INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 4, Issue 4)
Available online at: www.ijariit.com

Choice of antibiotics/antiviral agents in patients with sepsis of different aetiologies

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ABSTRACT

Sepsis is a potentially life-threatening complication of an infection. Sepsis occurs chemical released into the bloodstream to fight the infection trigger inflammatory response through the body. This inflammation can trigger a cascade of changes that can damage multiple organ systems, causing them to fail. Septic shock is defined as sepsis associated with hypotension and perfusion abnormalities despite the provision of adequate fluid resuscitation. Patients with septic shock who are receiving inotropic or vasopressor therapy might still exhibit perfusion abnormalities, despite the lack of hypotension. This was a prospective observational study, which included 75 patients admitted in Pushpagiri Medical College Hospital. The study was done to evaluate the choice of drug in patients with sepsis along with the type of organism and time of treatment, and additional therapy is given to the patient. From the present study, it was suggested that the use of antibiotic therapy, especially a broad spectrum antibiotic was the most appropriate initial therapy. Majority of the population uses the broad spectrum antibiotic (Piperacilline-tazobactam), because of the increased anaerobic or aerobic coverage to kill the bacteria. In critically severe patients, a combination of two or more antibiotic is preferred. But there is no difference in overall mortality between monotherapy and combination therapy. The most common causative organism for bacterial sepsis is a gram-negative organism. In a gram-negative organism, Escherichia coli is the most. The time of treatment is very important in the treatment of sepsis. Administration of antibiotics within one hour from admission showed better prognosis when compared with treatment started after one hour, so the time must be taken into consideration for the treatment of sepsis Early goal-directed therapy are given in order to treat hypoxemia, hypotension, hypovolemic conditions of patients. Vasopressors are preferred in certain conditions were IV fluids fails to correct the circulatory dysfunctions.

Keywords— *Sepsis, Septic shock, Antibiotics, Systemic inflammatory response syndrome, Early goal directed therapy*

1. INTRODUCTION

Sepsis is a potentially life-threatening complication of an infection. Sepsis occurs chemical released into the bloodstream to fight the infection trigger inflammatory response through the body. This inflammation can trigger a cascade of changes that can damage multiple organ systems, causing them to fail.[1]Septic shock is defined as sepsis associated with hypotension and perfusion abnormalities despite the provision of adequate fluid resuscitation. Perfusion abnormalities include lactic acidosis, oliguria or an acute alteration in mental status. Patients with septic shock who are receiving inotropic or vasopressor therapy might still exhibit perfusion abnormalities, despite the lack of hypotension.[2]

Sepsis is a clinical syndrome that develops as a response to a severe infection in the body. The resulting inflammation caused by the infection results in various systemic response such as dilation increased leakage from blood vessels. The spread of the infection results in increased heart rate, respiratory rate, temperature. This is called the systemic inflammatory response syndrome (SIRS). These responses can result in low blood pressure or inadequate perfusion of tissues and organ failure in the body. Poor perfusion puts these organs and tissues at risk for damage from ischemia, and lack of oxygen supply. Septic shock is a more severe form of sepsis, which result to produce hypotension and inadequate tissue perfusion persists despite the administration of adequate intravenous fluids. The results can be serious damage to multiple organs in the body and death. The common infection that causes sepsis include pneumonia and urinary tract infections, but any severe infection has potential to cause sepsis.[3]

If sepsis progress to septic shock, which is characterized initially by a normal or high cardiac output and a low systemic vascular resistance. Hypotension is caused by the low systemic vascular resistance as well as alterations in macrovascular and

microvascular tone, severe sepsis is defined as the presence of sepsis and one or more organ dysfunctions. Organ dysfunction can be defined as acute lung injury, coagulation abnormalities, thrombocytopenia, altered mental status, renal, liver or cardiac failure or hypoperfusion with lactic acidosis. Septic shock and hypotension, the systolic blood pressure less than 90 mm Hg, diastolic pressure decrease to 40mm Hg.[4]

The aim of the study is to evaluate the choice of antibiotic/antiviral agent in patients with sepsis of different etiology.

