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TAILORED MANAGEMENT PLAN FOR PREVENTING VIRAL DISEASES WITHIN DOG SHELTERS

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Abstract

Dog shelters play a crucial role in animal welfare by providing temporary care and finding permanent homes for homeless dogs. However, the close confinement and high turnover of animals in shelters create an ideal environment for the spread of viral diseases. To combat this, various preventive measures have been implemented, but a comprehensive and tailored approach is essential to effectively safeguard the health of shelter dogs. This study outlines a tailor-fit management plan that incorporates a multifaceted approach, encompassing vaccination, testing, hygienic practices, and quarantine protocols, to effectively prevent viral diseases within dog shelters.

Key words: viral disease; dog shelters; tailor-fit management; immune-prophylaxis

Introduction

Dog shelters play a crucial role in providing temporary care for homeless dogs and facilitating their adoption into loving homes. However, these environments often pose a significant risk for the spread of viral diseases among the shelter population. Viral diseases can cause significant morbidity and mortality in dogs, leading to reduced welfare and limiting the shelter's ability to effectively place animals. Therefore, implementing effective preventive measures is essential to safeguard the health and welfare of shelter dogs and minimize the risk of disease outbreaks.

Previous studies have shown that many dogs entering a shelter will have an insufficient antibody titer against viral but preventable diseases. Restricting vaccination to some dogs, and excluding others based on source, health status, false negative result or any other criterion contributes to the risk of transmission of infectious diseases in the shelter (Velescu, 2002; Lechner et al., 2010; Monteiro et al., 2016). Among the methods of preventing viral diseases in a shelter are vaccination, hygiene, avoiding overpopulation, and reducing the period of stay of animals in the shelter.

The occurrence of viral infections at a shelter may undeniably have a catastrophic impact on the health and well-being and may pose significant challenges even for shelters that are well-prepared and well-equipped. While a definitive solution to eradicate illnesses like parvovirus or Carré disease has not been found, significant progress has been made in treatment alternatives since their inception. (Perley et al., 2020). Many dog shelter organizations have begun to adopt various treatment strategies in their efforts to save more lives (Appel and Barr, 2009). Due to the significant losses caused by viruses, especially parvovirus, and the high costs of treatment of sick animals, 3 important problems arise:

- ✓ How can limited resources (infrastructure, personnel, medical supplies) be used without compromising the health and welfare of shelter animals?
- ✓ What preventive measures are more effective in case of viral diseases?
- ✓ Can a personalized plan for viral disease management be developed within each shelter?

TAILORED STRATEGY BASED ON SPECIFIC NEEDS

A comprehensive approach to disease prevention in dog shelters requires a tailored strategy that addresses the specific needs and characteristics of the shelter population and environment. This involves considering factors such as:

Shelter Size and Capacity: Shelter size and capacity influence the potential for disease spread and the feasibility of implementing certain prevention measures. Larger shelters may require more robust vaccination programs and enhanced biosecurity protocols.

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Shelter Location and Socioeconomic Factors: Shelters located in areas with higher disease prevalence or socioeconomic challenges may need to prioritize vaccination and disease surveillance efforts.

Shelter Population Demographics: The age, breed, and health status of the shelter population influence the risk of particular viral diseases. For instance, young puppies and unvaccinated dogs are more susceptible to parvovirus and distemper.

Vaccination Programs: Vaccination is the cornerstone of disease prevention in dog shelters. A comprehensive vaccination program should include core vaccines, such as those against parvovirus, distemper, adenovirus, and rabies. Shelters should also consider vaccinating against other relevant diseases based on the local prevalence and shelter population characteristics.

Biosecurity Practices: Biosecurity measures aim to prevent the introduction and spread of infectious agents within the shelter environment. These measures include:

Strict Entry and Exit Screening: Implementing clear protocols for entering and exiting the shelter premises, including thorough cleaning and disinfection of boots and clothing, can help prevent the introduction of pathogens from outside sources.

Separation of New Arrivals and Established Groups: Newly admitted dogs should be kept separate from the established shelter population for a period to allow for observation for signs of illness and potential infectious diseases.

Strict Cleaning and Disinfection: Regular cleaning and disinfection of kennels, common areas, and equipment are essential to minimize the accumulation of pathogens.

Personal Hygiene: Shelter staff and volunteers should maintain strict personal hygiene practices, including frequent handwashing and appropriate use of personal protective equipment.

