



INCIDENCE OF SUSPECTED SEPSIS IN NOSOCOMIAL PATIENTS WITH DIABETES AND COMPARISON BETWEEN EARLY INFLAMMATORY MARKERS

¹Amrita Roy, ²Sudip Banerjee

1 & 2 Department of Biochemistry Techno India University

Abstract :

Hospital Acquired Infections are mostly common among comorbid patients suffering from Diabetes mellitus. The early indication before culture can come from Inflammatory markers which were evaluated in our study. The study was designed to find the incidence of suspected sepsis in nosocomial patients with diabetes and comparison between early inflammatory markers. : In the 2 year study (March 2021-March 2023), From blood Enterobacteriaceae isolates were 27. 51.1% produced ESBL only. 13.3% were coproducers. Only 5.1% produced AmpC enzyme only. All coproducers were 100% sensitive to carbapenems only and the patients showed therapeutic response too. Among the Inflammatory markers IL 6 and IL 10 showed better identification among blood stream infected gram negative patients than CRP , PCT and TNF alpha. The area under the curve of receiver operating characteristic curve for septic shock prediction were 0.63 , 0.78 , 0.88 , 0.86 , 0.89 for CRP , PCT , IL 6 , IL 10 , THF alpha respectively. Serum Malonaldehyde (MDA) has marked increase among non survivors suggesting MDA can be a good marker for predicting more grave prognosis and empirical survival actions can be undertaken for such patients. Due to admission in Critical Care units for various diseases, the MDA level increases due to increase in stress.

Index Terms - Nosocomial patients, Diabetes mellitus , Inflammatory markers , Procalcitonin , Malonaldehyde

INTRODUCTION:

Hospital Acquired Infections are mostly common among comorbid patients suffering from Diabetes mellitus. The early indication before culture can come from Inflammatory markers which were evaluated in our study. Over last 20 years, the occurrence of hospital acquired bacterial and fungal infections (i.e., invasive bacterial and fungal infections appearing in a hospital-associated setting) has documentarily increased in number. The ground reason for the rise of these infections includes geriatric populations in countries with advanced medical infrastructure and facilities, ultimately in incidence of many carcinomas. Continuously autoimmune diseases are increasing, organ transplantation surgeries including bone marrow transplantation surgeries are attributing to increased incidence of fungal infections in India. Much of the clinical, epidemiological, and cost literature on fungal infections focuses on the occurrence in patients with three comorbid diagnoses: HIV/AIDS, neoplasia, or transplantation [1].

Common scenario in all hospital acquired fungal infections are the difficulty in establishing the real diagnosis due to lack of suspicion and awareness of increasing fungal infections among intensive care clinicians. Hence, stress has been given on deciding early empiric therapy according to prevalence and probable antibacterial and antifungal susceptibility in patients of that particular healthcare infrastructure where clinically suspected cases of having a bacterial and fungal infection are admitted, or on prophylaxis for the highest risk patients.

In contrast to the lack of progress in diagnosis, major advances in the medical therapy of nosocomial bacterial and fungal infections have been made in recent years, with the introduction and empirical extensive use of Second line antibiotics and lipid-associated amphotericinB triazole antifungals, and echinocandin class of antifungals.

OBJECTIVE: The study was designed to find the incidence of suspected sepsis in nosocomial patients with diabetes and comparison between early inflammatory markers.

MATERIAL AND METHODS: The patients Blood was collected for culture of suspected sepsis patients admitted in hospital for more than 5 days and was having no such features during admission. Their serum level of Procalcitonin (PCT), C reactive Protein(CRP), IL 6, IL 10, TNF alpha within 6 hour of onset of fever to evaluate the better sepsis identification marker. The culture outcome of the above patients were also evaluated in the study with bacterial and fungal isolates and their antibiotic and antifungal susceptibility pattern as per CLSI 2021 Guidelines.

RESULTS: In the 2 year study (March 2021-March 2023), From blood Enterobacteriaceae isolates were 27. 51.1% produced ESBL only. 13.3% were coproducers. Only 5.1% produced AmpC enzyme only. All coproducers were 100% sensitive to carbapenems only and the patients showed therapeutic response too. Among the Inflammatory markers IL 6 and IL 10 showed better identification among blood stream infected gram negative patients than CRP, PCT and TNF alpha. The area under the curve of receiver operating characteristic curve for septic shock prediction were 0.63, 0.78, 0.88, 0.86, 0.89 for CRP, PCT, IL 6, IL 10, TNF alpha respectively. Serum Malonaldehyde (MDA) has marked increase among non survivors suggesting MDA can be a good marker for predicting more grave prognosis and empirical survival actions can be undertaken for such patients. Due to admission in Critical Care units for various diseases, the MDA level increases due to increase in stress.