2. OBJECTIVES

- To assess the antibiotic / antiviral therapy with respect to their indication and severity.
- To find out the most common organism causing sepsis.
- To analyze the time of treatment started after the hour of diagnosis.
- To assess the need for additional therapy.

3. MATERIALS AND METHODS

Study design: prospective, observational study.

Study site: Department of General medicine, Pushpagiri Medical College Hospital, Thiruvalla

Study period: This study was conducted for a period of 6 months (January 2018 to June 2018).

Sample size: 75 patients diagnosed with sepsis.

Source of data and materials: Patients prescriptions, patient case sheets, data collection form, lab reports.

Inclusion criteria: Patient age above 18, Patient admitted in the department of general medicine in pushpagiri medical college hospital, Thiruvalla, Those who give consent voluntarily to participate in the study, both male and female.

Exclusion criteria: Patients who not willing to give consent, Neonate, and children, pregnant women, congenital abnormality.

Method of data collection: The study was carried out after taking approval from the institutional ethics committee. The informed consent of patients was taken prior to the study. A standardized data collection form was prepared and necessary data were collected which includes the demographic details, socioeconomic status, past medical history, past medication history, current medication. The choice of antibiotic/ antiviral therapy, time of treatment started and the need for additional therapy was assessed in the patient's case file. The most common organism causing sepsis were assessed from the bacteriology and virology department. All the information regarding the study were collected from the case record and discussion conducted with bystander during ward rounds, with the support of a physician.

Ethical consideration: The institutional ethics committee clearance was obtained (IEC No is PCP/E1/01A/01/2018) after that started the study. Informed consent was obtained from all patients who met the inclusion criteria were enrolled for the study.

4. RESULTS AND DISCUSSION

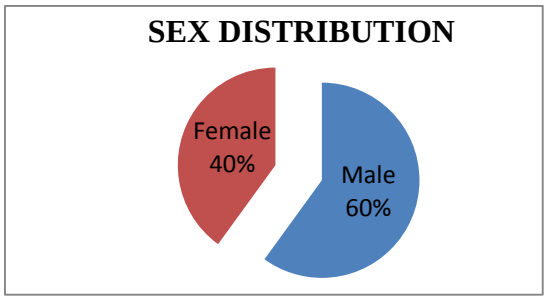

Fig. 1: Distribution of patients based on gender

The overall study populations showed that male patients were more in number (60%) than female patients (40%). A similar study was observed in **Peter Pillans *et. al*** [5]

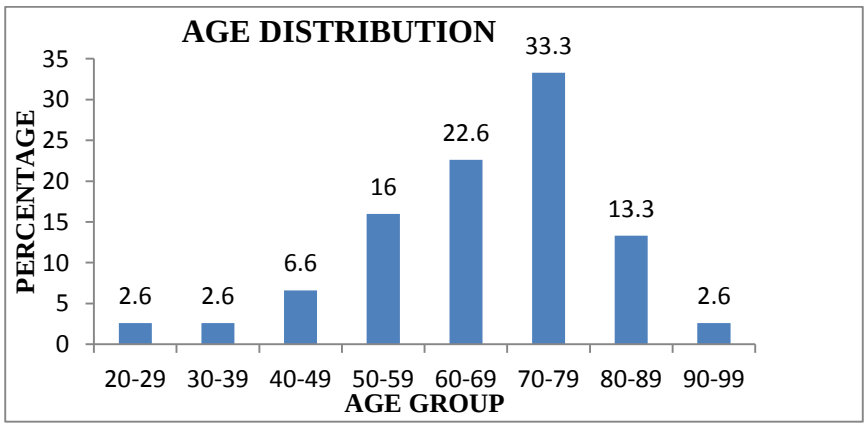

Fig. 2: Distribution of patients based on age

Patients above 18 years old were the inclusion criteria and the mean age 66.37 (±9.12). In this study patients coming into the age group (70–79) were found to be more prone to sepsis. A similar study was conducted by by **Chin-Ming Chen *et. al*** [6]