Disease Surveillance and Outbreak Management: Prompt identification and management of disease outbreaks are crucial to prevent widespread transmission and protect the health of the shelter population. This involves:

Regular Monitoring: Shelters should implement regular health screenings and observation of dogs for signs of illness, with particular attention to vaccinated dogs that may still be susceptible to certain diseases.

Prompt Diagnosis and Reporting: Upon detection of clinical signs suggestive of viral diseases, shelters should promptly seek veterinary diagnosis and report the incident to local authorities.

Isolation and Quarantine: Suspected or confirmed cases of viral disease should be isolated from the general shelter population to prevent further transmission.

Disinfection and Environmental Cleaning: After an outbreak, thorough cleaning and disinfection of the affected areas are essential to eliminate pathogens and prevent recurrence.

TAILOR-FIT MANAGEMENT PLAN FOR PREVENTING VIRAL DISEASES WITHIN DOG SHELTERS

Assessment of resources available to implement surveillance, disease control and treatment measures

The first step in creating a viral disease management plan appropriate to each shelter is to assess the resources available to implement measures to monitor and combat the disease and treatment. The purpose of this evaluation is to determine which animals can be successfully treated without endangering the health and welfare of those or other animals in the shelter (McCaw and Hosking, 2006; Appel and Barr, 2009). Given the highly infectious and deadly nature of parvovirus, having the physical ability to prevent transmission of the virus to other animals is of utmost importance. Vaccination is the cornerstone of parvovirus prevention in shelters and communities. In the absence of maternal protection, a single modified live vaccine can confer protection in 3-5 days. Research conducted to date has found that currently available vaccines protect against all known strains of parvovirus, including CPV-2c (Kelman et al., 2020). All dogs and puppies > 4 weeks of age should be vaccinated at the time of admission to the shelter (or ideally at least one week before), including those that are injured. Revaccinating puppies every two weeks until they are 18 weeks old, as long as they remain in the shelter, and revaccinating adult dogs at least once, 2 weeks after the first vaccine or after adoption may result in a decrease in incidence. Parvovirus spreads mainly through feces, also through vomiting and other bodily excretions. Dogs can become infected through direct contact, contaminated objects (food and water containers, leashes) and even aerosolization during surface cleaning (Lamm and Rezabek, 2008; Behdenna et al., 2019; Khatri et al., 2017; Van Arkel et al., 2019). At the shelter level, transmission of the virus can be fostered by several factors (Figure 1).