Comparison between survivors and non-survivors septic patients – Derived score and Inflammatory Markers			
	Total N=96	Survivors N=42	Non-Survivors N=54
Age (Years)	63	61	65
Gender	96	42	54
APACHE II	13	12	15
SOFA	7	5	9
PT (s)	16	16	18
ISTH	3	3	4
SIC	4	4	5
PCT	22	10	31
CRP	51	56	82
IL - 6	215	275	525
IL - 10	23	24	32
TNF α	178	182	232

Table 1

Comparison between survivors and non-survivors septic patients Derived score and Inflammatory Markers

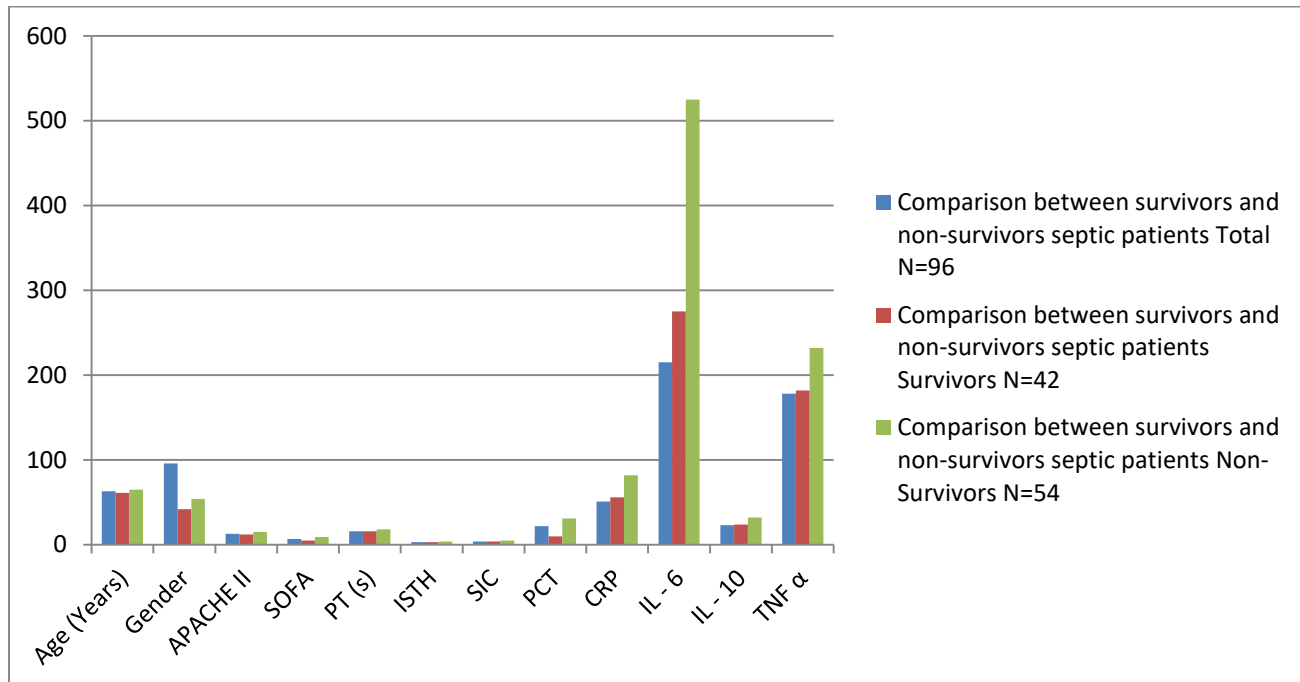


Figure 1

Comparison between survivors and non-survivors septic patients – Inflammatory Markers			
	Total N=96	Survivors N=42	Non-Survivors N=54
SIC	4	4	5
PCT	22	10	31
CRP	51	56	82
IL - 6	215	275	525
IL - 10	23	24	32
MDA	68	45	91
TNF α	178	182	232

