir on mucosa
- Transmission direct (often neonatal), fomite, droplet, activated by pregnancy
- Incubation 3-14 days
- Shedding may persist 18 months after recovery
- LONG treatment (3-6 weeks) required to clear infection
- Limited effective antibiotics
- If *Chlamydophila* is suspected or a cat responds markedly to treatment with doxycycline and relapses when taken off treatment, treat for a minimum of three weeks!
- Shedding stops within 2-4 weeks of treatment and cats may be put up for adoption or sent home while still on treatment provided signs have resolved
- Responsive to doxycycline; doxycycline is more effective than azithromycin (zithromax™)

***C. felis*: clinical significance**

- Conjunctivitis (may be unilateral)
- +/- mild to severe URI, fever early in disease
- Polyarthritis (uncommon)
- Abortion (postulated)
- Some clinically normal cats (1-6%)

Bordetella bronchiseptica

- Aerobic, gram negative coccobacillus.
- Incubation 3-10 days
- Shedding may persist up to 3 months after recovery.
- Reservoir is respiratory tract of infected animals. Cats may act as reservoir for dogs.
- Transmission: direct, fomite, droplet (aerosol from dogs).
- **Zoonotic** in immunosuppressed
- Potentially effective antibiotics include **tetracyclines**, TMS, clavamox (can have high levels of resistance – transferable multi-drug resistant plasmids documented). C+S if implicated in severe disease or herd problem. Always resistant to Cephalexin.

***B. bronchiseptica* : clinical significance**

- URI, usually mild, ocular and nasal discharge, conjunctivitis, tracheobronchitis.
- *Bordetella* pneumonia in young kittens (primary) or secondary to viral infection or immunosuppression.
- Most infected cats do not show clinical signs.
- Extensive *B. bronchiseptica* associated disease may be a marker for husbandry problems

***Mycoplasma spp.* (*felis*, *gateae*, others)**

- Obligately parasitic mollicute. No cell wall.
- Reservoir on respiratory and genital mucosa.
- Transmission: direct, fomite, droplet
- Clinical signs:
 - Conjunctivitis
 - Lower respiratory disease (uncommon)
 - Polyarthritis (uncommon, usually in immunosuppressed)
 - Role in URI uncertain – generally thought to be minor player, but significantly associated in recent survey of shelter cats, recovered from 25% of cats with URI in that study. Isolated from 10/10 cats in two recent outbreaks of unusually severe URI in shelters.
 - May be isolated from clinically normal cats.

Secondary bacterial infections

- Wide variety, including gram positive, gram negative and anaerobic

- Almost all can be found in normal cats as well

DIAGNOSIS

- Most often not necessary
- Often won't effect your treatment plan
- May be considered if signs persist > 1 month in an individual
- Unusually severe or frequent disease in population
- Liability issues – diagnostics may be able to distinguish shelter or clinic-origin disease from pre-existing infection

MANAGEMENT TOOLS

Crowd Control

- **The single most important tool for feline URI control in shelters is population management through spay / neuter outreach and other diversion programs to keep cats in their homes instead of in the shelter.**
- **Lives saved determined by adoptions and prevention**
 - ***adoptions* are determined by adopters, not number of cats in the shelter**
 - ***prevention* is determined by number of spays, not number of cats in the shelter**
- **Shelters must foster, limit intake, or euthanize for space to save lives**

Stress and Herpes virus recrudescence

Herpes virus is reactivated by many stressors, leading to viral shedding and sometimes development of clinical signs of FURDC. In particular, herpes is likely to be activated by the following:

- Pregnancy/birthing
- Moving from cage to cage
- Introduction of new cats into a group – especially intact cats

Vaccination: FVRC_P

FURDC IS NOT A VACCINE PREVENTABLE DISEASE.

Cats vaccinated for herpesvirus are significantly less likely to be shedding herpes than non-vaccinated cats. However, there was no significant difference in likelihood of shedding calicivirus between vaccinated and non-vaccinated cats.

Feline calicivirus is extremely variable, and mutates from year to year. Currently available vaccines are based on strains of feline calicivirus isolated many years ago and do not protect against many of the strains of calicivirus now seen. The bottom line is that vaccination against calicivirus provides, at best, limited protection against only some strains. It can never be assumed that a vaccinated cat will not develop severe calicivirus infection. Caution should be exercised in exposing pet cats to cats with signs of calicivirus infection (e.g. through foster care, adoption or in a veterinary clinic), whether or not the pet cats have been vaccinated. Investigations are currently underway to develop more effective vaccines for calicivirus.

Calici disinfection

- Bleach 1:32 (ideal conditions)
- Potassium peroxymonosulfate (aka. Trifectant or Virkon-S)
- Alcohol hand sanitizer: most effective choices are 70% ethanol or 1-propanol (62% may be the best you can find). Hand washing is a more reliable option, but hand sanitizers can be a helpful adjunct.

TREATMENT: WHEN PREVENTION FAILS

Isolation

- *Isolation facilities are a must* for treatment of URI in clinics or cat populations
- Fomite control is most important to prevent spread
- *Know that mildly affected cats can spread severe disease to other cats in the room*

General treatment guidelines

Use antibiotics only when clearly indicated. RESERVE “BIG GUN” DRUGS SUCH AS AZITHROMYCIN AND FLUOROQUINOLONES (BAYTRIL AND COMPANY) FOR SEVERE DISEASE when indicated. Overuse of antibiotics risks selecting for antibiotic resistant germs. This can be a serious human as well as animal health risk.

Mycoplasma treatment

- Tetracyclines (doxycycline)*, Zithromax, fluoroquinolones (Baytril and co.)
- Topical tetracycline, chloramphenicol, erythromycin
- NOT penicillins or cephalosporins

Chlamydophila treatment

- Tetracyclines (doxycycline)*
- Once a day dosing recommended; less stress for cats and less time for staff
- Continue at least 3-4 weeks if responds!
- Topical tetracycline, chloramphenicol, erythromycin
- NOT Zithromax after all

* All tetracyclines carry a risk of causing irreversible esophageal stricture in cats when given in tablet or capsule form. These drugs must be given in liquid formulation or followed with at least 6 mls of water. Some compounding methods may reduce availability or inactivate the drug (if the compounding mix contains calcium, magnesium or iron).

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