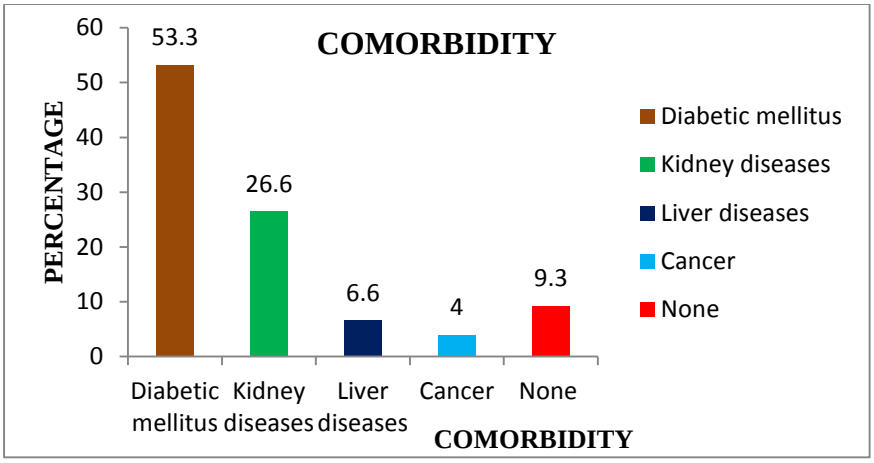

Fig. 3: Distribution of patients based on comorbidity

Among the study population, the majority of the population (53.3%) having a diabetic complication, followed by kidney problem (26.6%), liver disease (6.6%) and cancer (4%).

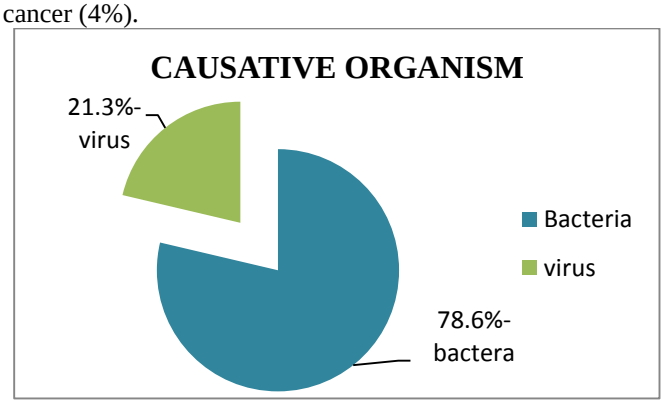

Fig. 4: Distribution of patients based on causative organism

Out of 75 patients, 78.6% patient was diagnosed with bacterial sepsis, 21.3% of patients were diagnosed with viral sepsis.

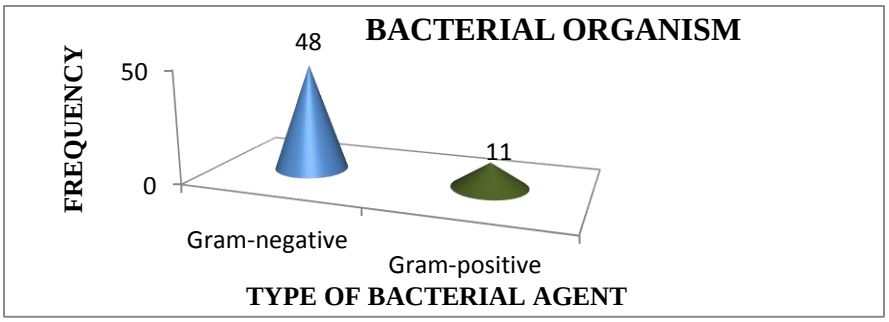

Fig. 5: Distribution of Patients Based on Bacterial Organism

Out of 59 patients, 48 patients have diagnosed with the Gram-negative bacterial organism, and 11 patients were diagnosed with Gram-positive bacteria organism.

