

# Feline immunodeficiency virus (FIV) in sick cats in Sri Lanka; prevalence, diagnosis, and treatment

## Abstract

Feline Immunodeficiency virus (FIV) is a lentivirus; significant pathogen in cats which causes a syndrome, with many similarities to Human Immunodeficiency Virus (HIV). The prevalence of disease is currently unknown in Sri Lanka as cage-side test kits for the viruses were not available until recently. This retrospective study evaluated 39 sick cats presented to Rover veterinary hospital since August 2018 till March 2019. They all shared a prior history of being bitten by another cat even though they were presented with different clinical signs. Out of 39, nine cats were positive for FIV anti body which was a share of 23 percent of the population selected. The diagnosis was confirmed by a commercially available ELISA test kit (Idexx SNAP FIV/FeLV Combo ®; IDEXX laboratories, USA); (FeLV-Feline Leukemia Virus).

All the cats were treated for the related diseases along with the treatment for FIV. Lamuvudine was the drug of choice; a class of medications called nucleoside reverse transcriptase inhibitors (NRTIs) which act by decreasing the amount of viremia. The medication was continued for 3 months in each patient at a dose of 20 mg/kg bid and have stopped once the animal has become clinically normal. The prognosis was determined by the improvement of clinical signs, curing of chronic bacterial infections, improvement of full blood count, FIV/FeLV SNAP and by differential cell count with regards to the lymphoblast percentage reduction in blood smears.

Out of the seven cats who recovered from the secondary infections, constipation and emaciation; blood smears were obtained while they were on Lamuvudine. A gradual reduction or no lymphoblast counts were observed in the blood smear of 4 cats over a period of three months during therapy. Seven cats recovered after the treatment while two cats were ceased. We attained a recovery rate of 77% in critically ill patients.

FIV positivity was associated with a history of bite wounds, male gender. Related clinical signs are most often a reflection of opportunistic infections. Early diagnosis of FIV is important for successful treatment to regain the immunity, better survival rates and screening is essential to prevent the spread of the disease.

**Keywords:** FIV, lamuvudine, SNAP, lymphoblast, bites

Volume 9 Issue 6 - 2020

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**Received:** July 24, 2020 | **Published:** November 11, 2020

## Introduction

Feline Immunodeficiency virus (FIV) is a Lenti virus infection that can cause immune suppression, predispose to secondary infections and immune mediated disease whereas many FIV infected cats remain healthy and life expectancy is often similar to uninfected cats. The prevalence of FIV can be up to 14% in healthy cats and 44% in sick cats.<sup>1</sup> The prevalence of the disease is currently unknown in Sri Lanka as cage-side test kits for the viruses were not available until recently.<sup>2</sup>

Most FIV infections occur after a bite wound from an infected cat, presumably through the inoculation of virus or virus-infected cells, thus more commonly affects free-ranging intact male cats, which are more likely to be involved in fights. The major immunological abnormalities observed in FIV-infected cats included a profound decline in the absolute number of the CD4+ T cells that caused the inversion of the CD4+/CD8+ T cell ratio and increased susceptibility to opportunistic infections and various clinic-pathological conditions.<sup>3</sup> FIV causes animmuno-suppression in two stages; a prolonged latent stage with minimal replication of virus without clinical signs and a later stage with severe immune suppression in the cat.<sup>4</sup> FIV increase the risk of opportunistic infections and neoplasia. HIV (Human immunodeficiency virus) and FIV have many properties in common. Lamuvudine is a HIV medication used in used in humans for HIV.<sup>5</sup>

Lamuvudine was the drug of choice; a class of medications called nucleoside reverse transcriptase inhibitors (NRTIs) which act by decreasing the amount viraemia. However, in literature, toxicities were observed in cats treated with zidovudine and lamivudine combination.<sup>5</sup> None of the research has tested FIV patients for lamuvudine alone so far.

