



A STUDY ON ORGAN DYSFUNCTION IN PATIENTS WITH SYSTEMIC INFLAMMATORY RESPONSE SYNDROME (SIRS) IN A TERTIARY CARE HOSPITAL.

Dr Akula.Srinivas*

Final year post-graduate, Department of General Medicine, Santhiram Medical College and General Hospital, Nandyal. *Corresponding Author

Dr. Talikota Shankar Kumar

M.D Assistant professor, Department of General Medicine, Santhiram Medical College and General Hospital, Nandyal.

ABSTRACT

BACKGROUND: To identify the impaired organ dysfunction and study the relevance of SIRS in predicting the organ dysfunction among 100 patients who fulfilled the criteria for SIRS

AIM: 1. To identify the organ dysfunction among patients with systemic inflammatory response syndrome (SIRS).

2. To study the relevance of systemic inflammatory response syndrome predicting an impaired organ function.

MATERIALS AND METHODS: A six-month hospital-based prospective study was conducted in General Medicine, Santhiram Medical College, and General Hospital after approval from the Hospital Ethics and Research Committee.

The study population consisted of patients admitted to this hospital who met the inclusion criteria. The clinical and laboratory profiles of fifty of these patients were examined.

RESULTS: 35% of the patients belonged to the 36-55 age group, and 33% belonged to the 56-75 age group. The respiratory system was the most common site for the focus of infection leading to systemic inflammatory response syndrome (SIRS). (40%). Our study's most common organ dysfunction was the renal system (39%), followed by the respiratory system (32%). Single organ dysfunction was commonly observed (36.4%), followed by 2 & 3 organ dysfunctions in 21.8%. 4 and 5 organ dysfunctions were observed in 10.9% and 9.1% of patients, respectively. The average number of days of hospital stay of the patients was 6-10 days, and the mortality was 21% in our study. The increase in the age of patients was associated with higher mortality in our study. Patients with SIRS criteria 2 had minimal organ dysfunction, whereas SIRS criteria 4 had the maximum number of organ dysfunctions.

CONCLUSION: Those patients with an increase in SIRS criteria had higher impaired organ functions and higher mortality. Hence the documentation of SIRS criteria in acutely ill patients is of paramount importance as it helps predict the organ dysfunctions and the outcome of the patients.

KEYWORDS :

INTRODUCTION:

- Sepsis and its complications are major causes of morbidity and mortality. According to the Centers for Disease Control and Prevention, sepsis is becoming more common and is now the third leading cause of infection leading to death. Early detection of systemic inflammatory response syndrome (SIRS) in critically ill patients may help avoid the increased mortality, morbidity, and length of hospital stay associated with multiple organ failure. Although a few studies have looked at the progression of SIRS in patients admitted to the emergency department with a suspected infection, most SIRS research has focused on patients in intensive care units (ICU). The prevalence and utility of registered SIRS status in all acute medical patients are less well documented.
- This current study attempts to comprehend the utility of SIRS registration in our context.

AIMS AND OBJECTIVES:

- To identify the organ dysfunction among patients with systemic inflammatory response syndrome (SIRS).
- To study the relevance of systemic inflammatory response syndrome (SIRS) in predicting impaired organ function.

MATERIALS AND METHODS:

A Hospital-based Prospective study was conducted in the Department of General Medicine, Santhiram Medical College, and General Hospital for six months after approval from the Hospital Ethics and Research Committee.

The study population is patients admitted to this hospital with evidence of meeting inclusion criteria. The clinical and laboratory profile of 50 of these patients were taken and evaluated.

Sampling Technique And Sample Size:

All the selected patients fulfilling the inclusion criteria admitted in Santhiram medical college and general hospital, Nandyal, were taken for study after taking prior informed consent. The data was collected from approximately 50 patients who met the inclusion criteria. The body temperature, heart rate, respiratory rate, total Leucocyte count, and Differential count of all patients were documented on arrival. A detailed history and general physical examination were performed. These patients were evaluated for end-organ dysfunction, and necessary investigations were obtained. They will be followed until

discharge from the hospital and observe the impaired organ function and various factors affecting the outcome.

Inclusion Criteria:

All acutely ill patients aged more than 15 years diagnosed as systemic inflammatory response syndrome (SIRS)

Patients willing to give informed written consent and those willing to participate in the study.

Exclusion Criteria:

- Patients age less than and equal to 15 years.
- Patients who are not willing to give informed written consent.
- Patients who are not willing to participate in the study
- Acutely hospitalized medical patients with SIRS criteria <2.
- Patients with prior history of diabetes mellitus, hypertension and COPD.

