

Incidence of Systemic Inflammatory Response Syndrome in Patients Admitted in Surgical Intensive Care Unit and Their Outcome

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Abstract

Introduction: Systemic inflammatory response syndrome (SIRS) is serious condition involving immunity system of the body and affects all body systems, which can be infectious or noninfectious insult. Although the definition of SIRS refers to it as an inflammatory response, it actually has pro- and anti-inflammatory components.

Aims and Objectives: The aim of our study is to observe the incidence and outcomes of patients with SIRS admitted in surgical intensive care unit (SICU), due to various cause.

Materials and Methods: This prospective study was conducted in the Department of Surgery, Sanjay Gandhi Memorial Hospital and Associated Shyam Shah Medical College, Rewa, Madhya Pradesh, from 1st August 2015 to 31st July 2016 (12 months). All patients admitted in SICU due to various causes were included in this study.

Results: Among total 1101 SICU admission during 12 months of the study period, 712 patients were developed SIRS.

Conclusion: SIRS is a serious condition which may be worst if no intervention was done in the form of severe sepsis and multiple organ dysfunction syndrome. If we early diagnosed, SIRS prevents patients' morbidity and mortality.

Keywords: Inflammatory pathophysiology, Multiple organ dysfunction syndrome, Peritonitis, Post-operative, Surgical intensive care unit, Systemic inflammatory response syndrome

INTRODUCTION

Systemic inflammatory response syndrome (SIRS) was first described by Dr. William R. Nelson. There was intent to encourage a definition which dealt with the multiple (rather than a single) etiologies associated with organ dysfunction and failure following a hypotensive shock episode. The active pathways leading to such pathophysiology may include fibrin deposition, platelet aggregation, coagulopathies, cytokinin release¹ and leukocyte liposomal release. The implication of such a

definition suggests that recognition of the activation of one such pathway is often indicative of that additional pathophysiologic processes are also active and that these pathways are synergistically destructive. The clinical condition may lead to renal failure, respiratory distress syndrome, central nervous system dysfunction, and possible gastrointestinal bleeding.

Criteria for SIRS were established in 1992 as part of the American College of Chest Physicians/Society of Critical Care Medicine.

SIRS is an inflammatory state affecting the whole body organ dysfunction,² mostly a response of the immune system to infection, but not always. Hence, it is related to sepsis, a condition in which individuals meet criteria for SIRS and have a known infection.³ SIRS may be the body's response to an infectious or noninfectious insult. Although the definition of SIRS refers to it as

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an “inflammatory” response, it actually has pro- and anti-inflammatory components. The syndrome is a clinical response to an inflammatory, infectious, or tissue traumatic stimulus. SIRS occurs if at least two of the following criteria are present:

1. Hyperthermia $>38^{\circ}\text{C}$ or hypothermia $<36^{\circ}\text{C}$,
2. Heart rate (HR) $>90/\text{min}$,
3. Respiratory rate (RR) $>20/\text{min}$ or $\text{PaCO}_2 <32 \text{ mmHg}$,
4. White cell count (WCC) $>12,000/\mu\text{L}$ or $<4000/\mu\text{L}$, or $>10\%$ immature white cells.

SIRS can be incited by ischemia, inflammation, trauma, infection, or a combination of several “insults.”

SIRS is not always associated with infection. While not universally accepted, some have proposed the terms “severe SIRS^{4,5}” and “SIRS shock^{4,5}” to describe serious clinical syndromes that are not infectious in nature and thus cannot be labeled according to the various sepsis definitions.⁴

These terms suggest organ dysfunction⁶ or refractory hypotension not related to an infectious etiology, but rather an ischemic, traumatic, or inflammatory process.

When SIRS progresses to multiple organ failure,⁷ the mortality⁷ becomes high, ranging from 30% to 80% depending on the number of failed organs.⁷

MATERIALS AND METHODS

The study was carried out in 1101 patients admitted to surgical intensive care unit (SICU), Department of Surgery, Sanjay Gandhi Memorial Hospital and associated with Shayam Shah Medical College, Rewa, Madhya Pradesh from 1st August 2015 to 31st July 2016 with the study period of 12 months. All patients were admitted to SICU with the various causes such as head injury, blunt trauma abdomen and pelvis, post-operative emergency and elective, renal dysfunction, sepsis, and respiratory distress. On admission, assessment of patients using parameters, such as pulse, blood pressure, saturation, urine output, and Glasgow coma scale made then resuscitation of patients done with IV fluids, antibiotics, analgesics. Moreover, in indicated patients, inotropic agents, blood transfusion, oxygenation, intubation, ventilator support, and emergency procedures such as central line, intercostal drainage, and intraperitoneal drainage were done. Then, investigation was done and made the diagnosis of SIRS by following parameter:

1. Hyperthermia $>38^{\circ}\text{C}$ or hypothermia $<36^{\circ}\text{C}$,
2. HR $>90/\text{min}$,
3. RR $>20/\text{min}$ or $\text{PaCO}_2 <32 \text{ mmHg}$,
4. WCC $>12,000/\mu\text{L}$ or $<4000/\mu\text{L}$, or $>10\%$ immature white cells.

