



ORIGINAL RESEARCH PAPER

General Surgery

CLINICAL STUDY OF SYSTEMIC INFLAMMATORY RESPONSE SYNDROME IN SURGICAL INTENSIVE CARE UNIT PATIENTS

KEY WORDS: SIRS, Infection, Sepsis, Septicemia.

Dr. Mhase Akshay Junior Resident ,Department of Surgery

Dr. R. M. Kulkarni* M.S.,Professor and HOD, Department of Surgery. *Corresponding Author

ABSTRACT

Most of the patients who are admitted in the surgical intensive care unit (SICU) and have undergone any major surgery, major trauma or exposed to infections may develop Systemic inflammatory response syndrome (SIRS) . Early recognition of such patients is required for early identification and intervention in order to reduce the mortality and improve the survival rate of the patients. The thesis aims to study and evaluate about the patients of SIRS and their biological response.

INTRODUCTION :

This project deals with one of the leading cause of death in surgical intensive care unit.

Systemic inflammatory response syndrome (SIRS) is a non-specific condition and can be initiated by ischemia, trauma, inflammation and infection. SIRS was first described by Dr William R. Nelson of university of Toronto in 1983. In 1992, The American College Of Chest Physicians and Society Of Critical Health Care described the term SIRS as "Clinical expression of the host response to inflammation".^[1]

Clinically, the term SIRS is defined as two or more of the following criteria:-^{[2][3]}

- 1) Fever which is more than 38 degrees OR less than 36 degree celsius.
- 2) Heart rate of more than 90 beats per minute.
- 3) Respiratory rate of more than 20 breaths per minute.
- 4) Abnormal white blood cell count i.e. either >12000 per cubic mm or <4000 per cubic mm.

Most of the patients who are admitted in the SICU and have undergone any major surgery, major trauma or exposed to infections may suffer an acute phase inflammatory response. When these inflammatory response of the body to certain factors becomes uncontrollable, they are termed as Systemic inflammatory response of inflammation. This is one of the serious condition related to sepsis, septic shock, multiorgan failure and death.^{[4][5]} Early recognition of such patients is required for early identification and intervention in order to reduce the mortality and improve the survival rate of the patients. This study intends to evaluate patients of SIRS and their biological response.

AIM

Clinical study of Systemic Inflammatory Response Syndrome (SIRS) in surgical intensive care unit patients.

OBJECTIVES

1. To identify SIRS criteria.
Fever >38 degree C or <36 degree C
Heart rate >90bpm
Respiratory rate >20/min or PaCO2 <32mmhg
Abnormal WBC >12000/mm3 or <4000/mm3 or >10% bands
2. To examine the incidence, risk factors and etiology of SIRS.
3. To find the most common presenting complaints of SIRS.
4. To find out complications associated with SIRS.

MATERIAL AND METHODS :

This prospective study deals with 45 patients of SIRS, who were admitted to the SICU .Selection of cases was done on the basis of SIRS criteria as follows:-

A) Inclusion criteria-

- Patient admitted in surgical Intensive care unit with complaints
- Body temperature <36 degree Celsius or>37 degree Celsius

- Tachycardia (heart rate >90 bpm)
- Tachypnoea(RR>20bp)
- Abnormal WBC >12000/cubic mm or 4000/cubic mm

B) Exclusion criteria

- Patient on immunosuppressants
- Patients on steroids
- Patient with pre existing malignancies
- Patient on extremes of ages.

RESULT :

It was found that, Out of 450 patients, 45 patients had incidence of SIRS.

In this study , prevalence of SIRS is 10 % with peak incidence in age group of 31 - 60. i.e: 28 patients (62 %).

Females (24 %) were less affected than males (76 %).

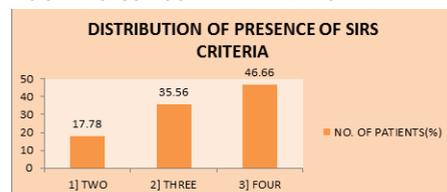
Diabetes was the most common risk factor. Septicaemia was documented as the most common complication in SIRS patients (26 %).