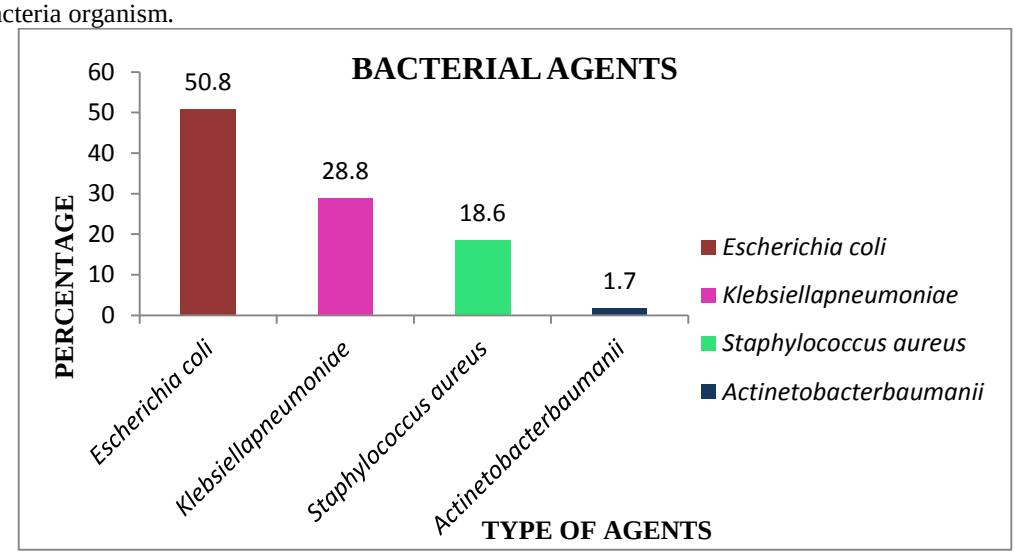

Fig. 6: Distribution of patients based on type of bacterial agents in gram-negative and positive

Out of 59 patients, 50.8% patients were detected with *Echerichia coli*, 28.8% patients were detected with *Klebsiella pneumonia*, 18.6% were *Staphyloccusaureus*, and 1.7% patients were detected with *Actinetobacterbaumanii*