Data Analysis:

The data will be collected from approximately 50 patients who will meet the inclusion criteria and analyzed through chi-square test and significance derived. The body temperature, heart rate, respiratory rate and total Leucocyte count and Differential count of all patients will be documented on arrival. A detailed history and general physical examination will be performed. These patients will be for end-organ damage, and necessary investigations will be obtained. They will be followed until discharge from the hospital and observe the impaired organ function and various factors affecting the outcome.

RESULTS:

35% of the patients belonged to the 36-55 age group, and 33% belonged to the 56-75 age group. Fifty-five patients had organ dysfunction. One organ dysfunction was commonly observed. 20 patients (36.4%) had 1 organ dysfunction, 12 (21.8%) had 2 & 3 organ dysfunctions each. 4 and 5 organ dysfunction was observed in 6 (10.9%) and 5 (9.1%) patients. In our study, 40 patients were admitted with SIRS criteria 3(40%), 30 patients were admitted with SIRS criteria 2 and 4 respectively, comprising 30% each. The respiratory system was the most common site for the focus of infection leading to SIRS (40%). Renal system contributed to 16%, blood 12%, skin 10%, GIT 7% and others 15% for patients diagnosed with SIRS. In our study, the most common organ dysfunction with SIRS was the renal system

39%, followed by respiratory 32%, hepatic 23%, cardiovascular system 17%, coagulation 9%, and the brain 9%. The most common pathogen in blood culture was Staphylococcus aureus, followed by enterobacter, klebsiella and acinetobacter.

In urine cultures, a Significant number of E. coli colonies was present in 8 (47.1%) patients. The other pathogens obtained was pseudomonas and meth resistant Staphylococcus aureus. Sputum culture revealed Staphylococcus aureus attributed to 6 (14.3%) patients. Sputum culture revealed MRSA in 4(9.5%) patients, streptococcus pneumonia in 2 (4.8%) and pseudomonas in 1(2.4) patients. In our study, the average number of days of hospital stay of the patients commonly was 6-10 days (49%). 41% of the patients had less than five days of stay in the hospital.

In the age group 56-75 years, 10 out of 33 patients died; among the 36-55 years group, 5 out of 35 died, and in the 16-35 years group, only 2 out of 25 were dead. It is statistically significant that an increase in the age of patients was associated with higher mortality in our study.

Table 1. Distribution Of Type Of Organ Dysfunction

Test Statistics						
	Respiratory	Renal	Hepatic	CVS	Coagulation	Brain
Chi-Square	12.960	4.840	29.160	43.560	67.240	67.240
df	1	1	1	1	1	1
Asymptotic Significance	.000	.028	.000	.000	.000	.000

In our study, the most common organ dysfunction with SIRS was the renal system 39%, followed by respiratory 32%, hepatic 23%, cardiovascular system 17%, coagulation 9%, and the brain 9%.

Table 2: SIRS Criteria And Organ Dysfunction

ORGAN DYSFUNCTION								
		NO					Total	
		1	2	3	4	5		
SIRS.C	2.00	Count	3	1	0	0	0	4
		% of NO	15.0%	8.3%	.0%	.0%	.0%	7.3%
	3.00	Count	14	6	2	1	0	23
		% of NO	70.0%	50.0%	16.7%	16.7%	.0%	41.8%
4.00	Count	3	5	10	5	5	28	
	% of NO	15.0%	41.7%	83.3%	83.3%	100.0%	50.9%	
Total	Count	20	12	12	6	5	55	
	% of NO	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.547	.003
N of Valid Cases		50	

In SIRS Cr.2, only 4 out of 30patients developed organ dysfunction. Three patients had one organ dysfunction, and one patient had two organs dysfunction. In SIRS Cr., 3 14 patients out of 40 had one organ dysfunction, 6 had two organs dysfunction, 2 had three organs dysfunction, and 1 had four organs dysfunction. Among patients with SIRS Cr., 4 3 had one organ dysfunction, 5 had two organs dysfunction,10 had three organs dysfunction, 5 had four organs dysfunction, and 5 had five organs dysfunction. This is statistically significant to note that patients with higher SIRS criteria had higher organ dysfunctions.

Table 3: SIRS Criteria And Final Outcome

FINAL OUTCOME					
		OUTCOME		Total	
		recovered	Dead		
SIRS.C	2.00	Count	30	0	30
		% of OUTCOME	38.0%	.0%	30.0%
3.00	Count	37	3	40	
	% of OUTCOME	46.8%	14.3%	40.0%	
4.00	Count	12	18	30	
	% of OUTCOME	15.2%	85.7%	30.0%	
Total	Count	79	21	100	
	% of OUTCOME	100.0%	100.0%	100.0%	

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.534	.000
N of Valid Cases		50	

In our study, patients with SIRS Cr. 2 had very good outcomes as all the patients recovered. Among patients with SIRS Cr 3. 37 out of 40 recovered. In patients with SIRS Cr. 4, 12 survived, and 18 died. This test is statistically significant. This shows the importance of SIRS criteria on admission, as patients admitted with higher SIRS criteria had a poorer prognosis.