Majority of the mortality was because of septicaemia and septicaemic shock.

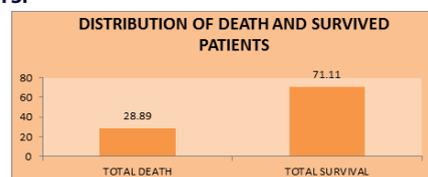
Abnormal Respiratory Rate was found in 41 patients (91 %) and Raised total leucocyte count in 42 patients (93 %) which is the most common presenting SIRS Criteria.

23 cases (51 %) cases showed infectious etiological factor. 17 patients (37.78 %) showed raised level of C - reactive protein, out of which only 5 cases (29.41 %) had infectious etiology. Mortality rate was 28.89 %, most of which was due to septicaemia and septic shock.

GRAPH 1: DISTRIBUTION OF PRESENCE OF SIRS CRITERIA OUT OF FOUR IN SICU POSITIVE PATIENTS.



GRAPH 2 : DISTRIBUTION OF DEATH AND SURVIVED PATIENTS.



DISCUSSION: Total of 450 patients were admitted in SICU during the study period of 2 years, out of which 45 cases were diagnosed as SIRS from different age group and included in the study. 33 were managed by surgical intervention and 12 cases conservatively.

The incidence of SIRS in this study was 10 %. Similar studies by W. J. Sibbald et. al^[6] and Pittet D et. al^[7] found 74 % and 93 % incidence of SIRS in 170 patients respectively. Another similar study by Pal Comstedt^[8] found 35 % incidence of SIRS in 437 patients.

Out of 45, 8 patients fulfilled the 2 criteria's (17.78 %), 16 patients fulfilled the 3 criteria's (35.55 %) and 21 patients fulfilled all 4 criteria's of SIRS (46.66 %). Similar study by Tony Dremsizov^[9] found that 18 % patients fulfilled the 2 criteria's, 21 % patients fulfilled the 3 criteria's and 17 % patients fulfilled the all 4 criteria's of SIRS. It was observed that out of 45 patients, 13 died during study of which 8 patients fulfilled all four Criteria's of SIRS. Based on this it can be stated that patients who fulfilled all four Criteria's of SIRS have more risk of mortality based on this study.

SIRS occurs in all age groups. The age spectrum in our clinical study ranged from 10 – 70 years. The study showed peak incidence in the age spectrum of 31 - 60 years. i.e: 28 patients (62 %). Which is comparable with previous study by D.Mokart et. al.^[10] and found that the age group ranges from 43–62 years.

In the present study the number of male patients i.e : 34 (76 %) were more as compared to female i.e:11 (24 %) patients. Similar studies by G.R.JONES et. al^[11] found that number of male patients was higher than females (M > F : 29 > 23) and Yuhei Yoshimoto et.al^[12] found that number of female patients was higher than males. (F > M : 63 > 38)

The findings of this study are similar with the finding of Amelia.K. Boehme et .al^[13] in respect of Heart Rate .

In the present study, it was found that infection as an etiological factor was present in 23 patients out of 45 (51.1 %). However, in similar study done by Merete Storgaard et. al^[14] and Timothy Horeczko, MD^[15] found 43 % and 26 % infectious etiological factor, respectively.

Horeczko et.al^[15] in his study, reported diabetes to be most common risk factor for SIRS i.e: 5,50,488 cases (85.1 %) Which is similar in our study i.e : 16 cases (35.55 %). However, similar study done by Niren Kapoor, MD. PhD^[16] in his study reported hypertension to be most common risk factor i.e : 36 cases (81.8 %).

Diabetes in critical illness, such as sepsis, severe sepsis and SIRS, is not only marker of severity of illness and the predictor of poor outcome, but also has many kinds of adverse effects on vital organ. One such adverse effect on the innate immune system impairs the ability of the host to combat infection , resulting in reduced neutrophilic activity such as chemotaxis, formation of reactive oxygen species and phagocytosis of bacteria , despite accelerated diapedesis of leukocytes into peripheral tissue, as well as specific alteration in cytokine pattern with increased concentration of early pro - inflammatory cytokines, tumor necrosis factor alpha and interleukin - 6 and a reduction of endothelial nitric oxide formation.