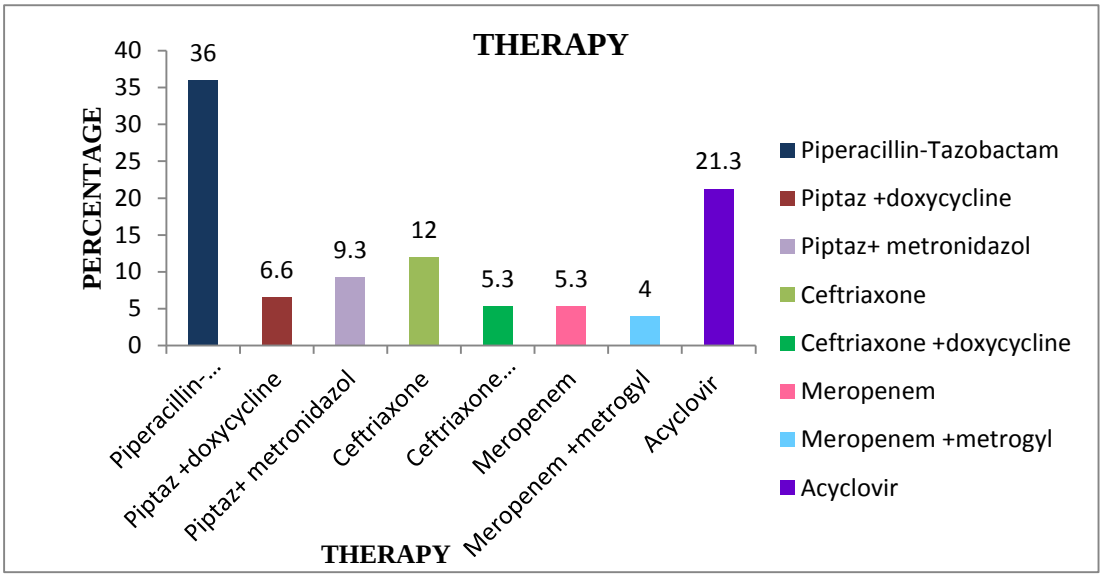

Fig. 7: Distribution of patients based on therapy

In the study population, 36% patients were treated with piperacilline-Tazobactam, 6.6% patients were treated with piperacillin-tazobactam +doxycyline, 9.3% patients treated with piperacillin-tazobactam+metronidazol, 12% treated with ceftriaxone, 5.3% patients treated with ceftrixone +doxycycline, 5.3% patients were treated with meropenem, 4% patients were treated with meropenem +metronidazole. And antiviral therapy acyclovir in 21.3% of patients. The P value of the therapy is P<0.0001 and hence significant

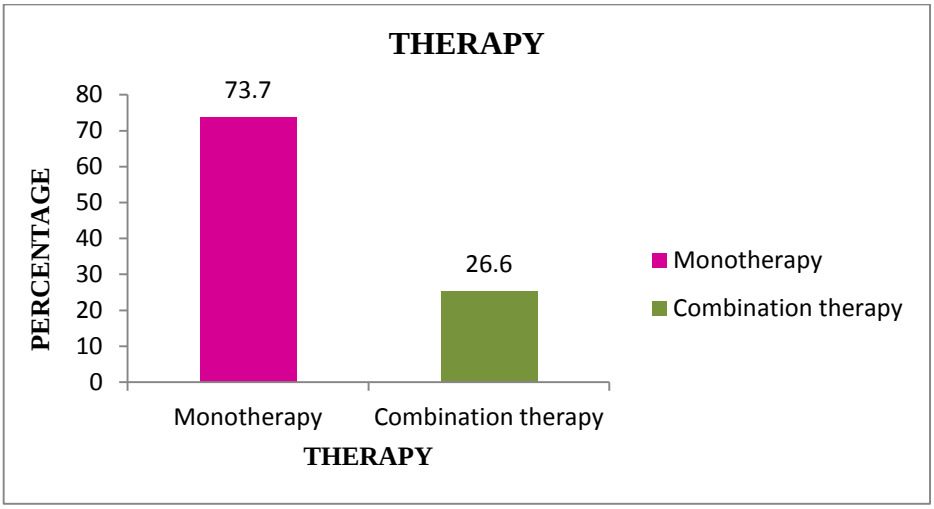

Fig. 8: Distribution of patients based on monotherapy and combination therapy

Among the study population, 73.7 % patient followedmonotherapy, and 26.6% patient followed combination therapy

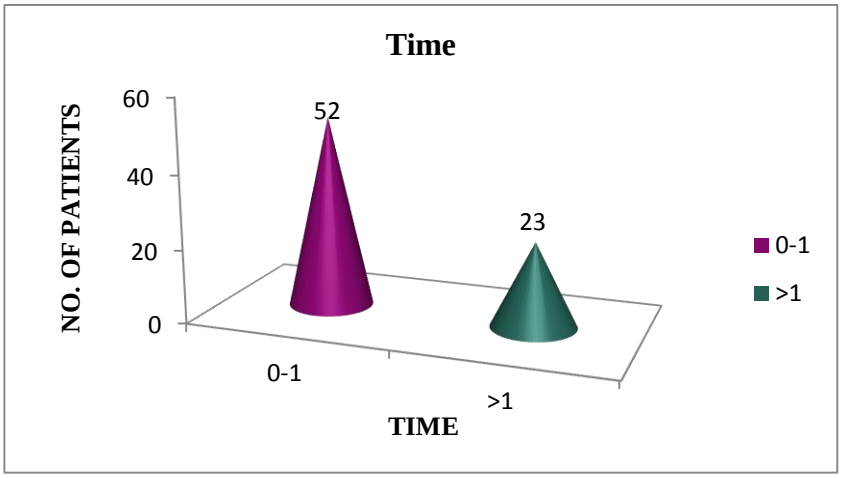

Fig. 9: Distribution of patients based on time of drug administration

Among the study population, the drug administration categorized into 0-1 and 1-2. 69.3% patients received antibiotic therapy within the 0-1 hour and 30.7% patients received antibiotic therapy >1 hour