Table 2

Comparison between survivors and non-survivors septic patients – Inflammatory Markers

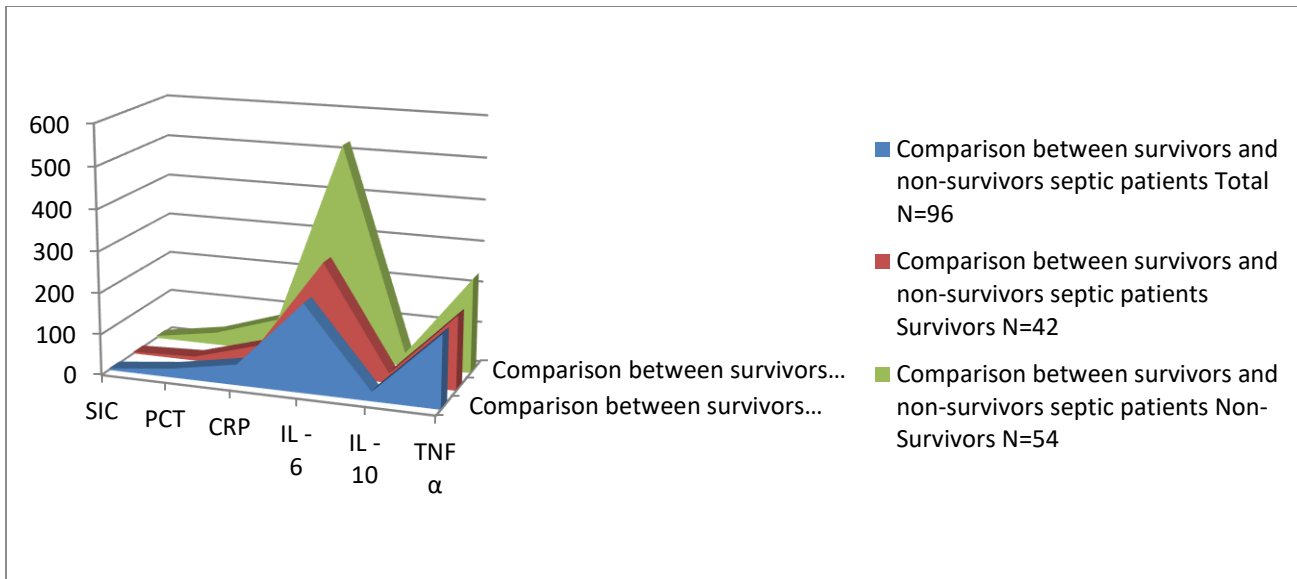


Figure 2

Sex wise distribution of clinically suspected and culture positive septicaemia in E.O.S and L.O.S group								
Sex	Early Onset Sepsis			P value	Late Onset Sepsis			P value
	Clinical	Culture Positive			Clinical	Culture Positive		
			Percentage				Percentage	
Male	23	21	67.7%		38	21	71.08%	
Female	25	12	60%		20	13	62.7%	
Total	48(27.5%)	33	64.7%	0.01	58(72.4)	34	67.9%	0.01

Table No. 3

P value – 0.04

Clinical presentation of Neonatal Septicaemia					
S.N	Diagnosis	EOS	Percentage	LOS	Percentage
1	Resp distress	15	29.4 %	31	23.1%
2	Hypo or Hyperthermia	11	21.5%	21	15.6%
3	Jaundice	1	1.9%	7	13.72%
4	Seizure	3	5.8%	5	3.7%
5	Hypotension or Tachycardia, Brachycardia	4	7.8%	7	5.2%
6	Reduced activity	9	17.6%	31	23.1%
7	Feeding intolerance	5	9.8%	29	21.6%
8	Redness of umbilicus extending to skin	3	5.8%	3	2.2%
	Total	51	100%	134	100%

Table No. 4

Resistance pattern of gram positive organisms											
Gm (+)		CXM	CTX	AMC	OF	SC	AK	AZM	Va	Le	G
Staph (+)	33	32	32	24	16	20	3	31	S	5	8
Staph (-)	14	9	8	8	5	7	2	11	S	5	5
Entrococcus	8	5	6	3	3	4	0	6	S	2	3
Total	55	46	46	35	24	31	5	48		12	16
Percentage		83.60 %	83.60 %	63.60 %	43.60 %	56.30 %	9.09 %	87.27 %		21.80 %	29.09 %