Two or more above variables present in a patient diagnosed as SIRS.

OBSERVATION AND RESULTS

In our study, 1101 patients were observed in which 778 (70.67%) were male and 323 (29.33%) were female, admitted in SICU with various cause, with various age groups.

Of 1101 patients, 778 were male (70.67%) and 323 were female (29.33%) (Table 1).

It is evident from the Table 2 that out of 1101 patients admitted in SICU majority were of 20-29 years group (19.26%) followed by 30-39 years group (13.99%). Patients of these groups are physically active.

It is evident from Table 3 that majority of patients were of head injury (27.97%) followed by patients with post-operative complications (23.43%) and peritonitis (19.39%).

As shown in Table 4, SIRS was present in 64.67% of total SICU admission.

As shown in Table 5, among the SIRS patients 17.42% patients were undergoing in MODS.³

DISCUSSION

In this study, male patients’ incidence was 70.67% and female 29.33% in total SICU patients admission,

Table 1: Sex-wise distribution of patients admitted in SICU

Sex	N (%)
Male	778 (70.67)
Female	323 (29.33)
Total	1101 (100)

SICU: Surgical intensive care unit

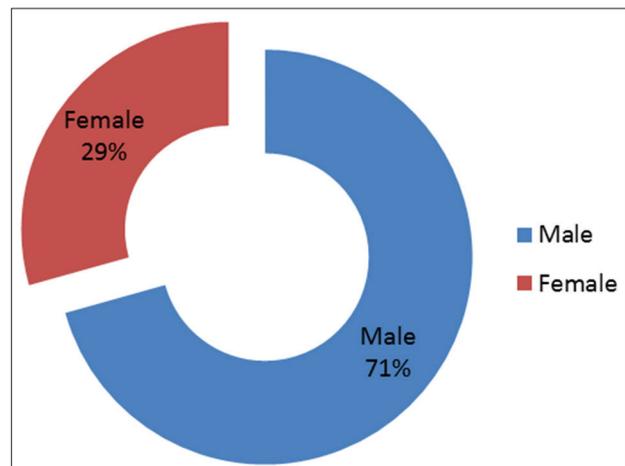


Table 2: Age-wise distribution of patients in SICU

Age group	N (%)
0-9	95 (8.63)
10-19	154 (13.99)
20-29	212 (19.26)
30-39	154 (13.99)
40-49	148 (13.43)
50-59	95 (8.63)
60-69	117 (10.63)
70-79	74 (6.72)
80-89	52 (4.72)
Total	1101 (100)

SICU: Surgical intensive care unit

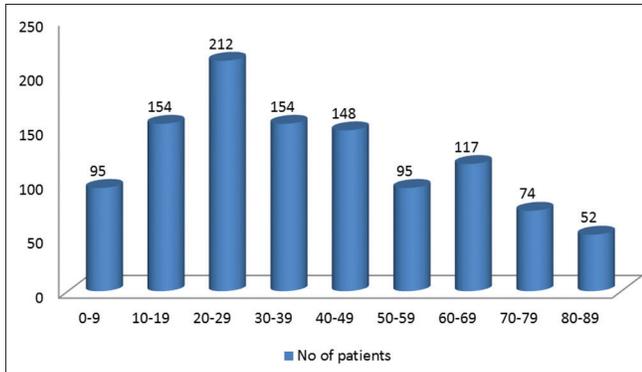
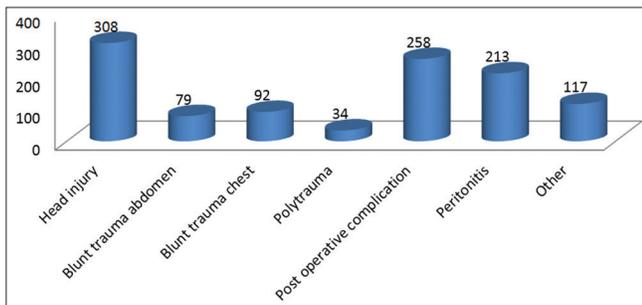


Table 3: Diagnosis-wise distribution of patients in SICU

Diagnosis	N (%)
Head injury	308 (27.97)
Post-operative complication	258 (23.43)
Peritonitis	213 (19.35)
Blunt trauma chest	92 (8.35)
Blunt trauma abdomen	79 (7.1)
Polytrauma ⁹	34 (3.09)
Other	117 (10.63)
Total	1101 (100)

SICU: Surgical intensive care unit



which is comparable to the study of Bolaji and Kolawole (2005) - 62.7% and 37.3%, respectively.

In the present study, the maximum number of patients admitted were in the age group of 20-29 years, which is 19.26% comparable with other studies of Bolaji and Kolawole (2005) - 20%, Onyekwulu and Anya (2015) - 21.5%, and Poluyi et al. (2016) - 23.65%. This is because of physically active age group.

