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Lateral flow assay based detection of canine distemper virus (CDV) infection in dogs

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Abstract

CDV is a fatal, highly contagious viral disease found in dogs worldwide. In settings where advanced labs are unavailable, achieving an early and accurate diagnosis is vital for managing the spread of the disease. This study utilized a lateral flow assay (LFA) as a point-of-care tool to determine CDV incidence among 40 dogs presenting with respiratory and neurological signs at Shree Veterinary Hospital, Jetpur. Following the manufacturer's protocol for the Bionote LFA kits, 7 out of the 40 samples (17.5%) were confirmed positive for CDV. The observed 17.5% positivity rate indicates a significant occurrence of CDV within the study population and underscores the diagnostic utility of LFA kits. Due to their rapid turnaround time, ease of use, and cost-effectiveness, these kits allow for on-site results without the need for sophisticated laboratory infrastructure. Consequently, LFA serves as a valuable tool for early detection and prompt intervention, ultimately helping to reduce disease transmission and mortality.

Keywords: CDV, dog, rapid test kit

Introduction

Viral diseases remain a primary cause of morbidity and mortality in canine populations worldwide, posing a persistent challenge to veterinary public health. Among these, Canine Distemper Virus (CDV) stands out as one of the most severe and highly contagious infections. This pathogen presents significant health risks—particularly to unvaccinated puppies and immunocompromised animals and is characterized by high mortality rates and the potential for widespread outbreaks. (Jyothi *et al.* 2024; Tallapaly, 2024) ^[8, 14].

Canine distemper (CD) is a highly contagious viral disease in dogs, ranking second only to rabies as a leading cause of mortality. The causative agent, Canine Distemper Virus (CDV), is a single-stranded, non-segmented, negative-sense RNA virus belonging to the genus *Morbillivirus*, family *Paramyxoviridae*, and order *Mononegavirales* (Joshi *et al.* 2022). Infection with highly virulent strains manifests in a broad clinical spectrum, including conjunctivitis, ocular and nasal discharges, anorexia, and hyperkeratosis of the footpads. Furthermore, it may cause catarrhal inflammation of the bronchi and larynx, as well as pustular lesions on the abdomen and thighs. (Carvalho *et al.* 2012) ^[3].

Effective control of CDV infection relies heavily on rapid and accurate diagnosis. Although qPCR remains a standard molecular approach, Lateral Flow Assays (LFAs) serve as a critical point-of-care alternative. Because they are cost-effective and produce rapid results without the need for sophisticated infrastructure, LFAs are particularly valuable in field conditions (Abousenna *et al.* 2024) ^[1]. By enabling early detection on-site, these assays empower veterinarians to intervene promptly, thereby significantly limiting the spread of the virus in domestic dog populations. (Desai *et al.* 2020) ^[4].

The lateral flow assay (LFA) is a significant advancement in diagnostics, offering a cost-effective and user-friendly platform for the rapid detection of various infectious diseases across both human and veterinary sectors. (Samy *et al.* 2020; Sayed *et al.* 2022) ^[11, 12].

Materials and Methods

Experimental details

The study was conducted at Shree Veterinary Hospital, Jetpur, during the year 2025.

Sample collection

For the rapid detection of Canine Distemper Virus (CDV), a total of 40 nasal swabs were collected from dogs presenting with both neurological and respiratory symptoms.

Detection of CDV by lateral flow assay

To detect Canine Distemper Virus (CDV), the study utilized commercial rapid diagnostic kits (Bionote, Inc.) specifically formulated for clinical swab samples. All assays were conducted in strict accordance with the manufacturer's instructions and standard operating procedures to ensure the accuracy and reproducibility of the results.

Results and Discussion

In the present study, 17.5% (7/40) of screened dogs tested positive for Canine Distemper Virus (CDV) via lateral flow assay (LFA), with results confirmed by the presence of both control and test bands on the strip (Figure 1).

This incidence rate is comparable to the 26.9% reported by Soma *et al.* (2003) [13]. However, our findings are notably lower than the rates documented by Fischer *et al.* (2013) [6], Ogbu *et al.* (2017) [10], and Awad (2019) [2], yet higher than the 2.82% and 9.00% reported by Naghibi *et al.* (2012) [9] and Dongre *et al.* (2013) [5], respectively.

These discrepancies likely stem from geographical variation, sample size differences, or temporal shifts in disease prevalence. Ultimately, these results reiterate the utility of LFA as a rapid, field-applicable tool that facilitates the early intervention necessary to improve prognosis and limit viral transmission.



Fig 1: Confirmation of canine distemper virus infection using lateral flow assay

Conclusion

The present investigation evaluated the incidence of Canine Distemper Virus (CDV) using Lateral Flow Assay (LFA) diagnostic kits, recording a 17.5% positivity rate. This reflects a significant viral burden within the study population. Our findings demonstrate that LFA kits are an effective solution for rapid, on-site diagnosis, particularly in field settings lacking advanced laboratory infrastructure. By providing reliable results, these kits facilitate early detection and the timely initiation of therapy—factors essential for reducing disease severity, limiting transmission, and decreasing mortality. Ultimately, these results underscore the importance of integrating point-of-care diagnostics into routine veterinary practice and large-scale disease surveillance programs.

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