## Case study

This retrospective study was evaluated 39 sick domestic cats, presented to Rover veterinary hospital since August 2018 till February 2019. Cats were tested for FIV/FeLV(FeLV-Feline Leukemia Virus) to evaluate possible underlying infection; to evaluate potential exposure to these viruses after a known fight with another cat. None of these cats had been vaccinated for FIV as it is not available in the country. FIV positivity was confirmed by commercially available ELISA test kits (Idexx SNAP FIV/FeLV Combo ®, IDEXX laboratories, USA) which has a documented sensitivity of 44% and specificity of 98% and 93.5% of sensitivity and 100% specificity (©2017 IDEXX Laboratories). Nine cats were positive for FIV and health records of them were reviewed to obtain history, signalment, clinical signs, laboratory findings, response to treatment and follow up findings. Prevalence of FIV infection in male cats (77%) was greater than in female cats(22%).

Out of the 9 cats; C1, and C2 cats were with severe constipation (Figure 1&2) after several weeks treatment, C3 had a jaw fracture with severe bacterial infection, C4 had a severe bacterial infection in nostrils and distorted nasal conchae, C5 had a wound on the hind leg with tendon damages and inflammation. C6, C7 were diagnosed to have consequently chronic fungal dermatitis and kidney disease. C8 was diagnosed with gastroenteritis where C9 with upper respiratory tract infection with swollen limb. Clinical signs of cats during presentation were summarized in Table 1. Weight loss and chronic emaciation and chronic multiple infections were a common sign in cats from C1-C9. C1 and C2 with constipation had large intestines comprised of thickened mucosa and sub mucosa which was observed in ultrasound scanning of the abdomen. During the surgery of C1 for removal of clogged fecal ball, enlarged lymph nodes were observed which are adjacent to thickened large intestine. FNA revealed small lymphocytic population which has not converted to a lymphoma. Blood smears of C1, C2, C4 and C9 had higher numbers of lymphoblast population. These lymphoblast's were overlapped (Figure 3) and identified as monocytosis in dot plot of lymphocytes in the FBC (Procyte IDEXX). Hence, it was seen as monocytosis. Other cats had leukocytosis with neutrophilia due to ongoing bacterial infections (Figure 1-3).

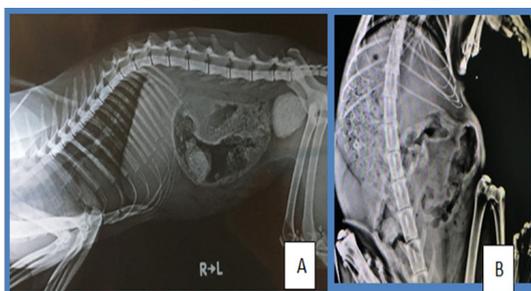


Figure 1 Abdominal radiographs of C1 (A) and C2 (B) with gas filled thickened bowels. B was taken after 3 days of enema and removal of fecal matter of C2.

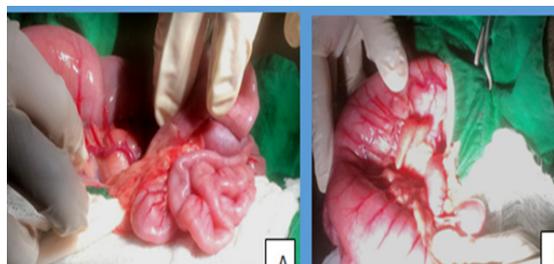


Figure 2 Abdominal surgery of C1, A - Arrow shows thickened bowel of > 5m, arrow head - enlarged LN. B- enlarged lymph nodes.

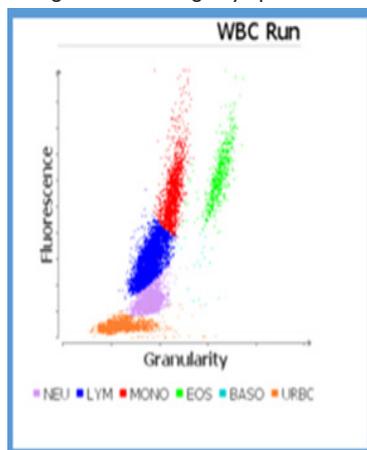


Figure 3 WBC dot plot of C2 - overlapped populations of Lymphocytes and monocytes due to lymphoblasts (arrow) and overlap of Neutrophils and lymphocytes due to severe secondary infections.