DISCUSSION:

The incidence of SIRS in our study group was higher in the 36-55 years age group, closely followed by the 56-75 years age group. The sex distribution ratio was 1.12:0.88.

The observation noted above is in concordance with Guidet et al. 1. In their study on sepsis and organ dysfunctions, they observed that the incidence of sepsis steeply increases above the age of 50 years and frequently involves men.

The BASES study conducted by Silva E et al. 2 concluded that the main source of infection was the respiratory tract (65.6%) followed by urinary tract (5.6%), abdominal/surgical wound (4%), bloodstream (2.5%) and unknown sites (21.4%). Our respiratory study system was the most common site for the focus of infection leading to SIRS (40%). Renal system contributed to 16%, blood 12%, skin 10%, GIT 7% and others 15% for patients diagnosed with SIRS.

In 1995, Rangel-Frausto MS et al 3 published a prospective study. They observed that as the population of study progressed from SIRS to septic shock, increasing proportions of them had adult respiratory distress syndrome, acute renal failure, disseminated intravascular coagulation, and shock.

The most common organ dysfunction in our study was renal system 39%, followed by respiratory 32%, hepatic 23%, cardiovascular system 17%, coagulation 9% and the brain 9%. One organ dysfunction was commonly observed. 20 patients (36.4%) had 1 organ dysfunction, 12 (21.8%) had 2 & 3 organ dysfunctions each. 4 and 5 organ dysfunctions was observed in 6 (10.9%) and 5 (9.1%) patients.

IN THEIR STUDY, Vincent JL et al. 4 observed that 60% of patients had positive cultures (i.e., positive sputum, blood, wound, etc.). Older patients with sepsis are 1.31 times more likely to have a Gram-negative pathogen than younger patients. In our study, blood culture was positive only in 7 out of 88 patients (7.95%). The most common pathogen was staphylococcus aureus. Urine culture was obtained in 17 patients of the study group. A significant number of E. coli colonies was present in 8 (47.1%) patients. The other pathogens obtained were pseudomonas and meth resistant Staphylococcus aureus. Sputum culture was done in 42 patients. Staphylococcus aureus was attributed to 6 (14.3%) patients. Sputum culture revealed MRSA in 4(9.5%) patients, Streptococcus pneumonia in 2 (4.8%) and pseudomonas in 1(2.4) patients. Among the 100 patients admitted with SIRS, 79 patients recovered, and 21 patients died. In our study, the mortality rate was 21%

According to Salvo I et al. 5, mortality rates in patients with SIRS (26.5 per cent) and without SIRS or infection (24 per cent) were similar but rose to 36 per cent in patients with sepsis, 52 per cent in those with severe sepsis, and 81.8 per cent in those with septic shock. Silva E et al. 2 discovered a mortality rate of 21.8 per cent at the end of 28 days in their study.

Rangel-Frausto MS 3 and colleagues discovered that the median interval from SIRS to sepsis was inversely related to the number of SIRS criteria met by the patients (two, three, or all four). As the patient population progressed from SIRS to septic shock, an increasing proportion of patients developed disseminated intravascular coagulation, adult respiratory distress syndrome, disseminated intravascular coagulation, acute renal failure, and shock. Our study yielded similar results to the preceding studies.

We concluded that patients with higher SIRS criteria had higher organ dysfunctions. Patients with SIRS criteria 2 had minimal organ dysfunction, whereas SIRS criteria 4 had the maximum number of organ dysfunctions. We also noted that patients with an increasing

number of organ dysfunctions had a poorer prognosis than patients with fewer organ involvement. Among patients with one organ dysfunction, all recovered with no mortality, whereas patients with 4 and 5 organs dysfunction had 100% mortality. In our study, patients with SIRS Cr. 2 had very good outcomes as all the patients recovered. Among patients with SIRS Cr 3. 37 out of 40 recovered. In patients with SIRS Cr. 4, 12 survived, and 18 died. This was in concordance with the above studies that SIRS criteria are important for the prediction of the outcome.

CONCLUSION:

This study concluded that most of the clinical observations were per earlier studies. Our patients' common source of infection was the respiratory tract, followed by the renal system and blood. The renal system was the common organ dysfunction encountered, followed by the the respiratory and hepatic systems. Staphylococcus aureus was the causative pathogen frequently obtained in blood and sputum culture, whereas Escherichia coli was present in urine culture. The mortality was 21% in our study. The increase in the age of patients was associated with higher mortality. Patients with an increase in the number of SIRS criteria had an increased number of organ dysfunctions and poor outcomes.

Hence, the documentation of SIRS criteria in acutely ill patients is of paramount importance as it helps predict the impaired organ function and the patient's outcome.

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