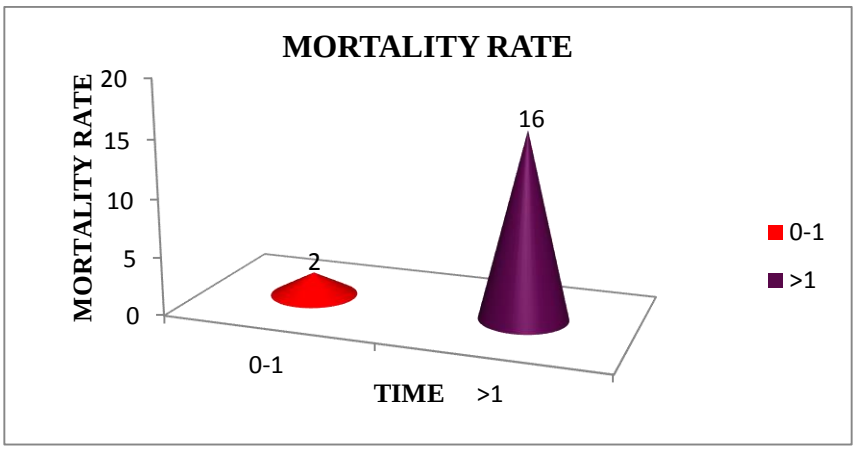

Fig. 10: Time of administration and mortality rate

The number of death reported in 0-1 hour 11.1% and >1 hour were 88.8%. This result was similar to **Richard Y. Kim *et al*** [7]. From the observation, it is clear that time has.

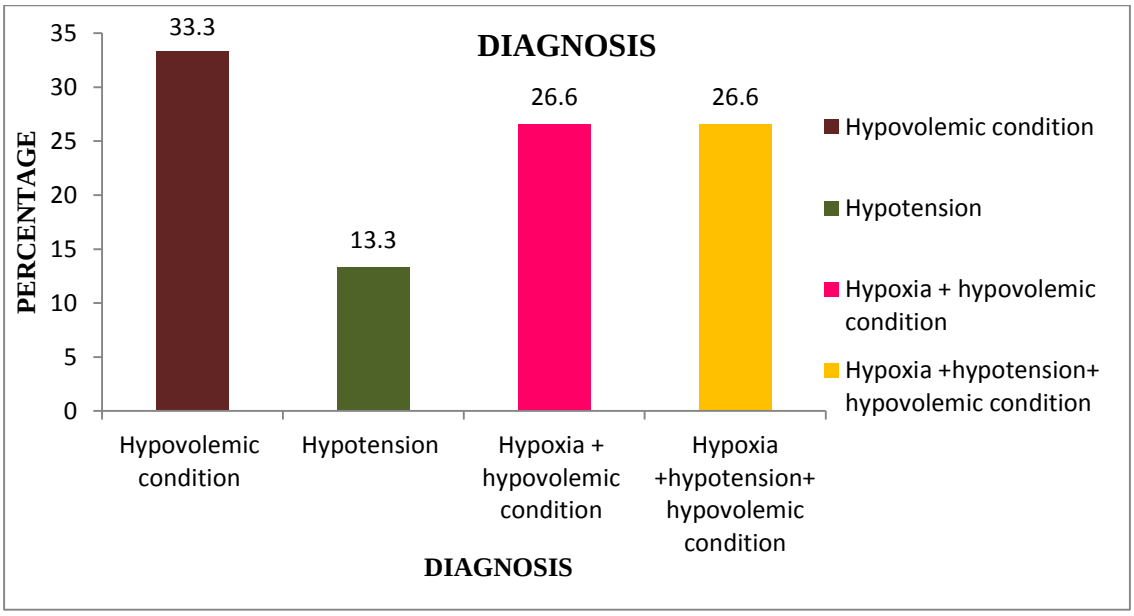

Fig.11: Distribution of patients based on diagnosis

Among the study population, 33.3% of patients diagnosed with the hypovolemic condition, 26.6% were hypotension, 13.3% of patients with the hypoxia+hypovolemic condition and 26.6% of patients with hypoxia+ hypotension+hypovolemic conditions.