TABLE 1 :COMMON RISK FACTORS IN VARIOUS STUDIES.

STUDY	MOST COMMON RISK FACTOR	IN PERCENTAGE
Horeczko et.al	Diabetes	85.1
Niren Kapoor, MD. PhD	Hypertension	81.1
Present study	Diabetes	35.55

In the present study, it was found that 12 (26%) patients had developed septicaemia in SICU and sepsis was associated with blood stream infection. However, in similar study done by Pal Cosmstedt et. al^[14], he documented infection (43 %) which further developed into septicaemia.

Pedro Pova^[17] in his study, reported that C- reactive protein response is non - specific and never used as single diagnostic tool, however it is very helpful in several disease and unquestionable in infectious diseases. However, in the present study shows significant rise in C-reactive protein value in 17 patients (37.78 %), out of which only 5 patients had infectious etiological factor.

Timlthy. et. al^[15] in his study, reported mean stay of SIRS diagnosed patients in SICU was 3 - 6 days. However, in the present study shows mean stay in SICU of SIRS diagnosed patients is 8 - 9 days.

Dong Sun et. al^[18] in his study, reported that individual mortality rate depending on presence of SIRS Criteria which is similar to our study.

TABLE 2 : MORTALITY RATE IN RELATION TO SIRS CRITERIA.

PRESENCE OF SIRS CRITERIA	MORTALITY RATE RESPECTIVE TO NO.OF SIRS CRITERIA IN (DONG SUN STUDY)	MORTALITY RATE RESPECTIVE TO NO.OF SIRS CRITERIA IN (PRESENT STUDY)	NO. OF DEATH WHO MET THE CRITERIA IN PRESENT STUDY
TWO	16.3	12.5	1
THREE	20.5	25	4
FOUR	26.9	38.09	8
			TOTAL : 13

Hence, it can be stated that the patients who fulfilled all four Criteria's of SIRS have more risk of mortality based on this study which is similar to study of Dong Sun et al^[18] .

Frequency of mortality rate in our study 28.89 % i.e:13 cases out of 45 cases. Mortality that has occurred during various studies has been as follows,

Mortality rate in the present study is 28.89 % which is comparable with the other study group M. J. Bown et.al^[19] with 15 %, Pittet D et.al^[7] with 8.2 %, Kirsi - Maija Kaukonen et .al^[20] with 36.1 % and Simrandeep Singh^[21] with 26 % .

CONCLUSION :

SIRS is most common emergency in SICU. From the clinical point of view, SIRS status in SICU provides information for decision making and management of patients. In our hospital, prevalence of SIRS is 10 % with peak incidence in age group of 31 - 60. i.e: 28 patients (62 %). Females (24 %) were less affected than males (76 %) which might be because of mitigation aspect of oestrogen. During study, it was documented that mortality rate and their relationship with presence of SIRS criteria, which was used as predictor of SIRS outcome and mortality rate. In my study, it was observed that 13 patients died during study. Out of these, 8 patients fulfilled all four Criteria's of SIRS. Hence, it can be stated that patients who fulfill all four Criteria's of SIRS have more risk of mortality based on this study.

Presence of co - morbidities probably affect the outcome of SIRS. Example: Diabetes, Hypertension. SIRS is highly associated with presence of infection, however in the study, it was reported that 51 % cases has infectious etiology. C- reactive protein level is non - specific and is never used as a single diagnostic tool, however it is very helpful in several disease conditions and unquestionable in infectious disease. However, in present study it showed significant rise in 17 patients (37.78 %) out of which only 5 cases (29.41 %) had an infectious etiology. Mortality rate in present study was 28.89 %. Most of the mortality was because of septicaemia and septicaemic shock. It was documented during study that increase in number of SIRS criteria met was associated with worse outcome in critically ill patients, regardless of infection. In our study, we have found that the prevalence of SIRS to be a predictor of infection, severity of disease, organ failure and is a better tool to assess the outcome of intensive care unit patients.

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