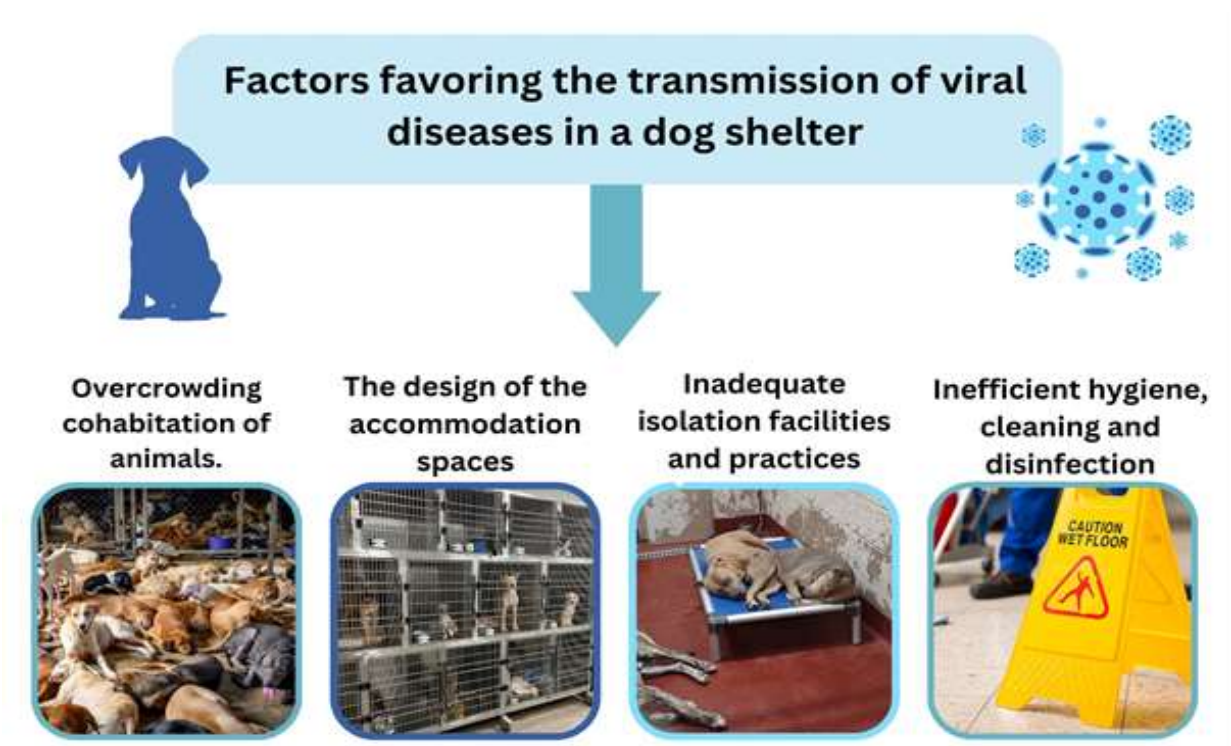

Figure 1. Factors favoring the transmission of viral diseases in dog shelters

The incubation period is usually 4-6 days, but the duration of incubation may be affected by the viral load to which the animal is exposed. It is recommended that animals be quarantined for at least two weeks after known exposure (Velescu, 2002; Goddard and Leisewitz, 2010; Perianu et al., 2012). Viremia usually occurs 2-3 days before the appearance of clinical signs (day 3-7), as early as day 1 after exposure (Figure 2).

In a crowded shelter where early signs might be missed, the viremia period may go unnoticed. Thus, this aspect must be taken into account when assessing the risk of dogs exposed to infection. Elimination of the virus can continue up to 2 weeks after recovery of the animal. A negative parvo ELISA in a dog that was initially diagnosed positive suggests that the virus is no longer eliminated in significant amounts.

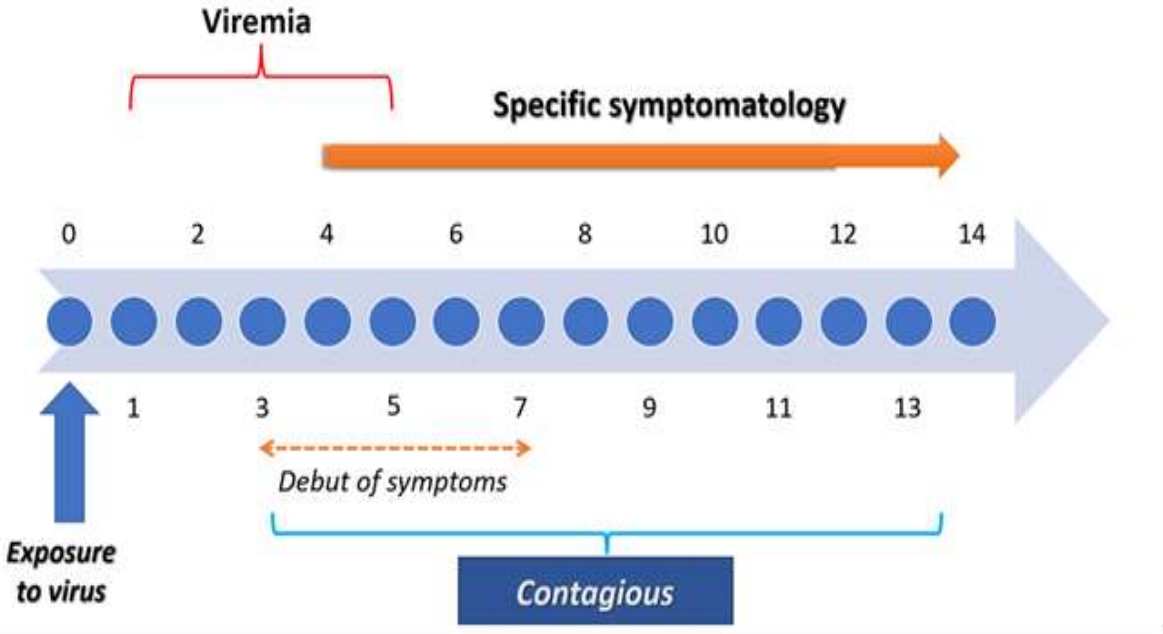

Figure 2. Parvovirus – duration of incubation period, viremia and specific symptoms