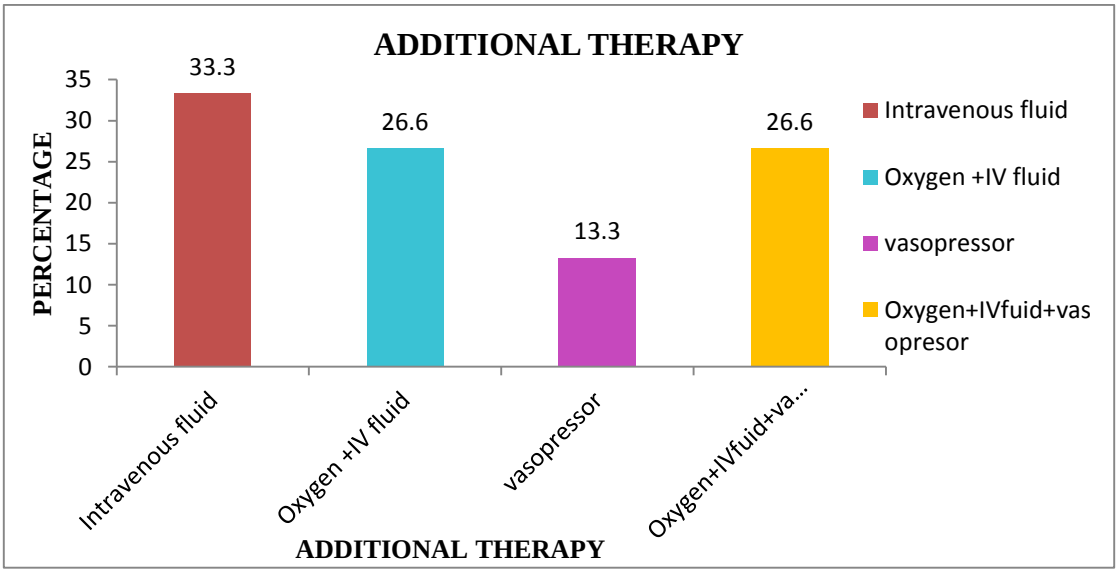

Fig. 12: Distribution of patients based on additional therapy

Among the 75 patients, 33.3% patients having the hypovolemic condition it treats with Intravenous fluid, 13.3% patients having hypotension were treated with Vasopressor 26.6% patients having hypoxia +hypovolemic condition were treated with oxygen +IV fluid therapy and 26.6% patients having a hypoxia+hypotension+hypovolemic condition were treated with vasopressor + oxgentherapy + IV fluid.

5. CONCLUSION

From the present study, it was suggested that the use of antibiotic therapy, especially a broad spectrum antibiotic was the most appropriate initial therapy. Majority of the population uses the broad spectrum antibiotic (Piperacilline-tazobactam), because of the increased anaerobic or aerobic coverage to kill the bacteria. In critically severe patients, a combination of two or more antibiotic is preferred. But there is no difference in overall mortality between monotherapy and combination therapy.

The most common causative organism for bacterial sepsis is a gram-negative organism. In a gram-negative organism, *Escherichia coli,* is the most.

From the study, it is clear that the time of treatment is very important in the treatment of sepsis. Administration of antibiotics within one hour from admission showed better prognosis when compared with treatment started after one hour, so the time must be taken into consideration for the treatment of sepsis.

In the study, the majority of the patients were administered with intravenous fluid therapy. Early goal-directed therapy is given in order to treat hypoxemia, hypotension, hypovolemic conditions of patients. Vasopressors are preferred in certain conditions were IV fluids fails to correct the circulatory dysfunctions.

6. ACKNOWLEDGMENTS

I would like to thank Dr. RN. Sharma, HOD-Department of General Medicine, Pushpagiri Medical College Hospital, Thiruvalla for his immense support and guidance for the success of the thesis work and also all the members of Pushpagiri College of Pharmacy.

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