Table 1 Clinical signs of FIV positive cats

Name	Animal	Clinical signs at presentation
Rocky	c1	Severe constipation
Orange	c2	Severe constipation
Rosi	c3	Jaw fracture with severe bacterial infection
Kitty	c4	Severe bacterial infection in nostrils and distorted nasal conchae
Mimi	c5	Wound on the hind leg with tendon damages and inflammation.
Jett	c6	Fungal dermatitis
	c7	Kidney disease
Pinky	c8	Fever ,vomiting
Nangi	c9	Sneezing, upper respiratory tract infection, swollen limb with wounds

The chosen medication was Lamuvudine, at a dose of 20 mg/kg bid. All the cats were monitored during the treatment and any toxicity signs were not observed for lamivudine in any of the cats. Lamuvudine was continued for 3 months in each patient and stopped once the animal has become clinically normal. The prognosis was determined by improvement of clinical signs, curing of chronic bacterial infections, FBC and by differential cell count with regard to lymphoblast percentage reduction in blood smear. Differential counts were observed every 7-10 days to monitor the prognosis. The percentage of lymphoblasts has reduced drastically within one month of the treatment. Follow-ups of these patients were performed monthly until recovery. The secondary infections, constipation and emaciation had resolved in all cats except 2 which were deceased. C3 was deceased due to septicemia after 10 days of admittance and c7 due to kidney disease. Reduction or no lymphoblast counts were seen in blood smears of C1, C2, C4 and C9 (Figure 4).

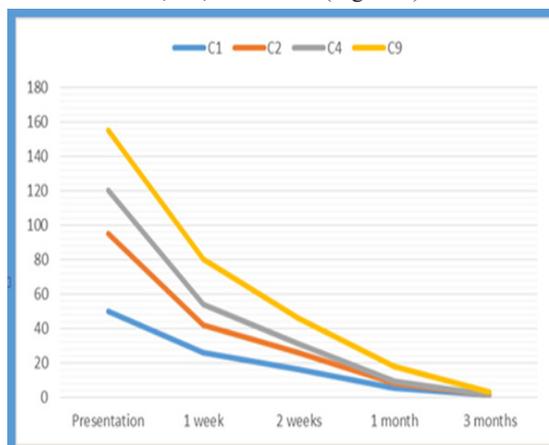


Figure 4 Lymphoblastic count in the differential cell count of blood smear of C1, C2, C4 and C9.

### Discussion

Prevalence studies have to be carried out to know the exact seroprevalence of the disease in Sri Lanka which is important for the feline medicine practitioners. Using diagnostics can lead to less confusion on chronic non-healing infections, cause un-identified constipations and lymphocytic neoplasms.

Even though the test kits are available, SNAP IDEXX (US) test kit is unable to differentiate the antibodies from vaccine and antibodies

from the disease.<sup>6</sup> However, since vaccines are not available in Sri Lanka and all cats had no history of immunization for FIV, all positives were identified as diseased patients. Differential cell count was used as a prognosis indicator in cats who had a higher initial number of lymphoblasts. This could not be used in other cats since lymphoblast were available in >50% of the cases. However, SNAP Combo was positive for FIV in many cats when we have repeated the test even after lymphoblastic counts were within normal margins. It is an essential need to establish a proper method for monitoring the viremia in the patient and activeness of the disease. No literature was found on effective prognosis markers.

Although toxicities were observed in cats treated with zidovudine and lamivudine combination. In this study any toxicity signs were not diagnosed in any of the patients so far. Due to the cost and the lack of availability of the medication, it was hard for the owners to continue with it for more after diseases were resolved. Hence, long term use of medication and toxicities are unknown.

### Acknowledgments

All the staff members of Rover veterinary hospital who treated these patients as hospitalized cases Laboratory and assistant staff.

### Conflicts of interest

Author declares that there is no conflict of interests.

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