Table No. 5

Resistant pattern of Gram negative organisms												
Gm (-)		CXM	CTX	AMC	OF	Sc	AK	AZM	G	Imp	Le	Va
Kleb	18	13	13	12	6	7	3	8	8	3	6	
E. coli	10	7	7	7	3	4	1	6	3	2	2	
Citrobacter	7	5	5	5	3	2	1	4	2		1	
Acinetobacter	2	2	2	1	2	1	1	2	1		1	
Proteus	9	7	7	6	3	3	2	3	3		2	
Pseudomonas	5	5	5	5	4	4	2	5	3	2	4	
Total	51	39	39	36	21	21	10	28	20	7	16	
Percentage		76.47 %	76.47 %	70.58 %	41.17 %	41.17 %	19.60 %	54.90 %	39.21 %		31.37 %	

Table No. 6

Resistant pattern of Candida sp.				
Drugs	Ketoconazole	Fluconazole	Itraconazole	Voriconazole
Candida sp.	20(55.5%)	8(44.4%)	17(94.4%)	8(44.4%)

Table No. 7

DISCUSSION: Taking into account its grave guess, early Identification of serious sepsis and septic shock in the ICU setting is of principal significance. In light of this, the purpose of this study was to determine whether or not the inflammatory markers CRP and NLR could be used to predict the onset of sepsis in critically ill patients. Ten patients without sepsis and 30 patients with varying degrees of sepsis were recruited for the study.

Our review showed that there was an exceptionally huge expansion in NLR levels in patients with sepsis contrasted and the benchmark group with great demonstrative execution communicated by the high responsiveness and explicitness. These outcomes are in accordance with numerous past reports [8,9,10,11]. Besides, the current review uncovered essentially higher CRP levels in sepsis patients as contrasted and controls as per the investigations of Li et al. [12], Khajuria et al. [9], and Westerdijk et al. [11].

What's more, our review perceived a huge relationship between expanded NLR and CRP levels and expanded the seriousness of sepsis. These information are in similarity with different examinations [9,13]. Interestingly, the investigation of Arif et al. [14] neglected to distinguish any connection between sepsis seriousness and CRP levels.

APACHE II and SOFA sepsis scores were found to be significantly and positively correlated with NLR and CRP levels in our study. In like manner, the investigation of Arif et al. [14] exhibited that NLR has a positive

relationship with APACHE II scoring framework. Furthermore, Khajuria et al. [9] saw that CRP and NLR in various levels of sepsis were in relationship with the worth of APACHE II score. In a similar vein, Velissaris et al. [15] showed a huge connection between the NLR and the sepsis prognostic scores Couch and APACHE II. Be that as it may, Pantzaris et al. [16] didn't track down such connection.

Additionally, our research supported the findings of Liu et al., who found a significant correlation between sepsis severity and neutrophil count [17], who noticed that patients with extreme sepsis or septic shock will generally have higher gauge levels of neutrophil count when contrasted and patients with sepsis

CONCLUSION: The inflammatory markers can give early prediction for Septic shock and contribute for initiation of empirical therapy and saving life of the patient but for specific antibiotic treatment utility of culture identification and MIC determination cannot be ignored. Sepsis continues to place a heavy impact on global health systems. However, in the past 20 years, more has been done than ever before in terms of understanding its pathogenesis and formulating comprehensive guidelines for its efficient management. There hasn't been a cure-all for the handling of septic shock. However, quick action plans like this proper use of antibiotics and hemodynamic support Using a ventilator and transfusing blood products wisely have significantly contributed to reducing morbidity and mortality. Despite still being in the early stages of development, the utilisation of more modern, precise modalities such immunomodulators offers a potential area of study. The development of simple yet effective clinical techniques for the assessment and prognostication of sepsis includes scores like the APACHE-II and sequential organ failure assessment (SOFA). The most recent guidelines rejected the previously accepted SIRS criterion in favour of a more nuanced classification based on multiorgan dysfunction and SOFA scores, which is still a contentious topic. In order to diagnose sepsis more accurately for clinical, epidemiological, and hospital coding purposes, this is hoped to happen. It remains to be seen whether healthcare facilities and providers will accept and use these recommendations more widely.

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