AP-1xx-PR Canine Distemper Protocol

Summary: The purpose of this document is to guide treatment and testing for distemper in dogs at Best Friends Lifesaving Centers.

Operational Protocol:

1. Initial Testing:
    a. Upon arrival, any dogs from distemper-endemic areas should receive a CDV Quantitative RealPCR (Idexx test code 3265).
    b. For any dog showing new respiratory signs (nasal discharge, ocular discharge, cough), a Canine Respiratory Disease (CRD) RealPCR Panel should be submitted to Idexx (test code 2524).
    c. Rechecks for serial monitoring of shedding in distemper patients should be a CDV Quantitative RealPCR (test code 3265) only (not full respiratory panel). See next section for retesting.
    d. Instructions for swab collection can be found at: https://vetmed-maddie.sites.medinfo.ufl.edu/files/2014/10/Collection-of-Swabs-for-Diagnosis-of-Respiratory-Pathogens-by-PCR.pdf
    e. Individual sample tubes should be labeled with the dog's ID number and name, then placed into a ziploc bag with the individual submission form, then placed in a styrofoam container with ice packs. The Styrofoam container should then be placed in a cardboard box for shipping.
    f. If multiple samples (from multiple dogs) are being submitted, an Idexx batch form may be used. If an outbreak is suspected, also collect information on signs, the date signs started, animal location in the shelter when signs started, and vaccinations; keep this information in a spreadsheet.
        i. Individual samples should be labeled with the dog's ID number and name, then put into a ziploc bag also labeled with ID number and name.
        ii. All sample ziplocs should be collected in a larger gallon ziploc, and this should be placed into a styrofoam container with ice packs.
        iii. The submission form should be placed in a ziploc and placed on top of the styrofoam; both should then be placed in a cardboard box for shipping.
    g. The box should be shipped overnight to the Idexx lab in Sacramento. Samples must be delivered to FedEx by 7pm for arrival the next morning.
    h. Preprinted labels are available – contact Idexx to obtain labels that bill to Idexx for shipping.
        Lab address:
        Molecular Diagnostics
        IDEXX Reference Labs
        2825 KOVR Drive
        West Sacramento, CA 95605
    i. Send samples out Monday through Friday only; otherwise, samples will be sitting for too long (either with FedEx or with the lab).

2. Serial/Recheck Testing and Clearing Positive Dogs

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a. Recheck CDV should be a CDV Quantitative RealPCR (NOT the full CRD Panel), test code 3265.
b. For initial PCR tests in **asymptomatic** dogs with a low viral count AND the dog has been vaccinated with a modified-live CDV vaccine **in the past 2 weeks**, retest with a CDV Quantitative PCR one week after the initial test to distinguish between real infection and vaccine interference.
    i. Isolate dog in case of true infection.
    ii. Schedule recheck PCR in one week.
    iii. PCR that is positive one week later is likely true infection.
    iv. PCR that is negative and no clinical signs are noted, the dog is not likely infected and can be released from isolation.
c. In infected dogs, the goal of serial testing is to identify when a dog's viral count is declining, i.e. when the viral count peak has passed.
d. Dogs can be released from isolation when the following 3 criteria are met:
    i. At least 14 days have passed since onset of clinical signs.
    ii. Viral count is decreasing, i.e. they are past the peak viral count, confirmed with 2 PCR results past the peak.
        1. Small fluctuations in viral count are possible after the peak has passed; the primary peak is the only one of importance
        2. This can be demonstrated by 2 additional PCRs beyond the peak of viral shedding, taken at least 2 days apart.
    iii. Clinical signs have resolved
        1. Persistent neurological signs are possible in some dogs; if all other signs have resolved and mild neurological signs are stable, the dog may be released.
e. Uncommonly, puppies may develop delayed (up to ~4 weeks later), progressive neurological signs, with or without previous respiratory signs. This does not affect their pathway, but adopters should be advised to monitor for signs and seek veterinary care if signs are noted.
f. Scheduling serial testing
    i. After diagnosis, serial testing can be scheduled based on:
        1. Practical factors, including availability of staff to sample and sample shipping factors
        2. When clinical signs appear to be resolving, as the dog will not be cleared until after signs resolve (with the exception of persistent mild neuro signs).
g. All positive dogs should have data entered into the Distemper Tracker (see below).

3. Treatment:
    a. Treatment for canine distemper is supportive; there is no direct treatment for the viral component of the disease. Treatment is aimed at controlling clinical signs and supporting the dog through the illness.
    b. Mild upper respiratory signs
        i. This includes any dog showing only mild respiratory signs, including ocular discharge, nasal discharge, sneezing, or cough, but is otherwise BAR and eating/drinking.
        ii. **Doxycycline 10mg/kg SID x 10 days**

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iii. Topical antibiotic medications can be used for ocular signs (BNP, tobramycin, etc.)