The virus can remain viable for months and years, especially in a dark and humid environment, so hygiene and disinfection using proven virulicidal biocidal products is essential. Effective options include 5% sodium hypochlorite (household bleach) freshly mixed with water in a ratio of 1:32 and applied to a clean surface. Products from the same family as bleach that have proven effective include calcium hypochlorite and sodium dichloroisocyanurate. Like bleach, they have no detergent properties and must be applied to a pre-cleaned surface. Other proven products include potassium peroxymonosulfate and accelerated hydrogen peroxide, which both have higher detergent properties and better activity against organic matter compared to bleach and related products (Howie et al., 2008; Eterpi et al., 2009).

Independent studies have repeatedly shown that quaternary ammonium disinfectants do not reliably kill parvovirus, despite repeated reformulation and claims of efficacy on the label. Pens, cages and accommodation spaces must be thoroughly cleaned, disinfected and dried at least twice before reuse. For areas such as courtyards and alleys where disinfection is not an option, careful and repeated mechanical cleaning can be effective if applied correctly (Sanekata et al., 2010; Addie et al., 2015; Cavalli et al., 2018).

In order to prevent the spread of diseases, it is essential to use appropriate protective equipment when interacting with sick animals (gloves, disposable overalls, booties for shoes). When treatment is carried out on-site, it is preferable to achieve it by using a free-standing, bio-safe isolation unit. In addition to adequate infrastructure facilities, human resource is especially important, since the management of this pathology requires adequate medical expertise. Veterinary input is essential, but it is particularly important that all staff and/or volunteers are properly trained, as prevention, diagnosis and treatment of viral diseases often require a significant investment of time to ensure adequate monitoring of patients and in some cases even the administration of treatments several times a day.

Finally, analyzing the shelter's budget is important to ensure that medical treatment is also financially feasible. The average duration of treatment for parvovirus is usually at least one week, so sufficient resources should be available at the shelter level to support a treatment plan for that length of time (Gerlach et al., 2020; Horecka et al., 2020).

In addition to assessing physical, staff, temporal and financial resources, an individual animal welfare assessment should be made. One of the fundamental goals in veterinary practice is that "treatment should not be worse than disease." This is a very real possibility in severe cases of parvovirus, therefore, the decision whether or not to treat these cases should also consider the benefit of treatment for that animal. Conducting treatment for animals that have a good prognosis and setting objective parameters of unacceptable welfare conditions to define treatment endpoints will help ensure success and adherence to personalized treatment protocol within each shelter. Treatment of parvovirus must consider a number of essential components such as avoiding and correcting dehydration, preventing secondary bacterial infections and treating endoparasites, ensuring proper nutrition and relieving discomfort to enhance well-being and accelerate recovery (Velescu, 2002; Perianu et al., 2012). Managing each of these components is essential for a positive outcome and all should be given equal importance. Hygiene and good biosecurity practices are also essential components of an effective parvovirus management plan at the shelter level. Taking into account resources and well-being, parvovirus treatment can be a successful and rewarding experience. An effective treatment protocol should result in recovery of 60% to 90% of patients.

Strategies to prevent viral diseases at dog shelter level

Viral diseases such as parvovirus or Carré disease are highly contagious and are a significant problem in dog shelters. That is why it is important for shelters to develop protocols to help prevent the introduction of the virus and effectively manage disease if it enters the shelter population. An effective viral disease management program takes into account both the animal and the space where it is housed, as well as the personnel with whom the animal comes into contact. Preventing exposure is one of the fundamental measures to avoid the introduction of the virus into the herd, but in a shelter, this is extremely difficult to achieve. Strengthening the immune system of dogs in the shelter by ensuring proper conditions and balanced nutrition can help increase the immunity of dogs and thus decrease their susceptibility to viral agents.

Reducing stress and carrying out appropriate vaccination schedules also helps prevent infections in the herd. Co-infection with gastrointestinal parasites is common, especially in puppies infected with parvovirus. Such infections can worsen the severity of the infection and delay recovery. Because the specific treatment protocol for each parasite species varies, administration of a

broad-spectrum dewormer such as ivermectin, fenbendazole may be used when a definitive diagnosis of coproparasitic infection is not possible or conclusive.

