



## Research Article

# BACTERIOLOGICAL EVALUATION OF DOGS WITH SIRS

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**Abstract-** The objective of this study was to demarcate the septic and non septic dogs with SIRS and to describe the variety of bacteria involved. The study was conducted in 110 dogs of which 80 clinical cases of dogs, which had SIRS, and 30 normal healthy dogs which were taken as control group. Bacteremia was detected by blood culture in 72% (80/110) of dogs and 0% (0/30) of control dogs. Bacteria cultured from blood included *Escherichia coli* (70% of all isolates), *Staphylococcus sp* (20%) and *Bacillus sp* (10%). It was concluded that blood culture was a reliable and standard test for demarcating dogs with septic and non septic SIRS compared with other diagnostic modalities.

**Keywords-** Septic SIRS, Bactremia, Blood culture

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## Introduction

Systemic inflammatory response syndrome (SIRS) is defined as a systemic response of the body to various infectious and non-infectious conditions and it is one of the major causes of mortality and morbidity in dogs. SIRS is the clinical manifestation of the body's response to an urging stimulus that causes systemic release of circulating inflammatory mediators [1], which has its clinical expression during the acute phase reaction is considered to be present based on SIRS criteria [2]. Bacterial infections are an important cause of morbidity and mortality in the dogs with SIRS. In a study, they observed that 49 (39 dogs, 10 cats) were bacteremic in the study 100 of critically ill dogs and cats. They also reported that gram-negative rods were the most common organisms isolated from the blood of dogs with bacteremia (46%) [3]. In an another study, they reported that Enterobacteriaceae and coagulase-positive Staphylococci were the most common bacteria found in the blood of ill dogs [4]. The dogs with SIRS presented at the Madras Veterinary College Teaching Hospital were evaluated for bacteriological study. The objectives of this study were to estimate the bacteriological study among dogs with SIRS and describe the variety of bacteria found in dogs with SIRS.

## Materials and Methods

The study was carried out at small animal outpatient unit and Emergency and Critical Care Unit (ECCU) of Madras Veterinary College Teaching Hospital (TANUVAS), comprised of healthy dogs and dogs with SIRS. Apparently healthy adult dogs of different breeds, sex, aged between 4 to 8 years, attending to the outpatient unit for general health check up and vaccination were selected for the study. They were grouped into two groups as follows, Group I apparently healthy dogs (30 dogs) and Group II SIRS dogs (110 dogs) were selected. According to the author [2], dogs presented with more than two of following clinical signs were considered as SIRS.

Temperature	<100°F or >103.5°F
Heart Rate	>160 beats per minute
Respiratory Rate	>20 beats per minute
Leucogram	<4000 or >12,000 cells/μL.

## Blood sample collection and processing

Whole blood samples were collected from dogs for culture. Prior to venipuncture, hair was shaved, skin was disinfected by vigorous scrubbing with povidone-iodine (7.5%) detergent, followed by one swabbing with isopropyl alcohol (99%) and one swabbing of povidone iodine (10%) solution. Five milliliters of blood were then drawn from traceable vein with a disposable syringe and a varying gauge needle based on the size of the dog. The blood samples were stored at 4°C in the nutrient broth until the culture has been performed and bacteriologic culture of blood samples were assessed in Centralized Clinical Laboratory.

## Bacteriological analysis

The blood samples were inoculated in nutrient broth and kept in incubator at 37°C over night. The broths were screened for the presence of turbidity. From the turbid broth, the inoculums were streaked on blood agar and kept in incubator at 37°C over night. After 24 hours, the colonies were examined for their morphology including the colonies surface patterns, shape, growth pattern and hemolytic reaction on blood agar. Further, the colonies were inoculated on differential and selective media like Edwards medium, Mannitol salt agar, Mac-conkey agar, and Eosin-methylene blue agar culture plates and were incubated at 37°C. After evaluation of colony morphology on plated media, Grams stain was performed to identify gram-positive and gram-negative organisms. Selected spectra of biochemical tests like catalase and oxidase test were also carried out to aid diagnosis. For samples with mixed infection that revealed the presence of more than one bacterial genus, subculture of colonies were performed. Single colonies were selected and streaked on media to obtain pure culture and Grams' staining

and biochemical tests were performed for identifying the organisms [5].

### Results and discussion

Blood culture was done with blood samples collected from 80 dogs with SIRS condition [Fig-1 & 2]. Among them, 50 dogs tested positive for the presence of bacterial growth with the isolates of *E. coli* (35 cases, 70%), *Staphylococcus Sp* (10 cases, 20%) and *Bacillus Sp* (5 cases, 10%) [Fig-3]. Sepsis were commonly associated with gram-negative enteric bacteria, gram-positive bacteria and mixed infections. The sources of such infections included from gastrointestinal and genitourinary systems (Gram-negative sepsis), skin, injured soft tissue (Gram +ve sepsis). Moreover, the common isolates characterized from culture were *E.coli*, *Enterococcus sp*, *Clostridium sp*,  $\alpha$ -hemolytic *Streptococci* from the septic dogs. The bacterial culture and sensitivity of blood and infected tissue were found to be mandatory for a sepsis case to differentiate from non-septic SIRS [6]. The present study was done to demarcate the septic patients from non-septic SIRS using blood culture method of the above author. In another study, the observed that the bacterial culture of blood from SIRS dogs revealed single organism infections namely *Escherichia coli*,  $\beta$ -hemolytic *Staphylococcus intermedius*, *Salmonella typhimurium*, *Methicilin Resistant Staphylococcus aureus* and *Actinobacter sp*. Of which infections caused by single organism gram-negative bacteria *Escherichia coli* evidenced most frequently [7]. The present study had 70% of *E. coli* pathogens, which were in concordance with the study of the above author.



Fig-1 Metallic sheen of *E.coli* in Eosin –Methylene Blue (EMB) agar

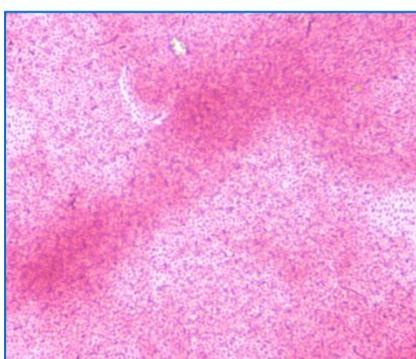


Fig-2 Gram-negative rods of *E.coli*

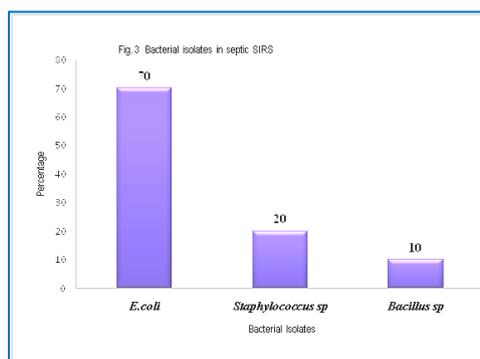


Fig-3 Bacterial isolates in Septic SIRS

### Conclusion

Bacteremia were identified among the dogs with septic SIRS in the study presented here, with the most frequently cultured bacteria being *Escherichia coli*. Bacteremia appeared to be a demarcating factor for septic SIRS from Non septic SIRS. As one would expect, development of bacteremia as increased the risk of death, so early recognition of the problem, as well as appropriate treatment, may be beneficial in increasing survival rates of SIRS dogs. Hence, identification of septic patients and their sensitivity found to be important in selection of antibiotics to reduce mortality.

**Conflict of Interest: None declared**

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