Table 4: Distribution of patients according to SIRS

SIRS	N (%)
Present	712 (64.67)
Absent	389 (35.33)
Total	1101 (100)

SIRS: Systemic inflammatory response syndrome

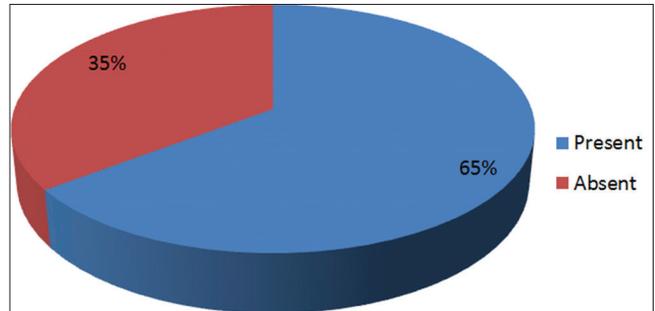
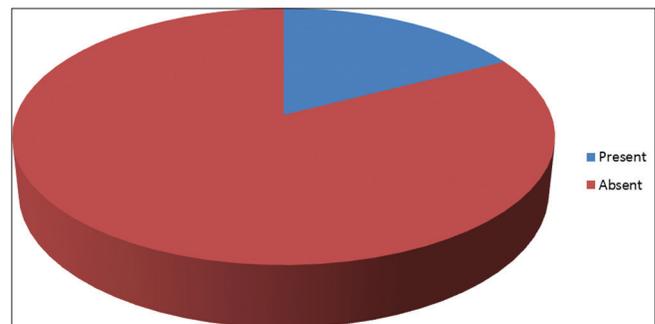


Table 5: Distribution of SIRS patients who developed MODS

MODS	N (%)
Present	124 (17.42)
Absent	588 (82.58)
Total	712 (100)

SIRS: Systemic inflammatory response syndrome, MODS: Multiple organ dysfunction syndrome



Mostly, patients admitted in SICU were with the diagnosis of neurosurgical causes - 27.97%, and the second common cause of admission in SICU is post-operative patients - 19.35%. According to Onyekwulu and Anya (2015), this incidence was 41.2% and 16.7%, respectively. This is because of rural parts of India have the bad shape of roads which cause road traffic accidents and poor hygiene which causes poor general condition of patients.

In our study, 712 patients diagnosed as SIRS 64.67% of total SICU patients, which is comparable with the study of Simrandeep Singh and Pradeep Singh (2009) 62% and Rangel-Frausto et al. 68%.^{4,5} Of 712 SIRS patients, 124 patients were undergoing to multiple organ dysfunction syndrome (MODS) and expired.⁸

CONCLUSION

SIRS is a serious condition which may be worst if no intervention was done, in the form of severe sepsis

and MODS. If we early diagnosed, SIRS prevents patients' morbidity and mortality.² When SIRS is present, it prompted us to look for additional foci of infection (e.g., wound, UTI, and lungs) or a second hit as early as possible and suggested that one should not wait for the normal duration of response before initiating this search. In our study, common patients admitted in SICU diagnosed as SIRS were head injury followed by post-operative patients. In head injury, the common age group was 20-29 years due to physical active groups.

REFERENCES

1. Bone RC. Toward a theory regarding the pathogenesis of the systemic inflammatory response syndrome: What we do and do not know about cytokine regulation. *Crit Care Med* 1996;24:163-72.
2. Talmor M, Hydo L, Barie PS. Relationship of systemic inflammatory response syndrome to organ dysfunction, length of stay, and mortality in critical surgical illness. *Arch Surg* 1999;134:81-7.
3. Shapiro N, Howell MD, Bates DW, Angus DC, Ngo L, Talmor D. The association of sepsis syndrome and organ dysfunction with mortality in emergency department patients with suspected infection. *Ann Emerg Med* 2006;48:583-90, 590.e1.
5. Pittet D, Rangel-Frausto S, Li N, Tarara D, Costigan M, Rempe L, *et al.* Systemic inflammatory response syndrome, sepsis, severe sepsis and septic shock: Incidence, morbidities and outcomes in surgical ICU patients. *Intensive Care Med* 1995;21:302-9.
4. Rangel-Frausto MS, Pittet D, Costigan M, Hwang T, Davis CS, Wenzel RP. The natural history of the systemic inflammatory response syndrome (SIRS). A prospective study. *JAMA* 1995;273:117-23.
6. Beal AL, Cerra FB. Multiple organ failure syndrome in the 1990s. Systemic inflammatory response and organ dysfunction. *JAMA* 1994;271:226-33.
7. Manship L, McMillin RD, Brown JJ. The influence of sepsis and multisystem and organ failure on mortality in the surgical intensive care unit. *Am Surg* 1984;50:94-101.
8. Rhodes A, Phillips G, Beale R, Cecconi M, Chiche JD, De Backer D, *et al.* The surviving sepsis campaign bundles and outcome: Results from the international multicentre prevalence study on sepsis (the IMPReSS study). *Intensive Care Med* 2015;41:1620-8.
9. Faist E, Baue AE, Dittmer H, Heberer G. Multiple organ failure in polytrauma patients. *J Trauma* 1983;23:775-87.

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