c. Systemic signs
    i. This includes dogs that develop a fever either while on doxycycline or have a fever that does not respond in 24 hours to doxycycline treatment
    ii. This can also include dogs with upper respiratory signs that then progresses to include gastrointestinal signs (inappetance, vomiting, diarrhea)
    iii. Additional treatments:
        1. **Subcutaneous fluids (120ml/kg/day divided BID to TID)** or **IV fluids (boluses or continuous)** to maintain hydration.
        2. Anti-emetics/gastrointestinal protection for patients not eating or vomiting
        3. **Maropitant (Cerenia) 1mg/kg PO, SQ, or IV SID**
        4. Ondansetron (Zofran) 0.5 - 1mg/kg IV or SQ BID OR Dolasetron (Anzemet) 0.5mg/kg IV or SQ SID
        5. Famotidine 1mg/kg IV, SQ, or PO BID OR Omeprazole 1mg/kg PO BID OR pantoprazole 1mg/kg IV SID

d. Lower respiratory signs
    i. This includes dogs with moderate to severe tachypnea or dyspnea, likely related to CDV pneumonia.
    ii. Oxygen therapy should be considered for patients with severe lower respiratory signs (via nasal canula or oxygen cage); if this is not available in-house, transfer to a critical care facility or consider humane euthanasia.
    iii. Consider dexamethasone SP 0.1-0.2mg/kg IM or IV (anti-inflammatory dose), particularly if heartworm positive, followed by tapering dose of prednisone when appetite returns.
    iv. Add **Clavamox 12.5mg/kg PO BID or ampicillin 22mg/kg SQ or IV BID to TID** and **Enrofloxacin 10mg/kg PO, IM, or IV** for broader spectrum coverage (for pneumonia)
    v. Nebulization with saline and coupage BID to TID

e. Neurological signs
    i. For active seizure activity: Diazepam 0.5-2 mg/kg IV, intranasal, or rectally (or midazolam)
    ii. For longer-acting control:
        1. Phenobarbital 10-20 mg/kg IV once to effect then 2-8 mg/kg PO q 12 hrs
        2. and/or levetiracetam (60mg/kg IV bolus, then 20-30mg/kg PO or IV q8h or equivalent for BID extended release tablets)
    iii. For tremors:
        1. Methocarbamol 55-220mg/kg IV initially, do not exceed 330mg/kg/day; can also be used in a CRI
        2. Methocarbamol 330mg/kg PO ***divided*** BID for ongoing control
        3. Refractory and severe neurological signs causing significant reduction in quality of life warrant the consideration of euthanasia. Mild signs may not impact quality of life, but they may or may not resolve with recovery – some dogs have permanent mild neurological signs (typically tremors) but live normal lives. Mild neurological signs alone do not warrant euthanasia.

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4. Isolation and Management:
    a. Dogs with any respiratory signs or with confirmed/suspected distemper should be isolated from general population.
    b. PPE in the isolation area consists of: gloves, gown or coveralls/Tyvek (coveralls/Tyvek preferred), shoe covers/dedicated footwear.
    c. PPE should be changed in between individual patients or litters housed together to prevent spread of other illness.
    d. Dogs in isolation should be cared for by either separate staff or last in the order of animals cared for separate staff is not possible to prevent spread of distemper to the healthy population.
    e. During recovery, distemper dogs may be housed with fully vaccinated (at least two vaccines including one as an adult dog within the last 3 years), otherwise healthy adult dogs (over one year of age, no immunocompromising conditions or medications, no significant chronic health issues). See Canine Distemper Virus for Fosters document.

5. Exposure, Risk Assessment, and Quarantine:
    a. Dogs that are exposed to a distemper positive dog should be evaluated and handled based on risk.
    b. Puppies (< 6 months of age) are considered **high risk**, regardless of vaccine status.
    c. Adult, healthy dogs are considered fully vaccinated and **low risk** if:
        I. Dogs recently entering a shelter are older than 6 months and have received an intake vaccine AND a booster vaccine two weeks (or more) after the initial vaccine.
        II. Dogs have been in a home or at the center for an extended period and are considered current on their DHPP vaccine through a booster within the last year (or within the last 3 years for 3 year labeled vaccines).
        III. **Earliest** possible exposure was AFTER several days following the second vaccine.
    d. Antibody titer testing may be used at the discretion of a veterinarian for adult dogs only.
        a. If **less than a week since first exposure** (earliest possible exposure date must be known), a protective titer indicates low risk.
        b. If greater than a week since exposure, titer testing cannot distinguish between antibodies induced due to active infection and vaccine-induced (or induced from prior exposure).
        c. Paired antibody and PCR testing may be used to eliminate the need for quarantine in exposed, adult dogs. A protective titer and **concurrent** negative PCR test mean a dog is **low-risk** and this may replace quarantine.
        d. A titer that is not protective indicates that a dog is **high-risk** and should be quarantined.
        e. Antibody titer testing does not yield predictable results in puppies due to inability to distinguish between transient maternal antibodies and long-lasting vaccine-inducted antibody protection.

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e. **Low risk** dogs that have been exposed should be monitored for any clinical signs but do not need to be quarantined.
f. **High risk** dogs that have been exposed to a positive dog (confirmed or highly suspect) should be quarantined for 14 days after the exposure.
    I. If at any point, they develop clinical signs consistent with distemper, they should be tested at that time.
    II. If no clinical signs develop, at the end of 14 days, they should be tested (CDV only PCR test).
    III. If negative, they may be cleared from quarantine.
    IV. If positive, move to isolation and follow the serial testing protocol outlined above.

6. Record Keeping and Data Collection
    a. Any positive dog will have their information entered into the Distemper Tracker.
    b. Data to be collected:
        i. Name and animal ID
        ii. Location (center, building/area)
        iii. Initial PCR date
        iv. Initial PCR results and viral count
        v. Date of onset of clinical signs (if known)
        vi. Clinical signs
        vii. Serial PCR date(s) and results
        viii. Resolution date of clinical signs
        ix. Outcome and date
        x. Follow-up notes post-adoption/outcome

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