



Use of Vinegar as A Candidate Substitute Of Acetic Acid (CH_3COOH) in The Rivalta Test Method in Diagnosis Feline Infectious Peritonitis (FIP) Domestic Cat

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Abstract

This study aims to test the samples of abdominal fluid from cats suspected of having FIP by using vinegar as a substitute for acetic acid in the rival method. Feline Infectious Peritonitis (FIP) is a viral disease that is not zoonotic, but is very fatal with an infectious prognosis in various types of cats and it's transmitted orally. This study aims to determine the positive or negative results of FIP infection in cats. The diagnosis of FIP can be seen through clinical symptoms such as lack of appetite, diarrhea, weakness, dehydration (reaching 8%), Body Condition Score (BCS) 2, enlarged abdomen, and ultrasound results showing ascites and swollen kidneys. This study uses vinegar as a substitute for acetic acid in the rival method. The test was carried out experimentally in a laboratory. The research data were analyzed descriptively, the results of a positive FIP reaction were indicated by the presence of a cloudy jellyfish-shaped precipitate in the test tube.

Keywords: vinegar, feline infectious peritonitis, acetic acid

Background

Feline Infectious Peritonitis (FIP) is caused by a corona virus with a high mortality rate in cats, especially in kittens. The virus is a type of protein-coated single-stranded RNA virus from the *Coronaviridae* family. The FIP virus is a virulence form of Feline Enteric Coronavirus (FECV) which develops with enteric mutations. FECV (non-lethal) and FIPV (lethal) that can infect simultaneously in the body (Abbas *et al.*, 2014).

Defining the diagnosis of FIP is difficult, especially at the beginning period of the infection. This is due to the expensive testing fee to detect the FIP virus in cats such as the FIP rapid test. As a result of unclear clinical signs of FIP in cats, and occurs together with other diseases, often causing delays in diagnosis and treatment.

As an alternative to using the expensive FIP rapid test, diagnosing FIP cases in cats can also be done by examining the protein and albumin levels of the cat's peritoneal fluid using the rivalta test method, but the reagents in this test requires acetic acid (CH_3COOH) which is also difficult to

obtain. The rivalta test is a very simple test, but due to the limited availability of acetic acid, not all veterinary clinics offer this test. A very simple alternative as a substitute for acetic acid with a similar chemical composition is to use vinegar.

Vinegar is often used as a cooking additive, very acidic, with a pH of about 2.5. Vinegar usually containing 4-18% of acetic acid, it can be obtained easily at a relatively cheap price compared to the Rapid test and Rivalta test using the CH_3COOH reagent. Based on the problems above, it is necessary to conduct an experiment to study the use of vinegar as a substitute for acetic acid (CH_3COOH) to detect FIP infection in cats.

Materials and Methods

The tools and materials used in this study were a stethoscope, thermometer, surgical/minor set (scissors, scalpel, and tweezers), 3 ml syringe, test tube, distilled water, vinegar, and a cat diagnosed with FIP.

Research procedure

The FIP cats are first examined for body temperature, respiratory rate, heart rate, weighing and observation of other clinical signs such as enlargement of the abdomen which contains fluid. Then the abdominal fluid is removed by systoabdominal method. Then do the Rivalta Test Examination.

The Rivalta test is a conventional examination that is often carried out to date to distinguish negative or positive Rivalta test results. Interpretation of the Rivalta test is done by assessing whether there is turbidity after pleural effusion fluid is dripped into distilled water containing glacial acetic acid (Salmah and Culla, 2018).

The test was carried out using a 10 ml test tube filled with 10 ml of distilled water, added 1 ml of acetic acid (98% highly concentrated vinegar), and homogenized. Place 1 drop of pleural effusion fluid carefully on the surface of the solution. The Rivalta test result is negative if the droplet drop disappears and the solution remains clear. If the droplet remains attached to the surface or slowly floats to the bottom of the tube (like a jellyfish), a positive result is determined.

In the FIP case, the positive Rivalta Test Prediction Value (NPV) is 96%, while the Negative Predictive Value (NPN) is 76%. Positive results were also found in cats with peritonitis caused by bacteria. Meanwhile, effusion can be differentiated through PCR examination, Neutralization test, and bacterial culture (Levy, 2014).

Data Analysis

The data obtained were analyzed descriptively.

