First Case of **Babesia Vogeli** in a Cat in Vietnam

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Abstract

A 15 years-old female British long hair cat was presented to a private veterinary clinic in Hanoi, Vietnam showing anemia, weakness, lethargy, weight loss and nose bleeding. Clinical examination of the cat showed pale mucous membrane, high fever, and shortness of breath. Amplification and sequence of the 18S rRNA gene follow by phylogenetic analysis, **Babesia vogeli** was confirmed with 100% and close to reported sequences from China, Thailand, and Japan. This is the first report of **Babesia vogeli** in cat in Vietnam.

Keywords: **Babesia vogeli**; Cat; Vietnam; PCR

Introduction

Babesia species are intracellular apicomplexa parasites transmitted by ticks [1]. Members of this genus are naturally infectious to a wide variety of mammals, inclusive of cats. Babesia in domestic cats is a rarer infection in comparison with its canine infection. Subsequent cases of infection were also published in some countries such as: Brazil, France, Germany, Thailand and Zimbabwe [2-4]. The first molecular evidence of **Brucella canis** infection in cats was reported after a partial amplification of the rRNA gene from feline blood in Spain and Portugal [5].

In 2003, an 18S rRNA gene-based PCR method was developed to the detection and distinction expressly of Babesia species [6]. Currently, in Vietnam to diagnosis of Babesiosis, it is common to use Giemsa-stained method and observe the morphology and developmental stages of Babesia under the light microscope. However, Babesia parasites are hard to detect by light microscope, specifically during the chronic phase of Babesiosis when parasitemias are low. Besides, the occurrence of molecular evidence of Babesia infection among normal cats in Vietnam has not previously been reported to date. Therefore, the purpose of this research was to use PCR assay based on 18S rRNA gene to accurately determine the prevalence of Babesia species in Vietnam.

Case Presentation

A 15 years-old female British long hair cat was presented to a private veterinary clinic showing anemia, weakness, lethargy, and epistaxis. Clinical examination of the cat showed pale mucous membrane, high fever (40°C) and weight lost with histological of tick infection. Approximately 2 ml of blood was obtained aseptically from the jugular vein for hematological and biochemical analysis. Complete blood count revealed the strongly regenerative anemia (Hematocrit = 7.3%), accompanying a dramatic decrease of erythrocyte (3.8 × 1012/l), hemoglobin (8.7 g/dl) and platelets (170 × 109/l). Serum biochemistry showed a moderate increase in alanine transaminase (ALT; 240 IU/l) and AST (370 IU/l) with increasing of creatinine level (434 mg/dl) (Table 1).

Thin blood smears were prepared and used Giemsa-stained method, after that examination under a light microscope. Molecular identification of **B. vogeli** was performed by amplifying the 18S rRNA gene-based PCR method. The DNA was extracted using the DNeasy Blood & Tissue Kit (QIAGEN, Valencia, CA, USA) according to the manufacturer's instructions. Fragment of the 18S rRNA of Babesia spp. amplified a 422 bp to 440 bp using conventional PCR with a primer set, 18S primers: 18SS-forward: GTTCTGACGCTGTAAC and 18SF-forward: TTTCTGMCCTCATCAGCTTGA [7], following the conditions: denaturation at 94°C for 10 min, followed by 40 amplification cycles (94°C for 30 sec, 60°C for 30 sec and 72°C for 30 sec) and a final extension at 72°C for 5 min. Phylogenetic analysis was, realize based on the variable region of the Babesia 18S rRNA gene, the sequences identified in this study were compared with the homologous sequences on GenBank, the phylogenetic tree were constructed by the neighbor-joining method using the Kimura 2-parameter model. Bootstrap value were 1000 replicates with MEGA X software. **B. vogeli** in this study was 100% to the sequences reported from China, Thailand, and Japan. (KY073363.1, KF621074.1, AY077719.1) (Figure 1).

Discussion

The results of this study are the first molecular evidence of **B. vogeli** infection in cats in Vietnam. The first report of **B. vogeli** infection in cats was from Bangkok, Thailand with infection rate of 1.4% out of a total of 1,490 stray cat’s positive [8]. **B. vogeli** is commonly reported in dogs, however, seems to be increasingly widespread in domestic cats, with reports of high prevalence of this species in cats, for example, 16% on Brazil [9,10], 13% on St Kitts [11] in the Americas, 8.1% on Portugal [12] in Europe, 2.9% on Qatar in the Middle East [13] and Thailand [8] in Asia.

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Cats infected with Babesia spp. are related to anorexia, lethargy, anemia, and icterus. In a research on B. felis, most cats showed symptoms of anorectic, lethargic and hypochromic microcytic anemia; In addition, hyperbilirubinemia and Alanine Aminotransferase Activity (ALT) at a high rate (86% to 89%) [14].

Main clinical signs commonly found with B. vogeli infection: fever, lethargy, anorexia, jaundice, Immune mediated Haemolytic anemia, non-regenerative anemia, leukocytosis, leukopenia, and thrombocytopenia [15]. Although B. vogeli in cats has been detected in some countries around the world by molecular methods, but, the clinical features of B. vogeli infection in cats have not been well described. In this case, the cat showed anemia, weakness, and epistaxis. The clinical sign of weakness and anemia may cause by rapid increasing of Babesia organisms in peripheral blood vessels leading to decrease in level of hemoglobin, erythrocyte and hematocrit (Table 1). Although B. vogeli in cats has been detected in some countries around the world by molecular methods, but, the clinical features of B. vogeli infection in cats have not been well described. In this case, the cat showed anemia, weakness, and epistaxis. The clinical sign of weakness and anemia may cause by rapid increasing of Babesia organisms in peripheral blood vessels leading to decrease in level of hemoglobin, erythrocyte and hematocrit (Table 1).

Epistaxis evident was well reported in various infections including babesiosis [16] and nose bleeding in this study case may cause by rapid increasing of Babesia organisms in peripheral blood vessels leading to decrease in level of hemoglobin, erythrocyte and hematocrit (Table 1).

Evidence of this cat with tick infected histologically was confirmed by the owner but the tick species was not clarified. It is well known that Rhipicephalus sanguineusiss commonly found in Vietnam [20,21]. On the other hand, evidence of B. vogeli in Rhipicephalus sanguineus tick in Vietnam was reported recently [22]. Present of tick may prove as an important risk factor for transition B. vogeli in this study.

This report raises awareness for cat owners in controlling of blood sucking agent in the animal and environment surrounding, especially in the endemic area to prevent this infection. Further research is required to better understand this pathogen, including host susceptibility factors. Moreover, if any abnormal clinical signs have been observed on the animal such as weakness, anemia, weigh loss it should be delivered to the animal clinic to promptly receive the appropriate treatment.

Conflict of Interest
The authors declare that they have no conflict of interest.

Ethics Approval and Consent to Participate
Informed consent and agreement were obtained from cat's owner. The examination of animal was conducted with regards to their welfare.

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References