Hygiene and cleanliness within the shelter is crucial to prevent the occurrence and spread of viral diseases. Both spaces where animals and common objects are kept should be sanitized periodically. It is also important that protective equipment for single use is used when handling sick animals and in areas intended for quarantine and treatment of animals.

Given the contagiousness of viral diseases and the resources needed to treat them, shelters must properly assess their capacity for optimal care, ensuring they have sufficient supplies, medicines, and staff to meet the animals' physical needs and medical performance in the best conditions (Figure 3).

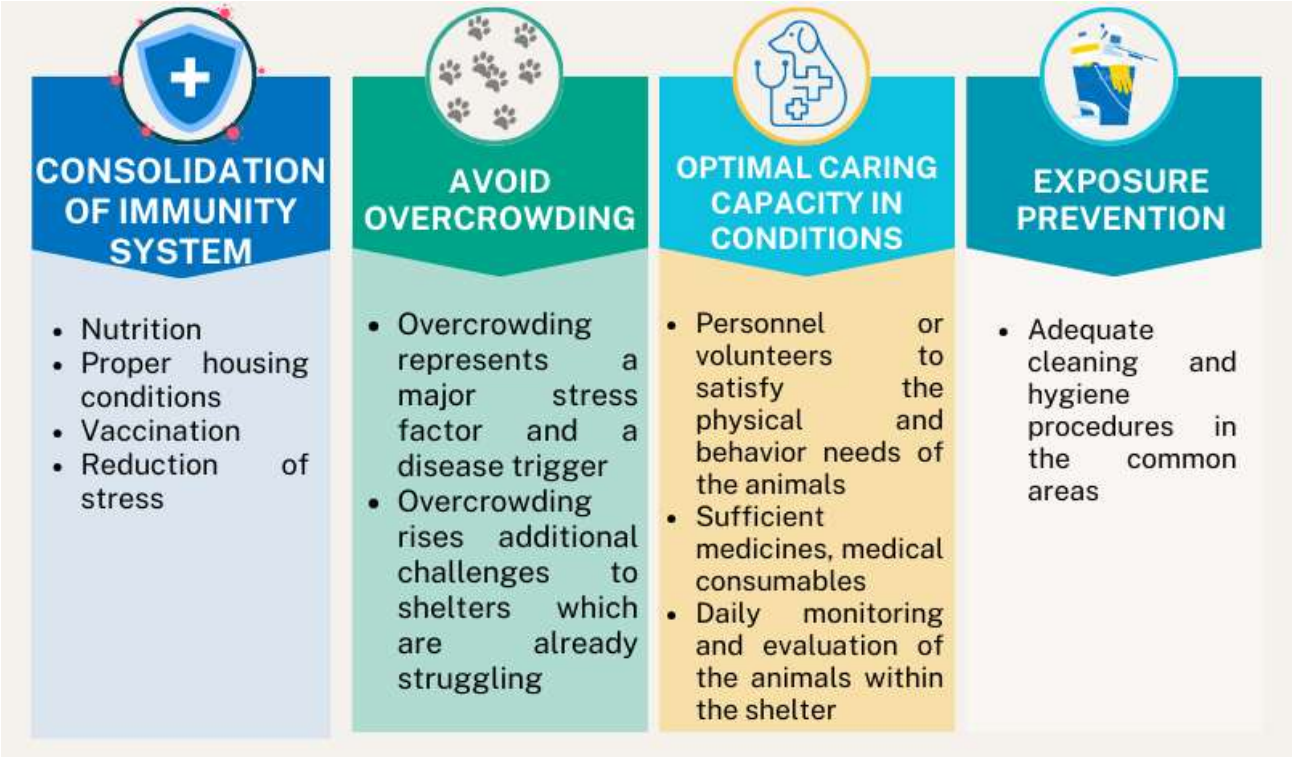

Figure 3. Strategies to prevent viral diseases in dog shelters

Conclusion

By implementing a tailored management plan that combines vaccination programs, biosecurity measures, disease surveillance, and outbreak management, dog shelters can effectively prevent the spread of viral diseases and safeguard the health and welfare of the shelter population. This approach not only contributes to the welfare of individual dogs but also ensures that shelters can continue fulfilling their mission of providing temporary care and facilitating adoptions.

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