Results and Discussion

The FIP is a viral disease that is not zoonotic, but is very fatal in cats (especially in kittens and old cats over 10 years old). The FIP is common at the age of 6 months to 2 years. Domestic cats more than 5% die due to FIP (Arimbi, 2010). However, the majority of infected cats show no obvious symptoms, but actually the virus is still developing in the body (Simons *et al.*, 2005). The FIP is subclinical type disease

and has potential as a carrier. Common clinical symptoms that occur in cats with FIP are fever, decreased appetite, lethargy, weight loss, incoordination, and ascites. It is also often found vomiting, diarrhea and jaundice. (Uliantara and Suparti, 2014).

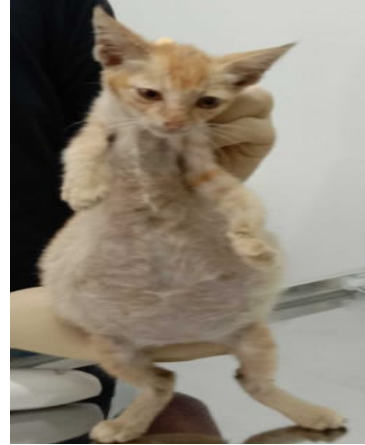


Figure 1. Enlarged on abdominal section of a cat suspected of FIP

The vinegar used for the Rivalta test in this study was used as a substitute for acetic acid in detecting positive or negative FIP. The advantages of the Rivalta test are that the method is simple, the materials used are inexpensive, do not require special laboratory equipment, and can be done quickly in vet clinics. This test is useful to see the difference between an effusion (peritoneal fluid) caused by FIP or by another disease. The high protein content, fibrin concentration and inflammatory mediators cause a positive reaction (Levy, 2014).

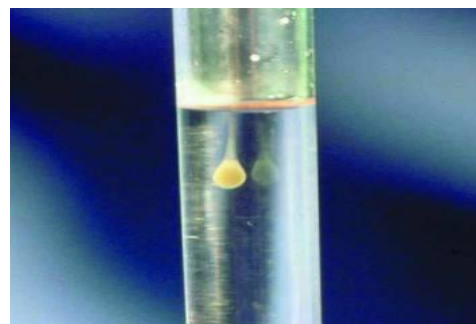


Figure 2. Positive Rivalta test in cats (Levy, 2014)

The Rivalta test is useful for seeing the difference between transudate and exudate of an effusion fluid. The principle of the test is the formation of a precipitate

when the effusion fluid sample is added to an acetic acid solution (Fischer *et al.*, 2012). In this case, a positive Rivalta test reaction is useful to see the presence of high protein content, fibrinogen concentration, and inflammatory mediators in an effusion. Therefore, the effusion fluid contains a lot of leukocytes and cellular infiltration so that chemical changes occur, namely the process of decreasing glucose and increasing protein (Ariharyani *et al.*, 2014). The test has a sensitivity of 91.3% with a specificity of 65.5% in diagnosing FIP (Rotoro and Puspitasari, 2014).

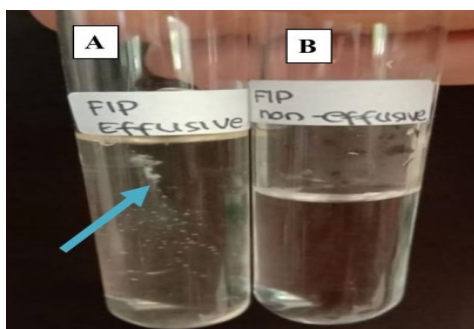


Figure 3. Results test Rivalta test. (A) Sign arrow blue reaction positive precipitate murky resemble fog. (B) Reaction negative

According to Rotoro and Puspitasari (2014), so far FIP treatment is still carried out within supportive and symptomatic treatment. The therapy given for the FIP is antivirals, glucocorticoids, and immunostimulants. In this case the drugs given were corticosteroids anti inflammation drugs (methylprednisolone) and multivitamins in the form of vitamin B12, vitamin B complex, and vitamin C.

The success of using vinegar as a substitute for acetic acid in detecting FIP in cats has helped students carry out small animal internal medicine practicums. Besides that, it can assist Veterinary Internal Medicine Co-assistant students in detecting cats *suspected of* FIP with this method.

Conclusion

The FIP is a disease that is often experienced by cats with high mortality so it is necessary to have an ingredient that can support the results of the diagnosis for early prevention of FIP cats.

From the research obtain that the vinegar can be used as a substitute for acetic acid in the Rivalta test method in detecting cats with *suspected* FIP. The test reagent is easy to obtain at a more affordable price

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